

Speaking on the Record

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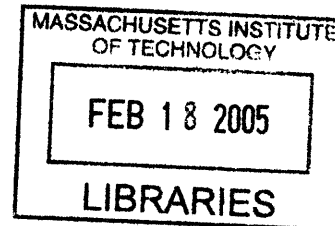
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Submitted to the program in Media Arts and Sciences,
School of Architecture and Planning,
in partial fulfillment of the requirements for the degree of
Doctorate of Philosophy in Media Arts and Sciences
at the Massachusetts Institute of Technology

ROTCH

February 2005

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Abstract

Reading and writing have become the predominant way of acquiring and expressing intellect in Western culture. Somewhere along the way, the ability to write has become completely identified with intellectual power, creating a *graphocentric* myopia concerning the very nature and transfer of knowledge. One of the effects of graphocentrism is a conflation of concepts proper to knowledge in general with concepts specific to written expression. The words 'literate' and 'literacy' themselves are a simple case: their connotations sometimes focus on the process of reading text and sometimes on the kinds of knowledge that happen to be associated in our culture with people who read many books.

This thesis has a conceptual and an empirical component. On the conceptual side a central task is to disengage certain concepts that have become conflated by defining new terms. Our vocabulary is insufficient to describe alternatives that serve some or all of the functions of writing and reading in a different modality. As a first step, I introduce a new word to provide a counterpart to writing in a spoken modality: *speak + write = sprite*.

Spriting in its general form is the activity of speaking 'on the record' that yields a technologically-supported representation of oral speech with essential properties of writing such as permanence of record, possibilities of editing, indexing, and scanning, but without the difficult transition to a deeply different form of representation such as writing itself. This thesis considers a particular (still primitive compared with might come in the future) version of spriting in the form of two technology-supported representations of speech: (1) the speech in audible form, and (2) the speech in visible form. The product of spriting is a kind of 'spoken' document, or *talkument*. As one *reads* a text, one may likewise *aude* a talkument. In contrast, I use the word *writing* for the manual activity of making marks, while *text* refers to the marks made.

Making these distinctions is a small step towards envisioning a deep change in the world that might go beyond graphocentrism and come to appreciate spriting as the first step—but just the first—towards developing ways of manipulating spoken language,

exemplified by turning it into a permanent record, permitting editing, indexing, searching and more.

The empirical side of the thesis is confined to exploring implications of spriting in educational settings. I study one group of urban adults who are at elementary levels of reading and writing, and two groups of urban elementary school children who are of different ages, cultures and socioeconomic status, and who have appropriated writing as a tool for thought and expression to greater or lesser extents. One effect of graphocentrism in our culture is the very limited and constrained developmental path of literacy and learning. This has not always been the case. And it does not need to be so in the future. This thesis discusses some small ways in which we might re-value modes of expression in education closer to oral language than to writing.

This thesis recognizes three ways in which spriting is relevant to education: (1) spriting can serve as a stepping stone to writing skills, (2) it can in some circumstances serve as a substitute for writing, and (3) it provides a window onto cognitive processes that are present but less apparent in the context of producing text.

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Philosophy Master Oh, certainly. A verse you'd like to jot?

Monsieur Jourdain No, no, no verse for me.

Philosophy Master So you want prose?

Monsieur Jourdain No, neither.

Philosophy Master Well, I think we must suppose
It's one or its the other.

Monsieur Jourdain Why?

Philosophy Master I guess
That those are all the options to express.

Monsieur Jourdain There's only prose and verse?

Philosophy Master To make the point most terse.
What isn't verse is prose, and what's not prose is verse.

Monsieur Jourdain And this, the way I speak. What name would be applied to the --

Philosophy Master The way you speak?

Monsieur Jourdain Yes.

Philosophy Master Prose.

Monsieur Jourdain It's prose?

Philosophy Master Decidedly.

Monsieur Jourdain Oh, really? So when I say: "Nicole bring me my slippers and fetch my nightcap," is that prose?

Philosophy Master Most clearly.

Monsieur Jourdain Well, what do you know about that! These forty years now, I've been speaking in prose without knowing it! How grateful am I to you for teaching me that!

*Excerpted from Timothy Mooney's adaptation of
Jean Baptiste Molière's play, 'The Bourgeois Gentleman'*

Acknowledgments

I have had the privilege of working with many creative people and making so many good friends during my time at MIT. The development of this thesis work owes much to the intellectual and research work done by pioneers here in the fields of computing, education and learning, speech technology and more. I would like to mention and thank those who have had a direct influence on me.

Seymour Papert gave me the most fun, final 18 months of a doctoral education a student could hope for. He modeled a graceful respect for all that goes into building a thesis and a doctoral student. The time spent thinking with him was a gift. My deepest thanks are not enough.

My Readers, Chris and Mel. Chris Schmandt taught me everything I know about speech editing systems and stuck with me for many years on this long research path. Mel King, who had a vision for the potential of this work, opened worlds for me that I could not have entered on my own. He also taught me about putting research ethics and respect for people first in everything. Thank you both for the insights you have given me.

Justine Cassell was first a teacher to me. She introduced me to the field of discourse analysis, the theoretical backbone that allowed me to unify my love of singing and words. She later stepped in as an advisor at a crucial moment, helped me improve this work's theoretical model, and buoyed my spirits.

Brian Smith's critical intelligence, humor and kind-heartedness guided me through the first four years of my doctoral study. It took him nearly that long to convince stubborn me that the best way of approaching this problem is to show how it might have real effect in people's learning experiences. He was right.

Several professors and researchers external to the Media Lab have contributed generously and directly to my own development as a scholar and researcher: Johanna Drucker, Ken Stevens, Stephanie Shattuck-Hufnagel, and Catherine Snow. As such, they have unknowingly made significant contributions to the creation of this thesis.

Nowhere else on earth could I have done this work in this way but at the MIT Media Lab. Thank you to all the Media Lab sponsors. Thank you to the Media Lab Administration, particularly Walter Bender, Linda Peterson, Pat Sokaloff, Ramona Allen, Missy Corley, and also to MIT Dean of Graduate Students, Isaac Colbert, for financial and/or academic support. Will, Elizabeth, John, Chi from NECSYS—thanks for saving my 'data' numerous times! Thank you to Ron MacNeil and Glorianna Davenport for giving me a start. Jacqueline Karaaslanian can always be counted on to make things happen—with style!

The empirical work described in this thesis was enabled through the personal vision and generosity of several individuals: the Founder/Principal of Umoja Elementary, the Principal and the Director of Admissions at Molière Elementary, and the Director of Adult Education at a New York City Settlement House. Teachers, staff and administrative members within each organization gave freely of their time and expertise to make this work possible on a daily basis. I wish I could mention your names. Thank you so much. The students

themselves gave generously of their time, enthusiasm, and great vision for the future possibilities of this work. I learned a great deal from each one of them.

Thank you to all the participants in the BETHA Summer Institute on New Media Studies (organized by Scott DeWitt) and the Harvard 'Snowcats' (organized by Catherine Snow) for feedback on early results. Thanks to the many, many colleagues and friends I've come to know through association with ML research groups: Future of Learning, Gesture and Narrative Language, Critical Computing, Intelligent Graphics, and Interactive Cinema, who provided help and critical insight over the years – David Cavallo deserves special mention for his financial and intellectual support over the last year. Dany Lussier-Desrochers provided data analysis advice. David Fernandez provided one summer of invaluable research assistance. Marisa Viveros, through IBM Research, gave me a summer of freedom in which I developed my first flexible audio system; Herb Derby helped me think about the code. The JAVA@media listserv was a lifesaver, especially Steve Waldman's and Erik Blankinship's friendly code examples.

Dear friends have provided humor and even professional development: Barbara Barry (we figured it out, buddy!), Jacqueline Karaaslanian, Jeana Frost, Erik Blankinship, Ellen Cushman, and Jim Porter.

My family in India, which includes parents Rajni and Sada Shankar Saxena, gave me endless encouragement and understanding through the rigors of a doctorate.

Mom and Dad – Charlotte and Henry – in Pennsylvania. Your love, and the pleasures of breaking bread with you, are the richest gifts. There are seeds of you in everything I do.

To my husband, Samarjit, all my love. Your super strong support and love make joyfulness possible in all things.

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1 Introduction

“He gave man speech, and speech created thought, which is the measure of the universe.”
(Percy Bysshe Shelley)

1.1 Preface

There are deeply built-in assumptions about language use that are intimately related to experience and culture. The very fact of language diversity and continuous language change is twisted into hegemonic relationships between people who speak differently; these hegemonic relations are produced and reproduced by prescriptive formulas about what constitutes literacy. I agree with Black American scholars who have written recently that White American scholars of language and literacy should examine their own language competence and how/where it departs from Standard English, because, as more crudely summarized here than the original, White people seem to believe they speak the Standard just because they're White when what they actually speak is another vernacular variety (Young 2004). Vershawn Young's challenge rang true with me as I remember very clearly my own developmental acquisition of what I will call academic American, and how it relates to my cultural ontogenesis. My own story helps me see some of the costs and consequences of graphocentric attitude towards language diversity and literacy development, and the complexity of this issue at cultural and individual levels.

As a Mennonite child, I grew up in a tight knit, insular community in which many syntactic and lexical features from German filtered into our culturally recent adoption of English (or 'accommodation to the encroaching Anglophiles'). My grandparents on both sides spoke German as their first language (Pennsylvania Dutch, a 'low' dialectical variety) but transitioned to English, though my father's parents continued to talk 'Dutch' between themselves for their entire lives. But for whatever intentional or situational reasons (WWII?), they and all their peers did not pass Deutsch on to their children, my parents amongst them. Probably in part due to the linguistic accommodation the Mennonite community made to the larger society in the past two generations, many people including my father became successful businessmen, often in various food industries (good commercial occupations for people one foot off 'the farm'). Had my family been African American, for example, such accommodation might have gone without these economic rewards, since 'blending' with the broader culture for people of color is not as simple as changing cultural dress and language. The most formal occasions of language use I encountered regularly was in church or for church, and I recognize my earlier tendency to adopt 'church language' when confronting unfamiliar composition tasks in some of the African American children I describe in this thesis. Probably in part because my mother loved books and read to us often, I also consumed enormous quantities of books indiscriminately, not knowing the different cultural valuing of 'high' and 'low' literature, reading everything of interest to me in the church, school and local libraries. (It has taken me twenty years to learn 'citation form' pronunciation

of all the words I remember from books. I often said them first in my idiosyncratic way to be met with either blank stares or laughter. I believe strongly that even if children learn from books as I did, having the opportunity to hear how those words are said is vastly underestimated.) And just to complicate outsiders' often condescending preconceptions of what it is like to be an 'insular' and 'regional' Mennonite, I had more international experience and perspective than most children my age. My father had attended a year of college at the University of Nairobi, Kenya, and my mother worked as a nurse in a remote area of Puerto Rico. We traveled to those same places as a family, amongst others, and had a stream of international, long-term guests through our house from Poland, Indonesia, Nigeria, Taiwan, Kenya, Tanzania, Brazil, the Congo (then Zaire) and more.

Because my school, family and church life revolved within the same group of Mennonites, I do not remember encountering a situation in which my attention was drawn to my regional colloquialisms until I left for college in Canada where I had my first run-in with the Queen's English, a very strong expectation of the formal academic syntax and register, and my generally unpopular status as an American. Because of my new friends' (sometimes) gentle ridicule, I was deeply embarrassed that my language use was considered sub-standard and determined to erase not only my regional colloquialisms and 'poor' syntax, but my American accent as well. For several years I remember clearly that I had difficulty even completing a thought orally—I simply couldn't think and usually my speech trailed off into nothingness. (Though I harbor some doubt whether that was more connected to interacting simply with less familiar people, or interacting with less interruptive people who chose not to complete my sentences, or whether it was indeed a sign of the ongoing reorganization of my expressive capacities, or all three and more.) I accomplished my goal but when I returned to the States for graduate school, I found I couldn't remember how I used to talk, something that many minority speakers fear with good reason when considering the sociocultural connections and legitimacy they stand to lose. I am now more or less fluent in speech and writing in academic American with a few traces of Canadian and am told that I write well (in marked contrast to the feedback I received in college), but I can't code switch back. And sometimes in homegrown circumstances my overblown puffing sounds pompous and inflated. In short, I have lost some things and I have gained other things.

1.2 Introduction

The introduction of writing greatly enhanced what people could do with language. Preservation of language was no longer dependent on human memory. As tools for writing became more and more flexible, it became possible to manipulate language in concrete ways. The shift from the diachronic organization of the spoken world to the synchronic organization of the written world created other new opportunities. Some of these are changes in what comprises a finished product. Some of these are changes to the composition process. Some of these are changes to the learning process.

Six thousand years or so after the advent of writing, we can observe a well-developed hierarchical relationship between written and spoken forms. The written form has become

the primary outlet for the most elitist uses of language in many cultures. In these cultures, even when language is used orally, for example, in speeches, theatre or radio, it is almost always preceded by the development of a written script. And this script undergoes a long process of refinement from first ideas to published form, however spontaneous the practiced reader or actor makes it seem.

This thesis explores ways in which some of what was achieved through the use of writing can be achieved in the domain of the oral, and ways in which the use of oral forms might be revalued as literate composition. Literacy is defined here as the sophisticated structures and elements that characterize linguistic stories and ideas, largely but not completely independent of the material ways in which these structures are realized; that is, this thesis separates and distinguishes *literacy* from *letteracy*, which is textual decoding and encoding abilities, and introduces a new term, *prosodacy*, which is oral decoding and encoding abilities. Three major points developed in this thesis are suggestive about how things might be in a very different world and things that we don't have to wait for: (1) I introduce a new way to realize literacy, (2) which can make important contributions to the way literacy has been realized for centuries (3) and to the general issue of democratic access to and production of knowledge. An important outcome of this work might be that more people can participate confidently, willingly and effectively in literate action.

Writing is a very narrow window on human modalities for knowing, communicating, and expressing. As this thesis observes, as soon as people are released in even small ways, they want to do more. The computer *in principle* challenges the hegemonic position of texts and writing in society because of the flexible way in which it encodes and decodes information and media. Digital technologies open up the window for speculation about what literacy can be in the future. They also place old dialogues, such as the prescriptive use of standardized language in education, in a very different light. Just as easily as the computer can enforce standardization, it can help us contend with diversity and change. Certainly the future of composition will not be writing or the technologies investigated in this thesis, but some very rich sensory combination of modalities. Robin Tolmach Lakoff predicts a "new mode that is gaining strength at the expense of [letteracy] will enable us to communicate more beautifully and forcefully with one another than can be envisioned now" (Lakoff 1982, p. 257, my substitution). But the politics and values for writing, texts, and what constitutes literacy is deep set into Western culture. Its cessation will not happen quickly or easily.

But even to observe the changes happening now in this slow cultural and technological evolution, we need new language for referring to new phenomenon. The operations discussed in this thesis have historically been conflated with writing and text. Words like 'writing' and 'speaking' and 'talking' have complex meanings and senses. The use of these words can often deal too loosely with the similarities and distinctions in making linguistic meaning across visual and aural modalities, leaving us no clear way to describe related, but new, activities. In this introduction, I tease apart meanings that have become conflated, limit the meanings of extremely polysemous words, and introduce new vocabulary to support the introduction of new concepts, tools, and practices for composition.

Writing can mean the act of writing ('Hold on, I'm writing this down'), a more extended effort ('She's writing a history of on-line community development'), or the text

itself ('Here's my writing'). But when someone claims to be a writer, this person means having a gift for crafting stories or communicating ideas, not that they are good at handling a pencil. *Write* is also not specific about supporting technology; people *wrote* by impressing clay with a stylus just as we *write* by typing on a keyboard plugged into a computer. For a thesis that seeks simultaneously to expand and to refine the idea of what composition is, this generality can lead to much confusion.

Our English word *writing*, in contrast to other European languages that use words descending from Latin *scrivere*, is from the German root *wreid-*, meaning *to cut, scratch, or tear*. In Old English, then, *to write* meant something like *to scratch on parchment with a quill pen*, emphasizing the manual production over the thinking required. Writing, from this historical perspective, is closely allied to drawing and painting. I note that origins of writing do not well describe composition through speech recognition – no scratching or work with the hands is involved. Nor does it extend well to the focal activity introduced in this thesis. Thus, I use the word *writing* in its historical sense only, meaning the manual production of marks with a stylus, pencil, computer keyboard, or other manual device. I use the word *text* to refer to the marks made.

Speaking and *talking* are both defined as expressing, or conversing about, ones thoughts and emotions by means of oral language. Speaking can produce visual marks and a permanent, editable record similar to writing, using new computational tools. To support this idea I introduce a *portmanteau* (blend word) to provide a counterpart for writing in a spoken modality: Speak + Write = Sprite.¹ I define *sprite* to mean speaking that yields two technologically-supported representations: (1) the speech in audible form, and (2) the speech in visual form. Spriting, therefore, equally encompasses digital speech recorders, speech editing tools, and any speech dictation recognition tools that would use speech in addition to text as an output mode (as far as I'm aware, none currently do).

The product of spriting is a kind of 'spoken' document, or *talkument*. But creating a spriting correlate for 'reading' is tricky. The origin of *read* (like *write*) is from Old English, *raedan*, rather than from Latin *legere* as are other Western European languages. *Raedan* means *to advise* and (probably later) *to interpret something complex*. Our English word *read* can be used to say things as diverse as, 'reading an x-ray,' 'reading a face,' 'reading a book,' and even 'reading the signs [in society] all around you.' Since the origin of *reading* is not founded in a visual modality, as opposed to *legere*, we could conceivably *read* a talkument. However, for clarity, I provide a new word, *auding*, from the Greek *auris*, meaning ear.² Therefore, *auding* is to spriting as *reading* is to writing.

The Talking Books (both analog and digital) many people are familiar with today are oral performances of written texts, known as *read speech*. In contrast, talkuments gives oral

¹ Sprite is already used today to refer to a bitmap image used in computer animation; an elusive supernatural faery; a Coca-Cola Company beverage; a now defunct multiprocessor operating system written by Ousterhout; and an Austin Healey car model, amongst others. But its archaic meaning is *soul*, deriving some time ago from Latin *spiritus*, meaning the animating force and breath within human beings. Spriting draws upon this etymology to capture the spirit of this new kind of recording and editing based in breath.

² I credit my awareness of the term *auding* to Sticht, Beck, Hauke, Kleiman and James (1974) *Auding and Reading: A developmental model*. Alexandria, VA: Human Resources Research Organization.

speech the status of primary object. The speech comprising a talkument is closer to what linguists call *spontaneous speech*, meaning that speakers talk in the moment, without resorting first to a writing process and then reading the composed text out loud. Any editing or more sophisticated acts of spriting composition work directly with the same 'spontaneous' spoken representation. There has been very little development of technology to sprite and edit talkuments, or technology to aude *spritten* talkuments, or even recognition that such things may make valuable contributions to culture and knowledge. I have taken small steps in this direction by inventing rudimentary examples of spriting and editing technology and talkument structures to support the investigations described in this thesis. My work-to-date is presented in the section, Design.

One can imagine that in some years hence, spriting technology will permit the recording of conversations and talk that can be structured and searched, from which excerpts can be excised, adapted, and reshaped into powerful talkuments. One can imagine editing will involve a technological process of adapting the recorded speech signal itself to new expressive discourse environs within a talkument. That is, one could change one's recorded voices through automatic and manual means to sound more like one would like to sound, which would be more (or less) like one's 'natural' speaking voice, as intended. A good expert spriting technology would of course be able to translate fluidly back and forth between an edited talkument and a text, taking into account linguistic register and dialect/accent/identity, and having the capacity to generate an expressive idiosyncratic facsimile of one's own speech from one's written text.

With respect to auding, one can imagine that through the integration of eye tracking and tiny 'wearable' or even bodily-embedded speakers, the act of looking at some visual icon could cause it to 'speak its message' to the on-looker. Philosophically, pushing the limits of the idea, we must allow the possibility that the 'icon' is in the form of alphabetic or other glottographic systems (writing that refers to linguistic structures) or semasiographic systems (writing that does not refer to linguistic structures). The objects enunciated from the act of looking might bear linguistic verisimilitude to what is written, or might deviate from the writing in large or small measure to achieve some rhetorical effect. Brief environmental signs and extended texts alike could be accessible in this aural/visual way to everyone. In this sense, spriting and writing could merge in future technologies into *bi-modal, full-duplex* linguistic objects. These objects would be composed and presented in either or both modalities, the semantic interplay between the two representations could range from conflict to cohesion. Looking far into the future, the objects and processes that will play the role that text and writing currently play in culture and the inner life of the mind are beyond both writing and spriting technologies, things no one has yet imagined.

I take the position in this thesis that the only way to pursue long-term change is to pursue things that also have immediate engagement with present day problems and offer results relevant to present day challenges. Therefore, this thesis is not only about what might happen beyond writing or the design of better spriting technologies, but also examines closely how children can have experience today with media other than alphabetic letters that can move them towards the intellectual goals and ways of thinking we desire for educated people.

The technologies used in my explorations with children are simple, but even in primitive form these technologies intimate new possibilities for expression, revealing a glimpse of the 'more beautiful and forceful' media anticipated by Lakoff. The children's enthusiastic appropriation of spriting technology demonstrate in turn how we can improve this technology for their editing and composition needs, which range from simple to quite complex. With respect to technology development, the conclusion to be drawn from children's great enthusiasm and their desire for more is that there is a vast territory to conquer. No one person can do it.

An equally important consideration for the development of the field will be the evolution of computing standards, especially those that consider the *production* of literacy equal to the *consumption* of literacy. Technological support for multi-modal curriculum in schools, like the recently suggested Universally Designed Learning (UDL) curriculum (Rose and Meyer 2002), are currently focused upon supporting the consumption of literacy, namely reading/auding activities. UDL approaches have successfully provided flexible curricular materials that can be auded and read. The provision of such materials have permitted *all* students—including the so-called 'learning disabled'—to successfully participate in mainstream education classes (Harac 2004). It is likely that UDL standards for curriculum will be mandated into federal law in the next few years, extending the Accessibility Act to intellectual as well as physical domains. But a one-sided focus upon universal standards for literacy, which do not consider production issues equal to consumption, is a weak mandate.

While a future 'spriting revolution' might be promulgated by children's whole-hearted adoption, as much as was the video game industry, spriting technology can only mature when systems are available that are equal to the composition needs of accomplished adult composers. The adult level mirrors the development of technology for children: while many standards are emerging for auding technologies (e.g. Digital Talking Book (DTB) consortium standards), there seems to be no parallel development of spriting technologies. One goal of this thesis is to make the composition activities of children, and the more advanced needs of adults, as much a subject of debate as are their reading activities.

In this thesis I report on working in classrooms with children from very different socio-economic and cultural backgrounds. While we assume an overlap between mental structures with respect to writing and spriting, we know that the children had very different relationships to the written language and kinds of texts. This difference provides an analytical window into many different aspects of literacy development, and how it can be seen in spriting and developed through spriting. The children that had had similar kinds of literacy exposure at home and school produced spriting examples that have many commonalities with the writing they produced for their classroom teachers. Some of them tended to engage in a highly iterative process of composition and editing that they were encountering in school. For the children who did not have a deep relationship to many forms of texts, and who might have had a stressful relationship with forms of school literacy in prior years, spriting was intimidating and difficult at first. Some resisted trying it for several weeks; others eased into it through collaboration with another child. Nonetheless, many of these children completed their first (or if not their first, their most extended examples of) letters, reports, and personal narratives in spriting. They also recognized ideas through

composing that we usually attribute to literacy learning. For the kindergarten children that were new to many forms school literacy, spriting was a delight that they eagerly sought out with unabashed enthusiasm. They engaged in impressive editing and cognitive operations with language in a remarkably short period. In short, the intellectual demands on a child while spriting are *significant*, not merely a diluted form of those encountered when writing. And children demonstrate their intellectual and literary prowess through spriting in dizzying and impressive variety.

From all the children we can learn equally important lessons about how the process and product of spriting demonstrate distinctive properties that differ from those of writing. These differences in processes and products are tied to the differences between the unique materials of voice and visual. Each seems to afford different, maybe even complementary, ways of thinking about literacy.

The classroom investigations were crucial and revealing parts of this research. Of course they provided answers to many of the questions I posed going in to the research: How do children compose in spriting? Does editing become a significant part of their spriting process and what does it look like? Can spriting channel students towards conventional literacy skills? Are there ways in which the processes and products of spriting and writing can be seen as similar? But they also revealed aspects of spriting I had never considered:

- Children use writing as a preparation for spriting, treating the talkument as the final product more so than the text.
- Children read their own writing to the Spriter in an iterative and edited process in order to *better understand what they wrote*. In this way, the Spriter functioned to engage writing, reading, spriting and auding in a full cycle of literacy learning.
- Children, while spriting, find that they need to take time to consciously *pause*, to think and plan. They seem to not have learned to do this while writing, perhaps because they can perform these cognitive functions contemporaneously with the time-consuming mechanical demands of writing. Learning that one can and should take time to pause and think might become more and more important as a cognitive skill in our hyperactive, multi-tasked world.
- Children tend to show off their talkuments to other children with quick enthusiasm. These talkuments can become a composition model for other children—a classroom meme—in a way that writing doesn't.
- Teachers can know how often children listened and re-listened to what they sprite. In the case of writing, teachers can't see how often they read what they wrote. Spriting also provides paralinguistic cues to the level of cognitive difficulty a child is experiencing while composing. Thus, spriting provides more insight into a child's process of and thinking about composition.
- Children treat singing as an extension of spriting—or they treat spriting as an extension of singing. There are so many examples of vocal arts in spriting that simply cannot be accounted for in writing or textual models of literacy, like singing, beats, rapping, dialogue and sound effects.

In this thesis I make the modest argument, which I support with technology design, classroom research and a year of observational data of children and adult composers, that spriting can be an effective way to compose objects with many of the same literate qualities as texts. Therefore, to put my design and empirical work into context—as nascent alternatives to writing, I build a conceptual framework in this thesis for arguing how and why spriting could replace writing, particularly as a tool for learning, and who might benefit from this sea change. As part and parcel of the conceptual framework, I try to convey my enormous excitement at the aesthetic and compositional opportunities presented by spriting, admittedly different than writing, but with a promise no less evocative and plastic. The balance of this Introduction and the Background present an overview of this conceptual framework.

1.3 Spriting and Writing: Compositional Siblings

Spriting holds much in common with writing. Through both we create linguistic meaning. Both permit a deliberative, thoughtful approach. Through both we can make our own thought explicit, to ourselves as well as others. Yet we lack a superordinate—a hypernym—to describe the things spriting and writing hold in common. I will use the word *compose* to mean the aspects of thinking common to both writing and spriting. In Webster's Dictionary, *compose* means forming a composite from pieces, creating through mental or artistic labor, arranging in proper and orderly form, and freeing constituent parts from agitation, all of which are appropriate to describe the mental labor that accompanies both writing and spriting, as well as the creation of music. In this thesis, then, to achieve the same common effect as saying, 'I am a writer' (recall this now means scratching), one should say instead, 'I am a composer,' which bridges the musical realms and the linguistic ones, and means one has a gift for using sound (spoken or otherwise) and the visual (writing or otherwise) to develop structures within the strictures of a cultural-historical tradition. Having available this new technical term now permits me to restate the central question to this thesis: Is composition a higher-order thinking skill that can be developed equally well through spriting as it is through writing?

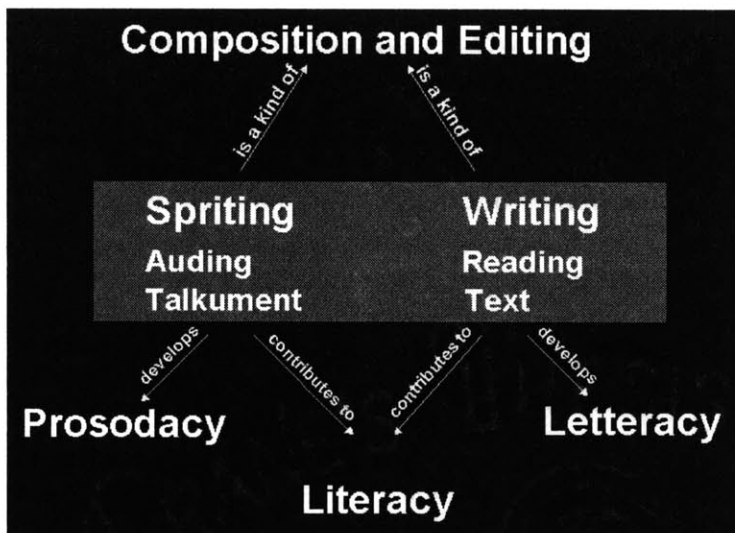


Figure 1 Composition superordinate of spriting and writing

knowledge at an individual level for centuries. But children learn very richly through direct experience before going to school. A little after the time they are ready to explore beyond the limitations of direct experience, they begin school where they are channeled into learning through text when their abilities with text are not yet well developed. During this time, they read and write at intellectual levels far beneath them. For this reason, one might characterize the first four to five years of school as a long and intellectually arid period.

The idea that reading is the preliminary step to learning, however, is becoming unstuck. The numbers of people in the United States who gain their worldly awareness through means other than the newspaper is already at least 70%. Alternate mediums for information distribution like the radio, television and Internet are developed and available.⁴ Of course, in the previous century, physically handicapped, dyslexic and other textually-disabled people have become highly literate through the use of enabling technologies (e.g. Braille, ASL, text-to-speech readers) and other non-textual advances, proving that writing and reading are just one of many paths to advanced literacy. In Figure 1, both spriting and writing are kinds of composition. *Spriting* is a kind of composition and editing that produces a *talkument* that can be *auded*. Writing is a kind of composition and editing that produces a

For the very same reasons that spriting might facilitate writing, it might also bypass writing.³ There is, by now, an enormous literature on how a child best learns to read, and a smaller literature on how a child best learns to write (reflecting our cultural emphasis on consumption over production). But the point of learning to read is not to decode writing, but to enable learning through text: text has been the primary method of distributing and acquiring

³ When I use the word 'writing,' I have been implicitly referring to systems that are *glottographic*, or *phonetic*, for such systems are dependent upon and secondary to the spoken tongue. But writing systems are not always secondary to speech. Mesoamerican historians (Boone and Mignolo 1994) argue that some writing, called *semasiographic*, is spatial, structural and relational writing, and it can be interpreted without recourse to spoken language. The Inca wrote with *quipu*, or bunches of knotted strings, that have yet to be deciphered. Mixtec, Aztec and Mayan people wrote pictographies, particularly useful in heterogenous empires since they achieve conventional meaning without encoding a particular tongue. Chinese script, and the Japanese kanji script inherited from it, is semasiographic in origin. This thesis has nothing to contribute to the composing and interpreting of semasiographic systems except to note that such systems are far less vulnerable to being bypassed by advances in speech technology than are glottographic systems.

⁴ The computer and the Internet are currently textual systems: continuations of old ways of realizing literacy. They demonstrate that even when other means are possible, they have not been conceived of or developed due to the persistence of graphocentric beliefs about literacy.

text that can be read. As I discuss next, both spriting/auding and writing/reading contribute to literacy development.

1.4 Literacy, Letteracy and Prosodacy

Spriting, through its sibling relationship to writing, has many implications for literacy. In all the most important senses, if composition skills may be developed through spriting in equal measure to writing, then someone can be highly *literate*—but not know how to read or write.

As a preliminary to this radical idea, many scholars step around defining literacy in terms of encoding and decoding ability. The National Committee on Preventing Reading Difficulties (Snow, Burns, and Griffin 1998) defines literacy as a relationship between a ‘reader’ and a particular composition:

Acts of literacy vary a great deal—for example, reading a listing in a phone book, reading a Shakespearean play, and reading a dissertation on electromagnetic force. As different as these are, there are commonalities among them. For most texts in most situations, understanding what the text means is, if not the end goal of the reader, at least an important intermediate step. If someone has difficulty understanding, the problem could be a matter of limited knowledge; in the case of the physics dissertation, for example, limited knowledge of physics could be the downfall, rather than a reading difficulty per se. Having learned to read without difficulty may not suffice to be literate with respect to that dissertation.

In our sense, literacy is both broader and more specific than reading. Literate behaviors include writing and other creative or analytical acts and at the same time invoke very particular bits of knowledge and skill in specific subject matter domains (e.g., history, physics, mathematics, etc.) (Anderson and Pearson, 1984).

In this definition, we are *all* more or less literate with respect to particular texts. Although the examples in this passage are reading and writing centric, the theoretical development of spriting composition is meant to provide specific evidence in support of the ‘more broad’ and ‘more specific’ interpretation of literacy.

Toward this end, I separate the definition of literacy from its limited dependency on writing. I define *literacy* as the knowledge of language, domains of experience, and structures of discourse that permit one to use language as an object for learning, reflection and analysis in specific and contextually appropriate ways. This definition is meant to describe the composition and interpretation skills that inhere in both spriting and writing activities.

I use Seymour Papert’s term *letteracy* to denote the mechanical and presentational skills specific to writing, including amongst others the ability to form characters, spell, punctuate, and design a page (Papert 1993). Our tools for the expression of literacy are almost exclusively letterate – tools like pencils and word processors. The absence of alternative composition tools contributes to the common belief that literacy and letteracy are the same thing, and obscures the development of a broad theory of composition.

I define a new term, *prosodacy*, to represent the material awareness specific to spriting that encompasses all of the characteristics of making meaning in oral language. Prosody

refers to the patterns of stress and intonation in a language, what linguists have referred to as the paralinguistic or the suprasegmental: the intonation, rhythm, stress patterns, and voice quality that convey meaning above the level of phonological contrast (Shattuck-Hufnagel and Turk 1996; Cutler, Dahan, and van Donselaar 1997). But I intend prosodacy also to refer to the kinds of expression and meaning discussed by poets and actors. Thus prosody equally refers to the study of poetic meter, important to the very old art of composing verse that would be heard more than it would be read (Bernstein 1998; Jakobson 1985), and the enormous repertoire of orally produced sounds that could even be said to verge on the vulgar (e.g. burps, filled pauses of all varieties, sighs, et cetera). Thus, to be *prosodate* means to be aware of ways in which situated intentions, emotion, identity and expression can be realized artfully and/or effectively in and through the *repleteness* of spoken language.

Defining literacy as a kind of relationship between oneself and a discourse (textual or spoken) provides a critical perspective on some popular concepts of literacy developmental. For example, 'decontextualized language' has long been understood as the ability to take words spoken in conversational context ('contextualized' language) and represent it in writing without referring obliquely or implicitly to objects the future reader wouldn't anticipate or know. Decontextualized language is supposed to be clear without resorting to a shared experience; it is held to be 'explicit' while face-to-face, experiential language is held to be 'implicit.' Thus, those students who come to school having had more books read to them are thought to have a better grasp of 'decontextualized' language than children who might watch more television or play games with their friends instead. Yet if we understand literacy as relationship, as James Paul Gee writes, "All language is meaningful only in and through the contexts in which it is used. All language is meaningful only on the basis of shared experiences and shared information. All language is 'implicit' until listeners and readers fill it out on the basis of the experiences they have had and the information they have gained in prior socioculturally significant interactions with others" (Gee 2000, p. 63). Thus, it is important that all children have the opportunity to interact with many different kinds of people and the discourses that these events encompass, in diverse environments, in formal and informal ways, and in many modes, so that they feel familiar with the many ways in which social meaning and purpose can be conveyed through words.

1.4.1 Centrality of Editing to Composition

Fundamental to composing is the concept of editing. Learning how to write in school is when most of us first become acquainted with editing. But editing is not limited to composition in language. It is also a highly specialized activity of professionals who work in film/video, radio and music production. Pre-dating the emergence of these fields, editing was a long-standing intellectual practice done individually through the practice of writing *drafts* and cooperatively with an editor in the publishing industry. Music composers also edit. Beethoven's ink-riddled scores are an example of musical directions explored, found wanting, and scratched out. Mozart crafted his music with very few edits, creating scores as lyrical looking as his music sounds, hinting that stylistic differences observed in the composition process of text (Sommers 1994) and computer code (Turkle and Papert 1990, 1990) may extend across symbolic representations. Plan-intensive and 'top-down'

approaches may characterize composition at one extreme, and bricolage, 'bottom-up' approaches at the other, each with attendant approaches to editing.

Prior to computing, editing was basically an elite intellectual activity. Computers democratized editing by giving us word, music and video 'processors.'⁵ Word processing technology, for example, has made editing words easier and faster, and the changes less visible. Writing and editing are no longer bound to discrete stages as they once were with paper and pencil. Paper-based concepts of *drafts*, reified in school pedagogy, are already antiquated even as they are practiced today. Technology development seems to make composition and editing more and more intertwined and inseparable.

What is editing? Editing may be generalized across text, film, and music composing as subjecting material to critical scrutiny and possibly changing it. Learning to edit is a powerful developmental achievement for it allows one to dare to start something large and challenging without knowing the 'right' answer. It allows one to begin and learn-while-doing through successive approximations (Clemens 1999).

Editing changes are made both at the level of the *composition*, when revising meaning, and at the level of the *material* being edited, for example, correcting misspellings when writing (a component of literacy), and correcting intonation when spriting (a component of prosody). Noam Chomsky's four possible grammatical transformations—deletions, additions, substitutions, and rearrangements—seem to cover the necessary editing operations at both conceptual and material levels in writing. Time will tell if they suffice for spriting also. When using computer systems to compose and edit, both the representational system (e.g. alphanumeric character set) and the purpose of the editing software place constraints on the process. It goes without saying that there is no computerized system with n^{th} degrees of editing freedom. Every system makes choices about what kind of meaning is important and allows changes to be made only to that chosen representational range. For example, the letter is the smallest granule of meaning in a word processor. As such, no commercial word processor cares to permit the writer to make subtle changes in the outline of the letters themselves.⁶ The writer may only substitute one font system for another. Therefore, what kind of units should a spriting processor represent and support, parallel to the scope of editing in writing of letters, words, sentences, paragraphs and so on? These editing issues will become more clear as applications and interactions form around spriting and talkuments.

At this point, I would argue, we cannot characterize the speech in a talkument well enough to know what the editable units should be, let alone know how to support substitutions, additions or rearrangements computationally. Although some is known about the prosody of read news, monologues, and less about conversational prosody; very little is known about the prosody of spriting. Also unknown is the process people would use to compose and edit talkuments, and if it is similar to the processes of composing and editing

⁵ The idea of process in education, introduced by Jerome Bruner with his 1963 book *The Process of Education*, followed the introduction of the computer. 'Process' is probably itself an infectious 'computational' meme.

⁶ Some experimental word processors attending to the material, poetic ways in which we represent meaning in text have created the means for composers to edit the character shapes and activity in a computational environment (Lewis and Weyers 1999).

text. Even less is known about the developmental trajectory of spriting. Through the investigations in this thesis, I describe different kinds of editing behaviors that emerged and the kinds of vocal material that characterize early forms of spriting by children.

1.4.2 Questioning the Ephemeral-Permanent Dichotomy

Composition and editing, as superordinate thinking activities that cut across materially specific instantiations (such as writing and spriting), allow me to theorize a new relationship between speech and writing. Writing has historically been treated as ‘permanent’ speech (Gelb 1952). As such, linguists of the early twentieth century considered writing even unworthy of linguistic investigation (de Saussure 1965; Bloomfield 1961). Jacques Derrida’s Grammatology project, in response to this neglect of writing, argued that writing—the visual mark—is the origin of science, modern thought, and ultimately, speech itself (Derrida 1977). Disregarding for the moment which came first, much of this debate is predicated on the argument that writing is permanent and available as an object for reflection and critical analysis; while speech is ephemeral and dissipates as quickly as it is being said.

But with increasingly flexible representational technology, the ephemeral-permanent dichotomy no longer captures the important differences between speech and writing. With pervasive and prolific recording devices, anything can be made permanent. Further, permanence (more or less) is a precondition of this particular variety of editing that concerns composition studies; it permits an accretion of changes. Whether something is permanent or ephemeral, then, becomes a secondary condition to whether or not we would like to edit its material instantiation. A new characterization might be something like ‘improvisable’ and ‘editable,’ the difference between them being closer to intention and style than a technological limitation.⁷ *Improvisable* implies a flowing experience in which external engagement and social feedback are immediate, in which the execution of an action and its conceptual form become merged. *Editing* implies an engagement with both the ideas and intentions that motivate the material realizations, and the material forms themselves. More flexible tools have emerged, such as Chat and Instant Messenger, which allow us to improvise with writing. Likewise, more flexible tools can emerge to allow us to compose and edit with speech.

In Table 1, the two columns labeled *improvisable* and *editable* are charted as rows of different kinds of activities. Dance notation, although less common than Western music notation, generalize movement and allow choreographers to compose and edit dances. But it is music, as an example, that reveals the weakness in any new structuralist dichotomy, including this one. Thousands of years ago, people began making music in an improvised manner, the music was formed in response to the performance context. Over time, we developed forms of notation, one of which, the bar, staff and note common to Western classical tradition, enables music of enormous scale and large numbers of musicians to play together at once. But recording technology has made possible a tight feedback loop between music-that-is-improvised and music-representations-that-are-editable (performances are

⁷ *Improvisable* and *editable* are offered suggestively, as speech/music/dance and more are not completely improvised nor do they completely resist certain kinds of temporal editing. These words and the strictness of the dichotomy itself are offered as placeholders for future theoretical insights.

recorded and remixed as improvisational material), suggesting that the theoretical model suggested here is not yet flexible enough.

IMPROVISEABLE	EDITABLE
Speech	<i>Spriting</i>
<i>Chat, Instant Messenger, Text Messenger</i>	Writing
Instrumental/Vocal Music	Bar and Staff, Music Recordings, MIDI
	Action Stroke, Labanotation, Kestenber Movement Profile, Benesh, Sutton
Dance	DanceWriting
	Film, Video

Table 1 A provisional sketch of the relationship between *improvisable* and *editable* forms

Italicized words in Table 1 mark new and quickly evolving forms. Certainly, the editable form of speech, *spriting*, is so new it only gains a name in this thesis. Improvisable forms of writing, like Chat and IM, are farther along, immensely popular, and multiplying rapidly. Another interesting part of Table 1 is the empty spaces. We have experimental stirrings of improvised film and video (e.g. Glorianna Davenport’s Interactive Cinema group, Myron Krueger, Stefan Agamanolis), but not yet on a mass commercial scale.

In sum, this thesis places limits on the concept of writing by introducing a new kind of linguistic composition, *spriting*, and then makes connections, drawn throughout this thesis, between linguistic forms of composition and other modal forms of the compositional arts. In doing so, I note that current literary and linguistic theories do not account for the kinds of relationships that hold between *spriting*, writing, Chatting, and speaking, nor the greater connections that might hold across the arts of human expression.

1.4.3 Our Graphocentric Inheritance

Aristotle opens his *Metaphysics* with, “Of all the senses, trust only the sense of sight.” If judging only from our language, we have deeply interiorized this command. Many of the words we use for thinking derive from visual origins. Scientific observation privileges visual data. *Phenomenon* owes its origin in Greek to the notion of exposing to sight (Ong 1982, p. 74). The word *definition* comes from *definire*, to draw a line around (ibid, 323). “Sight is equated with understanding and knowledge in much of our vocabulary: insight, idea, illuminate, light, enlighten, visible, reflect, clarity, survey, perspective, point of view, vision, observation, show, overview, farsighted” (Chandler 1995). Chandler observes also how visual qualities are used to indicate perceived levels of intelligence: clever people are bright or brilliant and those who are not are dull; other terms whose roots are visual include: intelligent, theory, contemplate and speculate.

Oddly enough, speaking and talking are often used as substitutes for writing, as in ‘What should I talk about next in my thesis?’ They serve to imbue a written context with emotional and engaged oral qualities (Lakoff 1982). But the effect is not bi-directional. Even composing text with speech recognition technology does not serve to lend written qualities,

such as visual and permanent, to talk. There is a fundamental asymmetry between perceptions of the visual and aural in Western culture.

Thus it is inconceivable to many that spriting could produce the developmental changes and intellectual maturity that people associate with writing. Critics challenge, *Writing is based on those formative elements called letters, and learning the alphabetic principle is fundamental to intelligent development.* I raise questions about pervasive assumptions that are commonly made about the value of reading and writing, or what Marvin Minsky might call 'bad memes.'

Bad meme: *Children must learn to read and write at four or five years of age.* Arguments for learning to read and write verge on the hysterical. Why? To understand the cultural revulsion towards any lessening of the hegemony of textual literacy, let us look to the 18th and 19th century. At that time, those of European descent were exploring the world. As they did so, they divided social systems into evolutionary categories of savage to human. (Writing was evidence of the human.) They also judged scripts on a worldwide basis on a scale of primitive to advanced, labeling hieroglyphics and early pre-linear alphabets as primitive and the alphabet as most advanced (Drucker 1995). Predictably, this established Europeans as intellectually and socially superior to other (colonized) peoples. These ideas continue as strains in scholarly work today. Eric Havelock claimed that Greek society was rendered literate *by virtue of its alphabet's phonetic character*, thus making all other forms of script inferior to phonetic (Havelock 1976).⁸ Even more recently, neuroscientists have set out to 'prove' that the actual structure of the Greek alphabet brought changes in cognition, by studying how learning the alphabet impacts the brain (de Kerckhove and Lumsden 1988; Hashimoto and Sakai 2004), with the intended implication that people who read alphabetic text are more creative and scientifically generative than those who do not. The implications of such a hypothesis are that people who write in more semasiographic forms, such as Chinese, Japanese, and many Native Americans, have not achieved the cognitive sophistication of Europeans. Every language is a full, expressive language, and most languages have never had a script (Ong 1977). The absence of a script, or the way a script segments and represents sound, simply cannot be used as evidence of cultural superiority or to justify racist agendas.

This history allows us to understand the deep resistance to being labeled illiterate. It is not so much a neutral description of one's lettered ability as a challenge to one's very humanity, a term of grave disrespect.⁹ Walter Ong wrote, "Because we have by today so deeply interiorized writing, made it so much a part of ourselves... we find it difficult to consider writing to be a technology" (Ong 1982, p. 82). He warned, "Freeing ourselves of chirographic and typographic bias... is probably more difficult than any of us can imagine" (p. 77). Likely the best way to make visible what the bias of old technology served to obscure is by introducing new technology and with it, new practices of use. To honor the many peoples who simply found writing superfluous to the development and preservation of their

⁸ Through applying the same logic, Johanna Drucker writes that if the Greek's literacy was made superior through its well-suitedness to their spoken tongue, anyone who speaks English must be inferior because of the ill-suitedness of our alphabet to our spoken tongue (Drucker 1995).

⁹ I am indebted to my thesis reader Mel King for this insight.

epistemological systems, I use the word *unlettered* or *not letterate* in this thesis to refer to those who do not use a written script.

Ultimately, hysterical arguments for learning to read and write are self-defeating on a day-to-day, child-to-child level. There is enormous tension generated around learning to read at an ever-decreasing age. Trying to make five-year-olds learn to read and write when they are having trouble doing so—or can see no good reason for doing so—creates an entire class of children who believe they are stupid. It is not that students today are learning less or are poorer learners, but that educational requirements for letterate abilities are rising (Snow, Burns, and Griffin 1998). Perhaps students have not had the formative oral preparation for the kinds of literacy and letteracy that children encounter in school, which many White, high SES children have had (Purcell-Gates 1991; Heath 1986). Perhaps, as Aaron Falbel discovered in his study of ‘non-forcing’ Danish schools, children will learn to read and write at 7, 8 or even 9 years of age—when they are ‘ready’ and can understand the value for themselves in doing so (Falbel 1989). Perhaps, like the peasants who Paolo Freire reports became letterate very quickly as adults, one needs first to realize the connections between letteracy and social emancipation (Freire 1970). Perhaps students have difficulty with reading and writing due to some physical or neurological impairment, but can learn to compose and interpret through other tools. We need many more rich ways of becoming linguistic composers and interpreters, more ways than writing and reading.

Bad meme: *‘Being educated’ invariably includes knowing how to read and write.* Reading and writing are in large part assumed responsible for cognitive development. Yet, reading and writing skills are not the cause of the cognitive effects of education. Scribner and Cole showed in their comprehensive study of the literate but uneducated Vai people of Liberia that it is the effects of education—school culture, effectively—that accounts for the cognitive effects typically attributed to literacy (Scribner and Cole 1981). They argued that “the tendency of schooled populations to generalize across a wide range of problems occurred because schooling provides people with a great deal of practice in treating individual learning problems as instances of general classes of problems” (p. 251). They recommend that close attention be paid to the contexts and uses of literacy, as “particular practices promote particular skills,” and caution against universalizing any epistemological practice.

Bad meme: *Poor writing reflects poor thinking.* Our definition of good writing is based upon old social hierarchies, not cognition. To take one example, William Labov (amongst others) rigorously showed how unlettered youth in Harlem, New York City, speakers of African American Vernacular English (AAVE), demonstrate more rhetorical skill than middle-class speakers of more mainstream English vernaculars—and run circles around most researchers, to boot (Labov 1972). Yet when these youths are taught to write in school they are often unsuccessful because, amongst other discouraging factors (Michaels 1981), they are expected to write in a different dialect than the one they speak that some call White English Vernacular (WEV). While they are, of course, intellectually capable of learning Standard White English, some instruction can confuse matters rather than help them learn (Labov 1995). The damage to their self-esteem and sense of identity, not to mention academic prospects, is immeasurable. Recent work in teaching underachieving AAVE speakers have found success by honoring the students’ home culture and dialect in literacy instruction (Lee

1997, 2001), and also exposing students to Standard (White) English dialect and allowing them to choose whether or not to adopt it (Delpit 1995). I believe spriting offers new possibilities, not because new technology will determine outcomes, but because it presents issues of language diversity in a different concrete form than writing, an already over-determined form in most classrooms. Thus, spriting may better support pedagogy that seeks to make dialect and issues of power and privilege a focus.

Bad meme: *Writing is the only way to learn literate concepts.* Spriting and talkuments may level the linguistic playing field. As I will describe more extensively in the Background section, literacy involves making language explorable and concrete – an object for inspection, reflection, and analysis. Spriting can also do this, albeit with different compositional units, potentially allowing many literacy benefits to be accrued through spriting alone. This might provide an alternative path to literacy. Students who have not excelled at school-based writing might first realize motivation for composition and editing through spriting, not the least because sound-based literate forms might appeal more to the forms of meaning important to young people today. And the skills they develop in spriting might transfer to writing, as well as prepare them for quicker and more successful reading and writing acquisition, should they so desire.

1.4.4 Rooting the Definition of Voice in Speech

The idea of ‘voice’ is often attributed as a central ingredient to ‘good composition,’ but there is precious little agreement about what it means or how to identify it.¹⁰ In a review of the literature on voice, Kathleen Yancey outlines various conceptions of how voice has been treated:

1. as infusing the process of writing;
2. as a reference for truth, for self;
3. as a reference for human presence in text;
4. as a reference for multiple, often conflicting selves;
5. as a source of resonance, for the writer, for the reader;
6. as a way of explaining the interaction of writer, reader, and text;
7. as the appropriations of others: writers, texts;
8. as the approximations of others;
9. as a synecdoche for discourse;
10. as points of critique;
11. as myth (1996, p. xviii).

Although these are powerful ideas, their very diversity and abstraction do not help us identify when one is ‘using voice’ or not. Possibly due in part to the graphocentric legacy that pits writing and speaking against each other on axis of complexity, intellectualism, literacy and more, voice is rarely defined as the use of one’s own spoken features in one’s writing, though some theorists and researchers dance very close to that conclusion. Barbara Johnston argues that a speaker cannot be “articulate” without drawing upon their

¹⁰ Catherine Snow has remarked publicly that there are few if any identifiable features of “voice” in writing, making it difficult to measure or treat.

idiosyncratic linguistic models drawn from class, ethnicity, region and gender and used to construct their individual voice (1996). Taylor Stoehr writes:

The writer is always the “I” whether he admits it or not. Finding one’s voice may be partly a matter of trying out different roles, and imagining oneself as someone else, but these different stances must be more than poses. They are imaginative attempts to discover one’s ...posture and speech (1968, p. 161).

It might be that it is only when one has deeply appropriated writing as an instrument for representing, communicating and examining one’s thoughts can voice be realized in writing.

While everyone has voice in speaking, it is not just because one is using one’s voice. Voice is about what is most individual about each of us: our idiolect, the experiences we’ve had, who and what we identify ourselves with, and cultures and languages we’ve internalized. While much of this affects emotional and cognitive development, it is not separate from the material ways in which we put on our identity and are claimed by it simultaneously. I define *voice* as the complex of structures available in one’s speech, including the so-called paralinguistic (prosody and rhythm) in addition to the linguistic (phonology, syntax). Some of these structures are transportable to written expression, in particular the morpho-syntactic structures and choice of lexicon.¹¹

Voice matters in the consumption of text/talkuments also. When people read a text written by an author they know, they imagine that author’s particular voice (or if they don’t know the author, they imagine a voice similar to the characteristics they attribute to that author) saying those words. This imaginative extension helps them comprehend the text. In this way, voice can be both a feature of literacy production and consumption.

With voice defined as characteristics that can be located particularly in speech but also in writing, researchers might consider the effect of voice as a legitimate writing variable rather than a mythic or merely metaphorical stylistic. It further serves to unify our literary theory to our knowledge of how language is related to composition development. It requires taking into consideration one’s oral language abilities when evaluating and developing writing, each thus serving as a ‘checksum’ reference to the other.

But the power differences that are produced and reproduced through voice--different ways of speaking—cannot be ignored. James Baldwin writes an unparalleled statement about language diversity and power within a culture (Baldwin 1979):

People evolve a language in order to describe and thus control their circumstances, or in order not to be submerged by a reality that they cannot articulate. (And, if they cannot articulate it, they are submerged.) A Frenchman living in Paris speaks a subtly and crucially different language from that of the man living in Marseilles; neither

¹¹ The materiality of writing has long served to identify people in ways similar to their voices. Handwriting was taught in colonial America to identify and distinguish gender, education and class (Thornton 2001), while the difference between handwritten and printed text was itself the difference that held between the personal and public spheres, respectively (Drucker 1995). Even though many people use print and digital technology now, there are nevertheless aspects of typographic design, formatting, and print quality that serve to identify and distinguish individual efforts, and connect them to broader sociocultural meaning (McGann 1991).

sounds very much like a man living in Quebec; and they would all have great difficulty in apprehending what the man from Guadeloupe, or Martinique, is saying, to say nothing of the man from Senegal--although the "common" language of all these areas is French. But each has paid, and is paying, a different price for this "common" language, in which, as it turns out, they are not saying, and cannot be saying, the same things: They each have very different realities to articulate, or control.

What joins all languages, and all men, is the necessity to confront life, in order, not inconceivably, to outwit death: The price for this is the acceptance, and achievement, of one's temporal identity. So that, for example, thought it is not taught in the schools (and this has the potential of becoming a political issue) the south of France still clings to its ancient and musical Provençal, which resists being described as a "dialect." And much of the tension in the Basque countries, and in Wales, is due to the Basque and Welsh determination not to allow their languages to be destroyed. This determination also feeds the flames in Ireland for many indignities the Irish have been forced to undergo at English hands is the English contempt for their language.

It goes without saying, then, that language is also a political instrument, means, and proof of power. It is the most vivid and crucial key to identify: It reveals the private identity, and connects one with, or divorces one from, the larger, public, or communal identity. There have been, and are, times, and places, when to speak a certain language could be dangerous, even fatal. Or, one may speak the same language, but in such a way that one's antecedents are revealed, or (one hopes) hidden. This is true in France, and is absolutely true in England: The range (and reign) of accents on that damp little island make England coherent for the English and totally incomprehensible for everyone else. To open your mouth in England is (if I may use black English) to "put your business in the street": You have confessed your parents, your youth, your school, your salary, your self-esteem, and, alas, your future.

While in America one's 'way of speaking English' is not quite so deterministic as it has been in England, it is nonetheless a powerful indicator of who you are. Vernacular language is often central to our identity, world knowledge and understanding. For speakers from sociocultural linguistic communities of low status and power, vernacular language is a means of distinguishing themselves from and protecting themselves (body and mind) against a broader hegemonic culture (Emery 2000; Acton and Dalphinis 2000). About the African American experience in America, Baldwin continues,

It is not the black child's language that is in question, it is not his language that is despised: It is his experience. A child cannot be taught by anyone who despises him, and a child cannot afford to be fooled. A child cannot be taught by anyone whose demand, essentially, is that the child repudiate his experience, and all that gives him sustenance, and enter a limbo in which he will no longer be black, and in which he knows that he can never become white.

Thirty years ago, in recognition of the ways in which language in use represents and reinforces identity, the National Council of Teachers of English voted to adopt a position statement on 'Students' Right to Their Own Language' (NCTE 1974). It says:

We affirm the students' right to their own patterns and varieties of language -- the dialects of their nurture or whatever dialects in which they find their own identity and style. Language scholars long ago denied that the myth of a standard American dialect has any validity. The claim that any one dialect is unacceptable amounts to an attempt of one social group to exert its dominance over another. Such a claim leads to false advice for speakers and writers, and immoral advice for humans. A nation proud of its diverse heritage and its cultural and racial variety will preserve its heritage of dialects. We affirm strongly that teachers must have the experiences and training that will enable them to respect diversity and uphold the right of students to their own language.

Yet, thirty years later, almost no progress has been made on this front. Standardized exams, including the newly revised 2002 GED and the new SAT, claim in opaque language to require proficiency in Standard American. Numerous scholars have studied how if AAVE speakers use AAVE 'voice' within their writing, they are marked down for it (Emery 2000). As recently as 1996, fiery debates in California about the use of AAVE (or Ebonics) in literacy education ended in lack of federal funding and dismantling of the program.¹² Ironically, it is often the upwardly mobile people of color who most vigorously oppose the use of the vernacular within education (Delpit 1995; Hymes 1996; Hancock 2000).

Most importantly, there is general confusion about the 'place' of vernacular language in the classroom and its relationship to literacy. While the NCTE statement calls for students' right to use their vernaculars, most efforts are intended to use the vernacular for the purpose of transitioning to the powerful prescribed 'standard.' Recently, sociolinguists, educators and Creolists who recognize the continuing failure of the education system to accommodate diversity, recommend policy of multiliteracies (Cope and Kalantzis 2000) and multi-lingual approaches (Acton and Dalphinis 2000). Acton and Dalphinis specifically recommend different preparation for teachers: "If grammar is to become politically important, then it is vital that educated people receive some grounding in a scientifically based descriptive linguistics before they are exposed to the moralizing prejudices of prescriptive grammar" (p. viii).

All of this is to say that there is a tremendous need in pluralistic education to recognize the connections between speaking and writing in new and powerful ways. Along with incisive scientifically-based socio-linguistic studies and grassroots mobilization for change, we need new technology to help us educate teachers in descriptive and comparative techniques; provide better tools for treating the difference between speaking and writing as one of 'translation' between different forms, styles, and registers; and most of all to disorient the duplicitous 'transparency' of writing—from emergent writing to full narrative forms—

¹² Literacy programs based in AAVE, incidentally, are still recommended as a strong approach (Labov 1995) and have never received a full evaluation because of the political backlash that forces program discontinuation (Emery 2000).

that can so easily condemn some legitimate ‘vernacular’ efforts as ‘wrong’ and reward other equally ‘vernacular’ efforts as ‘right.’ With advanced spriting technologies, there is also the exciting potential for languages that have never before had the need to create a written representation (e.g. Romani) to bypass the hegemonic necessity of choosing between dialects when inventing writing standards.

1.5 Four Kinds of Contributions

I develop four ways in which spriting is significant: as an invention of a new way of realizing literacy with unique material and literary qualities, as a window onto cognitive processes that can be seen and experienced more clearly in spriting than in writing, as making educational contributions to literacy learning, and as a way of improving general access to knowledge in the world.

1.5.1 For its Own Sake

New forms only seem empty, John Cage reminds, because of our unfamiliarity with their principles (Cage and Retallack 1996). Our voice apparatus is produced through exhalation of air through vibrating membranes, conditioned through the shape, elasticity and tension of the flesh, muscle, and bone. Whether we are standing or sitting, excited or calm, tense or relaxed, thoughtful or belligerent, these are evident in the way we speak. Our voices represent gender in ways that vary from culture to culture (Lieberman 1996). Our bodies register emotion in physical ways, transferring through the voice in intimate ways that is simply not evident in writing (Scherer 1981). Even how we are thinking—our cognitive processes—are evident in our speaking voice (Goldman Eisler 1968).

These material features of speaking—the rhythm, tone, and voice quality—become a central part of composing with spriting and interpreting talkuments. When students sprite and aude, not only do they listen to what they said (the linguistic), but they also listen to how they said it (the paralinguistic). The paralinguistic aspect of speech can be thought of as the qualities of sound that cannot be represented in text. “Sound is language’s flesh,” wrote Charles Bernstein, “Sound, like poetry ‘itself’, can never be completely recuperated as ideas, as content, as narrative, as extralexical meaning.” (Bernstein 1998, p. 15). I will call these unrecuperable characteristics of speech material its *semantic repleteness*.

While new tools do not *cause* change, they make way for different kinds of content and experiences.¹³ To take an example in architecture, would we have the legacy of Modernist buildings without the introduction of reinforced concrete, which permitted enormous seamless surfaces and walls of glass? In the same way, spriting opens the door to new kinds of play with linguistic structures. Conversations may become compositions, encouraging deep inquiry into the interactional experience of others and the lived experience

¹³ I particularly like the ‘design by society’ perspectives of recent science and technology theorists, which are working to extend design decisions more broadly for the purpose of forming an “exemplary society” that more equitably serves more people (Woodhouse and Patton 2004). They are developing very useful language. For example, neither guns nor people are completely responsible for killing others. But guns are *valenced* towards killing people.

of the everyday. Using social processes (e.g. speech, conversation) as material has an illustrious history, including, for example, Plato's dialogues, up to recent work of the Black Arts Movement (e.g. Amiri Baraka, Askia Muhammad Toure, Kalamu ya Salaam), Sound Poets (e.g. Henri Chopin, Bernard Heidsieck, Oyvind Fahlstrom), Beat poets (e.g. Allen Ginsberg), as well as rap and hiphop music. Spriting permits the kind of concerns these artists and intellectuals had to be discovered anew, illuminating subjects and materials too often rendered invisible when looked at through a textual lens.

Writing has become a kind of neutral currency. Copy and paste off the Internet is the way to do homework. Students buy and sell essays. If spriting were used in school settings, students might become responsible for using their own voices in ways that can only ever be metaphorical in writing. Their cognitive and emotional states, and possibly shifting cultural affiliations, would be recorded into the composition, providing a vehicle for admitting these characteristics into literacy education itself. From a teacher's perspective, the semantic repleteness of talkuments may aid teachers in diagnosing their students' comprehension, conceptual understanding, and level of personal engagement. For example, knowing where someone hesitated or had little conviction – almost impossible to detect in writing – is a clue to how, and how well, students know. For teachers, the speech prosody encoded in spriting can be a barometer of understanding.

1.5.2 For Revealing Social and Cognitive Processes

The past fifty years have yielded a wealth of discoveries about the processes of composing and the potential difficulties that can derail efforts to produce an effective text.¹⁴ Yet, this thesis finds (unexpectedly) that there remain things to be learned. Possibly even very significant things. But it might be that the next major insights are to be had by looking at the process from different perspectives than writing, including speech recognition dictation, spriting, and other technologies and composition activities that will certainly follow.

Certainly this thesis confirms the importance of the social in composition development; other people can positively influence one's own ability to compose. But spriting moves collaborative efforts to a unforeseen level of intimacy: it merges invention, planning, drafting and reflection into the same conversation. This kind of collaboration seems rarely explored in the business-oriented kind of collaborations that 'divide and conquer' composition tasks, or the classroom kind of collaborations oriented only towards editing and review. Spriting collaboration appears to lean toward genre that are inherently dialogic, towards forms that admit conversation as a foundational means of composition. It allows some highly successful pre-school and early elementary peer collaborations to extend into later years and more sophisticated composition contexts. Children learn strategy from each other, as well as the narrative forms so eloquently documented in research on learning from peers.¹⁵

¹⁴ I am thinking of the re-orientation towards processes of invention and the emergence of a writing process (Rohman and Wlecke 1965), the later critique that the processes of invention and drafting cannot be seen as sequential but iterative (Perl 1994; Emig 1971), the cognitive demands of which require planning (Hayes and Flower 1980; Flower and Hayes 1980), and the many reasons why someone might have difficulty (e.g. Shaughnessy 1977; Rose 1994; Bereiter and Scardamalia 1983).

¹⁵ (e.g. Daiute 1986; Nicolopoulou 2002; Pellegrini et al. 1998).

Cognitive phenomenon are also evident, including the important role of the emotions in thinking. Children need to approach the task of spriting differently than they do writing. While production factors associated with writing conceal their planning activities, the less time-consuming and faster processes of spriting production lay bare their need for planning throughout the composition process, forcing them to *think about thinking*. One way they learned to cope with the different production requirements of spriting was to learn to pause deliberately.

The spriting activities of children demonstrated a continuity between talking and singing. Some children used singing to remain rhythmically engaged in the composition process, perhaps in a manner similar to using doodling and drawing to perpetuate thinking in the writing composition process. Some children were only able to approach the threatening immediacy of the spriting task through singing, thus providing them self-confidence and motivation to keep trying. Singing also seemed to provide another way to 'talk' about their subject matter, providing examples and development to a topic, as well as musical songs forming the subject matter itself in a new way.

1.5.3 For Learning to Write

Many students currently struggle with the task of learning to read and write for school settings. The majority of learning disabled students is labeled as such because of difficulties with reading (Snow, Burns et al. 1998). For some, the challenge proves too great. If a student is not reading with modest facility by the third grade, it can be predicted that they will drop out before they graduate from high school (Snow, Burns et al. 1998). Spriting might allow students who struggle with reading and writing to learn fundamental composition principles, like the role of editing, organization, and considerations of audience and genre, in a different but equally effective way. Students could then meet the compositional requirements of History, Language Arts/English, Science laboratory and other writing intensive classes through spriting. Talkuments could substitute for texts to demonstrate deep thinking and development in an area.

To accept spriting as a substitute for writing would, to explore one implication only, require dealing with issues of language diversity ignored for all pragmatic purposes for too many years. 'Writing for school' considers only a narrow band of grammatical performance acceptable.¹⁶ The General Education Development (GED) exam provides a good example of how language diversity and power affects students in very real ways. The newly revised 2002 GED exam requires students to pass a timed essay, which the students I met loathe and approach with trepidation. There is a wide array of printed commentary explaining to teachers and students how the essay is scored. One can infer very different perspectives on language diversity from these commentaries. One commentary provided to GED students reads:

¹⁶ By diversity of talk I mean dialect, accent, and performance by English Speakers of Other Languages, as opposed to differences in register, the level of formality. Talk and writing can range from casual to formal. Regardless of dialect, accent and so on, learning how to control register to achieve desired ends is important in and out of school.

Please note that there is NO QUICK FIX to poor grammar skills or poor writing protocol. You have to PRACTICE writing the right way. Check with your local Adult Education program for training.

EAE mentioned below means “Edited American English.” That is the common sense “rule book” by which grammar is scored.

Since the “Edited American English” rulebook is purportedly commonsensical, no booklet or grammatical definitions are given. One may only assume that the many preparatory books—which teach a historically (White) Northeastern dialect (the high-status dialect of American English)—are in fact teaching what the scoring rubric calls Edited American English. To add insult to injury, “...there is no quick fix to poor grammar or poor writing protocols. You have to practice writing the *right way*” (my emphasis). Many students taking this exam do not consider “Edited American English” commonsensical, nor do they know how to practice writing the *right way* when they speak in a very different way. Although other commentaries are at great pains to emphasize that essay organization and coherence matters more than grammatical and mechanical correctness, there is no escaping that language diversity is not clearly addressed and using Standard White English grammar matters very much. In fact, verb conjugation and tense—forms that vary by dialect—are directly tested in a multiple choice portion of the exam. How does this affect students? Using 10 years of GED results from Florida, researchers found that Whites had an initial pass rate 30% higher than Blacks—a wider discrepancy than the 11% difference between Whites and Hispanics, who have the option of taking the GED in Spanish (Tyler, Murnane, and Willett 2000). The same researchers found that the writing exam is the biggest roadblock to male examinees (Tyler, Murnane, and Willett 2004).

At heart, this is a political and social issue, and while solutions are not straightforward, new technology such as spriting may find a role in helping people refine the political conversation. If students’ talk can be edited and distributed in ways that parallel writing, can assessment accommodate more diverse uses of language? What can we learn about the relationship between language and power through the process of spriting—would dialect and issues of power be addressed more often in schools? Would attending to the relationship between talk and text benefit some of the most politically embattled students?

1.5.4 For learning through spriting

In the case of both young children and seasoned adult learners, learning to read and write might eventually be seen as a kind of educational ‘side-dish.’

Jeanne Chall divides schooling broadly into two periods: learning to read, and reading to learn (2003; 1983). When children begin school in the ‘learning to read’ stage, they are provided highly simplified texts (e.g. basal readers) that are often “reasonably pedestrian, in that [the] choice of language is both limited and somewhat stilted” (Christie 1987). Even during this intellectually dull period, socioeconomic differences at home help some children continue to develop intellectually in ways that schools reward (Hart and Risley 1995). Maybe not coincidentally, when content areas are introduced in the fourth

grade, as children enter the 'reading to learn' stage, many low-income children are unprepared to deal with it intellectually, first falling behind in vocabulary and then comprehension, as texts they encounter contain higher percentages of uncommon words. Even given dedicated reading and writing attention, nearly 25% of young children still experience difficulties in learning to read and write (Snow, Burns, and Griffin 1998).

Spriting and auding might lead to alternate models for elementary education. Oral comprehension leads reading comprehension until at least high school (Sticht 1984); therefore, elementary school children should aude an increasingly rich set of genre and content, with active instructional attention on vocabulary, whole discourse comprehension, and use. Through spriting, children might realize the role of composition in the inner life of the mind and the outer life of communication more expediently than by writing. By relistening to their spriting (in contrast, they have difficulty reading their own writing), children might develop an intuition for the purpose and function of editing earlier. They might become more skilled at shaping compositions to suit their own intentions and anticipating how others might interpret their composition. The least literacy-prepared students, often low socioeconomic status (SES) children, through their early interactions with richer content and intensive classroom focus upon meanings and uses, could have more chances in school to interact with words and content ahead of grade level rather than one year behind on average (Biemiller and Slonim 2001; Biemiller 2001, 1999).

Reading and writing should be relegated to a secondary position, if not introduced much later after a child has encountered a significant diversity of compositions, has a facile grasp of language and ideas, and can participate capably in discussions with the teacher and peers. In this way, the literate materials children encounter upon entering school would be more equal to their intellectual abilities.

The many unlettered adults in the world would clearly benefit from new approaches to composition and literacy. Table 2 shows UNESCO collated data on the literacy abilities of 874 million adults worldwide.¹⁷ In the United States, one-in-four adults function at the lowest literacy level, a fact I experienced on a personal level during my design research in an adult learning class last year. But I note that in more developed regions where literacy rates are highest, radios outnumber newspapers nearly 5:1 – do even letterate people *prefer* to access knowledge through *listening*?

¹⁷ UNESCO uses data that defines an individual as literate if they have completed five or more years of schooling, due to the indirect methods of assessing literacy used by many countries in the world. Of course, as we in the United States know all too well, time spent in school in no way guarantees learning outcomes. With that understanding, then, we should interpret the data in Table 2 as a statistical “best case scenario” report of the world’s literacy levels.

UNESCO Region	Adult Nonletterate Population (1000s)	Adult Nonletterate Rate (Total %)	Adult Male Nonletterate (Total %)	Adult Female Nonletterate (Total %)	Public Educational Expenditure (% of GNP)	Radios /1000 People	TVs /1000 People	Newspapers /1000 People
<i>More Developed Regions</i>					5.10	1287	625	286
<i>Transitional Countries</i>					5.20	403	318	114
<i>Sub-Saharan Africa</i>	140,500	43.20	33.40	52.70	5.6	169	33	12
<i>Arab States</i>	65,500	43.40	31.60	55.80	5.20	251	109	37
<i>Latin America/Caribbean</i>	42,900	13.40	12.30	14.50	4.50	387	192	80
<i>Eastern Asia/Oceania</i>	209,900	17.40	9.40	23.70	3.00	199	170	57
<i>Southern Asia</i>	415,500	49.80	37.10	63.40	4.30	88	43	27

Table 2 UNESCO data on literacy rates worldwide.

Teaching adults to read is not the same thing as beginning a relationship with the kind of ideas most often found in books. Like the decoding skills necessary for reading, which can take well over 50 to 100 hours to achieve (Sticht 1984), the development of large bodies of knowledge takes a long time. Therefore, to accommodate the purposeful nature of adults seeking education, Tom Sticht believes adult education should make literacy concerns subservient to content concerns (1997) :

“Adults generally want literacy improvements to pursue some other goals, such as getting their citizenship, improving their parenting abilities, getting into post-secondary education, or getting into a job or into job training. ...Many research and demonstration projects show that reading can be taught using the content of job training—or other contents, such as parenting, religious study, health—right from the beginning levels of learning to read. Adults who want job training and are at the beginning levels of reading can learn and practice decoding skills during a part of the study period; during the rest of the period they can learn job vocabulary and concepts by listening to audio tapes, by ‘hands-on’ experiences with job tools, demonstrations, conversations, and illustrated books.”

Sticht developed a program called Functional Context Education (FCE) for adult instruction that uses audiotapes as key elements for learning. Adults then practice decoding to recognize vocabulary and concepts they have *already encountered* in the oral and hands-on learning program.¹⁸ In support of such instruction, spriting could serve the other half of literacy: as a tool for student production, reinforcing the aural emphasis on form and content. If expert spriting systems are developed, it could also provide ways for teachers and curriculum developers to develop audible/readable materials.

But reading itself may be less important for many adults than developing oral skills, especially those for eliciting information. Shirley Brice Heath found in her study of Black and White Appalachian families that adults most regretted not developing their oral rhetorical abilities, especially within conversational contexts (1982, p. 110-11):

“Trackton residents have to learn to respond to inadequate meaning clues, partial sentences, and pronouns without specified referents. In these latter situations, especially those in financial and legal institutions, Trackton residents recognize their deficiency of skills, but the skills which are missing are not literacy skills, but knowledge about oral language uses which would enable them to obtain information about the content and uses of written documents, and to ask questions to clarify their meanings. Learning how to do this appropriately, so as not to seem to challenge a person in power, is often critical to obtaining a desired outcome and maintaining a job or reputation as a ‘satisfactory’ applicant or worker.”

¹⁸ Tom Sticht claims these programs have been proven more successful (with over 12,000 adult learners across the country) than programs designed around theme or content-based instruction, like ‘life skills’ or other ‘functional’ basic skills programs (Sticht 2000, 1998, 1997, 1984).

Developing knowledge of spoken and textual genres, with particular attention to how certain uses of language command more power than others, and to negotiate those discourse and power relations, might be a useful curriculum for adult learners. This kind of education is more similar to an applied graduate course on Michel Foucault and Bruno Latour than a basic basal reader content. Spriting would provide the potential for such learners to engage in full cycle of literate action, both producing and consuming knowledge.

Of course, both of these child and adult future educational models are only tenable if there exist significant collections of rich audio material that teachers can provide, and children and adults can explore, for learning purposes. Although we have already limited libraries of books on tape and digital talking books, we need many more. To develop critical mass, it is important to develop expert technologies for spriting.

2 Research and Education Background

All children with normal neurophysiology raised in social settings learn how to speak. But not all learn to write. Why? A popular claim today is that humans have evolved to speak (Chomsky 1975; Pinker 1994) even against the greater risks introduced for choking (Liberman 1996), relegating writing to a secondary system parasitic on oral language and thus more prone to failures. Some linguists make structural comparisons between speech and writing. For example, Wallace Chafe (1994) argues that writing consists of units that are longer and more complex, more subordinated and interdependent, than equivalent units in speech. Others focus on the diversity of social-historical uses of one mode versus the other, emphasizing the features of language in use rather than mode, and dispute determinist claims (e.g. Heath 1983; Finnegan 1988).

I explore similarities and differences in comprehension, production and process between writing and speech (see also Sperling 1996; Kantor and Rubin 1981), to build questions and predictions about spriting, as follow:

1. What does the literature on *comprehension* suggest about auding?
2. What does the literature on *production factors* suggest about spriting?
3. How are writing *process models* (broadly construed) both sufficient and insufficient for spriting?

Finally, I present specific hypotheses and predictions I carry forward into the empirical parts of the thesis.

2.1 Auding and Reading Comprehension

When able children and adults have trouble reading a text, they will have the same difficulty comprehending it when it is read out loud to them (Sticht 1984; Gibbs 1984).¹⁹ How can this be true? It should be simple enough to understand something if its read out-loud. But herein lies the error of simple-minded phonics approaches to teaching reading. Unfamiliarity with the world knowledge, genre, and vocabulary represented in these discourses—and the cognitive approaches to monitoring one’s own comprehension—is as fundamental to auding comprehension as it is to reading comprehension. Therefore, one is literate with respect to a particular text or talkument when one has enough knowledge and skills to comprehend a discourse *either by reading or auding it*.

The role of world knowledge in the production and comprehension of discourse has been demonstrated through the efforts of artificial intelligence. Roger Schank (1982) argues that we can understand world knowledge as a multitude of scripts, goals, plans, and beliefs. Children's limited experience with the world does not give them exposure to adult beliefs, scripts beyond their immediate neighborhood, goals beyond eating and playing, or plans for achieving those beyond asking permission from their parents. Schank believes reading

¹⁹ Comprehension is defined here as reading or auding some linguistic object for meaning (Baker and Brown 1984).

development is about exposing children to progressively less familiar narratives, with more complex beliefs, goals and plans, which serve to motivate the conflicts and action. His theory ties reading comprehension strongly to personally lived experience, while making no distinction between the mode (e.g. auding, reading) of consumption.²⁰

Knowledge of many types of genre develops expectations of how form and content are presented, aiding comprehension of even unfamiliar pieces. For example, newspaper articles are known to state the '5Ws' (who, what, where, why, how) in the first sentence or paragraph. A reader would also not expect the author to use the word 'I' as there is the expectation of 'objectivity' in all but the Opinion Section articles. Furthermore, newspaper articles historically 'frontload' the most important information ('upside-down' pyramid structure) to enable the article to be trimmed as needed to fit the available space. For this reason, a traditional reader of printed newspaper articles would always start from the beginning and not expect to be surprised at the end.

Genres also govern many forms of speech (Bakhtin 1986), and our conversational interactions are patterned and purposeful (Sacks, Schegloff, and Jefferson 1974; Goffman 1967, 1981; Duncan and Fiske 1985). Some theorists believe that textual genres are simply reified social interactions and purposes (Kamberelis 1999). For example, Scollon and Scollon (1981) provide very compelling data and analysis of the forms of social interactions in Athabaskan society in Canada and Alaska, and compare these interactional forms to Western forms. They argue that the literacy practiced in Western schools, which they call *essayist literacy*, is antithetical to the ways in which Athabaskan people interact politely, communicate their knowledge and intentions, and socialize their children. The effect of this mismatch is that Athabaskan children tend to perform abysmally on Canadian national measures of essayist literacy in comparison to other Canadian youth. For them to perform well, Scollon and Scollon argue, would require a fundamental reorientation of their ways of speaking and interacting.

Text and speech genres alike become deeply interred as cognitive models, guiding our interpretation of discourse in the world, broadly construed, and even of our thought.

Feldman and Kalmar (1996) wrote:

"[Written and spoken] discourse types are candidates for becoming cognitive models that guide interpretation. For if discourse of any type follows a certain pattern, and readers read it, the pattern becomes part of the reader's knowledge, 'going underground' to become a cognitive model, or a framework for construal. Through this process, the genres of literature, as well as, for example, the discourse patterns of ordinary conversation, or scientific writing, or even classroom talk can become mental models that guide interpretation" (p. 438-9, my substitution).

Due to their familiarity with the purposes and use of books, and the genre and vocabulary found in them valued in schools, children who have had many thousands of books read to them before beginning school are more successful readers than those who have

²⁰ I note here a need for a superordinate term that encompasses the modally specific activity or activities referred to as reading and auding.

not (Purcell-Gates 1988, 1991). Reading books to a child is one way of moving beyond the daily language routines constructed around food, hygiene, and activities to a wider and more imaginative conceptual sphere.²¹ Books can provide that, but so do other activities, including certain kinds of television programming (Wright et al. 2001). The most important thing for a child to develop ‘literate modes of thought’ when watching television (Close 2004) and when reading books (van Kleek et al. 1997; van Kleek et al. 1996) is that the caregiver interacts with the child around the content, issues, and material approaches to the program or book. Some children come to school already well-versed in the instructional dialogues common to school (Snow 1983), the narrative forms of storytelling (Michaels 1981) and storybooks (Michaels 1986) that serve to bias school success in favor of some and not others. Children thus prepared, usually middle to high socioeconomic status (SES) children, also enjoy more of the teacher’s attention and approval (Michaels 1981).

Words themselves are critically important. They are tools for forming, differentiating, and manipulating concepts. Each word can be seen as an idea, a carapace that contains experiences. Even more important than expanding one’s arsenal for outward expression, then, words become personal resources for thinking and learning. One of the most consistent findings in reading research for nearly a century is the correlation between vocabulary and comprehension. Simply put, larger vocabularies permit greater understanding. Recent research has pointed to large differences in vocabulary size between low and high SES children entering elementary school as a leading factor in whether the child experiences success in school (Hart and Risley 1995).

When children learn to read, they must learn to *decode* the printed form of a word they should already know from oral contexts. But while decoding is necessary, it is not sufficient.²² What if one does not know the word from an oral context? Children must do two things at once: struggle to construct the sound of the word (decoding), and struggle to construct its meaning through contextual, morphemic and other clues (word comprehension). This is a difficult task, and one that might require an already sufficiently large oral vocabulary (Snow, Burns, and Griffin 1998). Thus, many researchers argue that in elementary school, children should focus equal if not greater attention on building vocabulary knowledge—truly learning how to use words, not just memorizing them—through oral means (McLaughlin et al. 2000; Biemiller 2001), because oral comprehension sets the ceiling on reading comprehension (Biemiller 2003). In sum, a rich vocabulary is a necessary step towards learning to read, but much more importantly, vocabulary is a tool for thought, comprehension and expression, and should be developed with challenging aural materials early and often.

We may have put the cart before the horse by teaching reading as soon as children enter school. In the elementary grades, children tend to add new vocabulary and concepts mainly through ‘listening’ sources, such as parents, peers, and popular media, despite the fact they

²¹ Most routine language spoken between child and caregiver is limited to the same high-frequency words (McLaughlin et al. 2000; Hart and Risley 1995).

²² Decoding ability might itself be dependent upon the sheer size of one’s vocabulary: “The development of fine within-word discrimination ability (phonemic representation) may be contingent on vocabulary size rather than age or general developmental level” (Snow, Burns, and Griffin 1998).

are learning to read (Weizman and Snow 2001; Biemiller 1999). Little significant development of genre awareness occurs in these early grades as well (Kamberelis 1999), as teachers must place a total focus upon decoding and writing mechanics in order for students to be prepared to 'learn through text' in higher grades. Written curricular materials must be 'dumbed down' to the level of young children's reading and writing comprehension (Christie 1987), which is *on average* a year behind their oral language skills (Biemiller and Slonim 2001). Although researchers claim that comprehension of reading and auding begins to equalize at the eighth grade (Sticht et al. 1974), many students by that point have already slipped well below the average. For them, auding comprehension would remain superior.

2.1.1 Adults Learning Literacy and Letteracy

The case of nonletterate adult learners clarifies the problem and the challenge. Unlike children, nonletterate adults have well-developed oral language abilities and pragmatic knowledge for using language appropriately in the contexts they inhabit. Their reading comprehension *potential*, then, is very high. As such, researchers often assume that learning to read for them is simply a matter of teaching decoding skills. On average, this is false. Sticht and James (1984) report comparative results of assessing nearly 2,000 adults in both listening to and reading of the same written content. Although they predicted higher levels of listening ability, particularly at lower levels of reading (e.g. 2nd grade), predicted differences did not emerge when comprehending at the level of paragraphs and above. We learn a very important point: *Adults still have to learn how to comprehend 'text' even when auding.* A major task of learning to read—and a very under-appreciated one—is seeing both the differences and similarities between typical spoken exchanges and the long, monologic sequences found most often in textual mode (Sperling 1996; Ninio and Snow 1996). Knowledge of the world and vocabulary, many different genres and forms, a broad knowledge of history, science, literature, social studies and more, takes a long time to develop, regardless of which mode is used (Sticht 1997). Indeed, adult literacy levels can be assessed through the telephone at least as well as direct reading comprehension methods by simply inquiring about the adult's familiarity and recognition of popular figures and other world knowledge (Sticht, Hofstetter, and Hofstetter 1996). Through auding, learners can focus upon developing familiarity with 'textual' genre, world knowledge, and vocabulary at more sophisticated levels than their textual decoding abilities would otherwise permit. This is, after all, the motivation and goal for learning to read.

To summarize, learning a great deal about specialized forms of knowledge is critical to comprehension through reading or auding. But there seems little evidence against learner's ability to do so through auding, and a lot of evidence that learners of all ages would benefit from auding as a solution or at least an important supplement to learning.

2.2 Spriting and Writing Production

Before we learn to write, we learn to talk. Yet, writing is not simply 'speech written down' because of pragmatic, structural and social differences between modalities (Olson 1977). Nor is writing completely different from talk. One researcher found that in the fourth grade, one-

half of children begin to mouth the words they intend to compose, the frequency of which is correlated with the rated quality of compositions (as reported in Scardamalia, Bereiter, and Goelman 1982). The recent *emergent literacy* perspective paints a much more subtle picture of the relationship between oral and written acquisition, describing how children's writing development co-occurs with and is deeply intertwined with spoken meaning production (Sulzby and Teale 1991; Sulzby 1987). Even the development of punctuation – the so-called 'mechanics' of writing – has a developmental basis in prosody: the intonation of speech is often a child's first and only model for learning how to punctuate (Gumperz and Cook Gumperz 1976). But considerable work remains to be done on the relationship between oral and written language production (Sperling 1996), and how that should influence, in particular, education.

2.2.1 Oral Composition

People can create studied and deliberate oral 'structures' that compare favorably to literate structures and standards. Thus, talk is not an inherently inappropriate medium for producing and conveying literacy. Anthropologist Ruth Finnegan asserts that there are many and varied oral modes of discourse, many of which feature distance between speaker and audience in much the same way as writing, thus not displaying connectives or audience response features as conversational speech does (Finnegan 1988; Finnegan 1970, 1977). There are also numerous examples of nonletterate cultures who engage in sophisticated processes of composition and have a wealth of oral literature. To choose only one example, ethnologist Arthur Grimble describes the Gilbertese island poets in the South Pacific (as found in Finnegan 1973):

"It is only when the poet feels the divine spark of inspiration once more stirring within him that he deviates from the ordinary course of village life.... He removes himself to some lonely spot, there to avoid all contact with man or woman...This is his 'house of song,' wherein he will sit in travail with the poem that is yet unborn. All the next night he squats there, bolt upright, facing east, while the song quickens within him.

The next morning he performs the prescribed ritual for a poet, then goes to the village for five friends whom he brings back with him to his 'house of song.' Together they work on his 'rough draft.'

It is the business of his friends to interrupt, criticize, interject suggestions, applaud, or howl down, according to their taste...They will remain without food or drink under the pitiless sun until night falls, searching for the right word, the balance, the music that will convert it into a finished work of art.

When all their wit and wisdom has been poured out upon him, they depart. He remains alone again—probably for several days—to reflect upon their advice, accept, reject, accommodate, improve, as his genius dictates. The responsibility for the completed song will be entirely his" (p. 131-2).

The Gilbert Island poet engages in contemplation, numerous cycles of editing and revision and a day of peer review, to use our contemporary words for such activities. While Finnegan

cautions on the difficulty of appreciating the nuance of foreign literatures of any kind, she writes that the inspiration within the Gilbert island poets work is hard to deny. For example, Finnegan quotes a Gilbert island work (1973, p. 131-2):

Even in a little thing
(A leaf, a child's hand, a star's flicker)
I shall find a song worth singing
If my eyes are wide, and sleep not.
Even in a laughable thing
(Oh, hark! The children are laughing!)
There is that which fills the heart to over-flowing,
And makes dreams wistful.
Small is the life of a man
(No too sad, not too happy):
I shall find my songs in a man's small life. Behold them soaring!
Very low on earth are the frigate-birds hatched,
Yet they soar as high as the sun.

Finnegan concludes that on the basis of study of oral cultures from around the world, it is not justified to attribute the activity of writing as the cause of our literate modes of thought, for these modes can occur without writing:

"...One cannot assume as necessarily so, that individuals in non-literate (or largely non-literate) cultures are ipso facto less creative, thoughtful, self-aware or individually sensitive than people in literate cultures, and therefore fundamentally different in their modes of thought. Non-literacy itself is unclear and relative enough as a characterization; but the further assumption that non-literate cultures and individuals necessarily lack the insight and inspiration—the modes of thought—that we associate with literature seems on the basis of present evidence an unjustified conclusion" (1973, p. 144).

2.2.2 Dictated Composition

This thesis builds upon studies of dictation, that is, saying words for someone (or something) else to record them. Elementary school teachers have long taken dictation from children to capture the beauty of some oral composition and to impress upon them how literacy functions in a literate world. Tape recorders, dictation machines, and most recently, a plethora of computer technology that 'records' and/or attempts to 'recognize' dictation, have taken the place of these manual efforts.

Children and adults who dictate assume a different verbal 'posture' in both how they use words and the language they choose to use. This different posture might be related to notions that preletterate children already have about text and books. Elizabeth Sulzby writes

that amongst other characteristics, children speak much more slowly when dictating stories than when 'telling' them so that adult scribes can keep up (Sulzby 1987). Scribner and Cole's (1981) study of Vai culture in Liberia analyzed the content of letters that people dictated to scriptionally proficient people. They conclude, "Analysis of our letter collection made it clear that Vai letters are more than talk written down; they are a new, written form of discourse" produced orally (204). More provocatively, Scollon and Scollon (1981) claim that by using a tape recorder as a surrogate scribe, their 2-year-old daughter is literate because she used "wording of written language and the prosody of reading" (p. 135) and fictionalized herself as an author while addressing a fictional audience.

In most dictation recording and listening, there seems to be a certain amount of editing involved that largely goes unrecognized. Speech is full of filled pauses, false starts, incomplete words, and other detritus of the thinking and speech production processes. When we listen to others speak extempore, we pay no attention to these things. In the same way, we 'edit' a tape recording of dictated speech by not 'hearing' these things when we listen to it. Human scribes, in a similar way, tend to transcribe the thrust and intention of speech, not speech itself. For example, poets McCaffery and bpnichols (1991), who used dictation to each other as a poetic composition technique, deny that their use of dictation is actually a transcript of their conversation. They used dictation as a technique of 'oral deceleration': one dictated, the other wrote, though the one writing didn't always write what was being dictated. While they wanted "to somehow get beyond the cool, retentive approach to argumentation, carefully thought out and equally carefully (neutrally) presented, and to somehow stretch the thinking itself by forcing the inclusion of those emotional and energetic accompaniments which traditionally are held superfluous" (p. 141), they nonetheless desired a certain kind of editing of the dictation, because "you get a lot of useful information and a seeming feeling of spontaneity, you also get the more overriding sense of a lot of slackness, a lack of energy in the actual language, in the actual line of speech" (p. 140).

Speech dictation recognition technology has not yet been resolved with developmental, process, and poetic issues of composition. Speech dictation recognizers, trained statistically with written documents ('final drafts'), are founded on the assumption that people can produce lucid and fluent speech that models a written genre, speaking at normal speech pace and without the conversational aid of another human being. But many people (myself included) who write a lot like to write with word processors by testing out phrases, working on a phrase, then a sentence at a time, refining it, before moving on to the next (Honeycutt 2003). This piecemeal process is not permitted in speech dictation without incurring an overwhelming number of errors.

2.2.2.1 John Gould

John Gould compared well-educated adults' writing of letters and memos with their speaking of letters and memos on an IBM dictation machine (Gould and Boies 1978, 1978; Gould 1980; Gould 1982).²³ The machine recorded only when the user spoke and permitted

²³ Gould's use of the term 'speaking' is much more like spriting than it is like dictation since it produces 'spoken letters'.

editing operations like insert and delete. It had an aural interface, differentiating it from spriting technology's aural and visual interface.

Gould found that time spent planning versus composing consumed a constant two-thirds proportion of composing time across all modalities, indicating that higher-level processes are the main source of limitation for experienced composers. However, spoken letters consumed less total composition time: 35-85% less than writing across both simple and complex composition tasks. Even though less time was spent, spoken letters were judged to be no less cohesive than written letters (Goldberg 1979, as cited in Gould 1982). Five judges rated letters on effectiveness, finding the quality of written and spoken letters about the same. Gould notes, "The prosody and intonation seemed to make spoken letters about one's daily activities more personal than written letters.... In the other letter voice intonation sometimes conveyed additional sincerity about the dilemma in which participants found themselves" (1982, p. 153). Gould noted that listeners tended to overlook filled pauses (e.g. uh, um), disfluencies, and artifacts of editing operations when auditing the spoken letters.

In sum, Gould argued that the differences between writing and speaking are a style that can be learned and applied through either modality, finding that the three composers of the best-spoken letters were also judged to compose the best-written letters.

2.2.2.2 Scardamalia, Bereiter, and Goelman

Addressing how developmental issues interact with speaking and writing production factors, Scardamalia, Bereiter, and Goelman compare the writing and dictation of children in 4th and 6th grades (1982). They observed that inexperienced writers have difficulty doing two things at once: composing, and doing so in writing. Hypothesizing that composition would improve by removing the writing production factors (e.g. spelling, punctuation) that children find so difficult, they compared student performance on writing, dictating, and slow dictating essays. The writing condition was done by the child's own hand. Dictation was tape-recorded speech. Slow dictation was the experimenter writing down what the child says at the rate that individual child uses when writing. Dictation and slow dictation allow the researchers to separate the effects of rate from the mode of production (speaking or writing). Similar to Gould, they found that children produce essays twice as long in dictation mode as in both slow dictation and writing modes. No significant quality differences between dictation and writing were found. All essays, however, were very short.

Theorizing that the demands of producing language in isolation must likewise impact writing production, they examined the effect of conversational prompting on composition. In this second experiment, the experimenter encouraged the child verbally to continue producing more equally across all conditions. As a result of prompting, the quantity of discourse produced across all conditions doubled. Given these longer compositions, they judged the quality of textual products to be superior to both dictated products, in marked contrast to Gould's studies. They also found that differences in planning time (dictation versus slow dictation modes) had no effect on quality; they took this as evidence against planning being the most important aspect of the writing process.

To account for these findings, they speculated that the production disadvantages of writing might actually be cognitive advantages because a writer is forced to reconstruct their

high-level representation of what they are going to write more often as they switch between low-level production concerns and high-level composition concerns, thus iteratively improving and refining their cognitive model. Because dictation production is more facile and fast, it does not require reconstruction of the high-level composition representation as often. However, it is noteworthy that Scardamalia and Bereiter's experiment did not permit children to fully control the production of their dictation or slow dictation in the same way they controlled their writing. If children had full control over the recording and editing of their 'dictation' as they would in a spriting interface, might they attend to the mechanical level ('low') and discursive level ('high') more often, thus reconstructing their high-level writing representations more often in the process?

To summarize, although dictation requires consistently less time to plan and compose than writing, there is conflicting evidence about the quality of the resulting composition product. Gould claims equal if not superior results with dictating; Scardamalia and Bereiter claim superior results with writing – but only after conversational prompts are made a part of the process and with conditions that are questionably comparable.

Many questions remain, but this line of research largely fell by the wayside as word processors permitted easier writing and editing production cycles, and speech dictation recognition became tractable. Now, with the decidedly underwhelming effects of speech dictation recognition upon us, we can look at these early experiments again and wonder if we really need text at all.

2.3 The Way You Get There: Process Matters

In the writing process most followed in K-12 classrooms and beyond, planning is emphasized as the single most important part of writing because it reduces cognitive overload (Emig 1971; Flower and Hayes 1980; Hayes and Flower 1980). Outlining, brainstorming, concept mapping and flow diagrams, originally paper-based tools and now duplicated for digital use, have all been used to support making plans. In Hayes and Flower's cognitive process model, the single most influential work on writing process for decades, a writer lays plans and then translates from 'inner speech' to text (Hayes and Flower 1980). The entire process, from invention and organization processes to drafting and editing (both for rhetorical/communication issues and mechanical issues), occurs in textual mode.

But planning is not a panacea. As Turkle and Papert (1990) noted, planning may be more of an intellectual style, contrasting with *bricolage* style, either of which is more or less comfortable for certain individuals and on certain occasions. Planning activities further depend upon students already possessing enough metalinguistic awareness to permit themselves to imagine words as objects that can be manipulated and ordered. Certainly, for older students who have difficulty writing and have experienced repeated defeats in the process, the mechanical demands of expressing themselves in text simply overwhelm the process. When reading their text aloud, they often substitute corrections that are not there in the text (Perl 1994). Their concern with spelling errors and correct form constantly disrupts—

even stalls—their composition (Rose 1994). I observed that such writers cannot (or do not) plan using brainstorming or outlining because they believe ‘writing for school’ occurs in full sentences only. Such students, who have failed repeatedly at school tasks, have become highly sensitive to issues of standard syntax, mechanics and spelling, the simplest items to pick out from a poorly written paper. Whether they are writing on paper or on computer, they spend the majority of their time on character formation (if on paper) or character selection (if on computer) and spelling. Frequently they erase even the few words they have produced, certain it is incorrect.

Highly skilled writers, on the other hand, concern themselves first and foremost with ideas and how best to represent them to the audience (Sommers 1994, 1994). The effect of a total focus on mechanics and conventions, is that unskilled adult writers rarely get to explore what they think, believe, and would like to express in an iterative, reflective manner.



Figure 2 One process of composition, as explored in this thesis, is spriting literacy to writing letteracy

One way that spriting could work is to facilitate an alternative composition process that leads to improvements in writing: students first explore their ideas through a spriting interface and then translate those ideas to a textual composition. As shown in Figure 2, the composition process is divided into two different modes, literacy and letteracy, mediated by a sub-process of translation. In Literacy mode, students fully articulate what they would like to say and then edit this language into a compelling composition. In Letteracy mode, students decide how to map their own language to textual conventions and formal written syntax. Translation is the process (manual, at this point) of deciding how to represent recorded speech in written text, thus using two communicative and expressive modes to negotiate a composition task rather than one. Thus, the composition process involves two equal halves: first, shaping ideas in speech; second, translating those ideas to text.

Translation requires explicit definition since it is often assumed the translation to text is done by machine. But I would argue that a composer should learn to know differences between oral and written genres and feel comfortable controlling them; therefore, the composer should be involved in translating the talkument to text. The question remains how. Is this learning best achieved by giving composers transcription software to aid them in writing out their talkument ‘by hand’ (supporting direct manipulation in the fashion of Terry Winograd, Ben Schneiderman, and Edward Tufte)? By giving them a machine-generated translation that they can edit (assuming the machine will one day be able to perform near perfect speech recognition)? Or do other relationships and processes between spriting and writing emerge?

In the empirical part of this thesis, I address the complex relationships that did in fact emerge.



Figure 3 The subprocesses of spriting literacy

Another way that spriting might work is to facilitate a literacy process that leads to better composition and editing skills. These spriting skills might be equivalent to those observed in writing. A spriting literacy process consists of spriting, relistening, and editing. The literacy process as shown in Figure 3 is iterative: a spriter creates and refines a talkument through successive iterations of the cycle. *Spriting* is the technologically supported act of recording speech and having it aurally and visually available for listening and organization. *Relistening* is the technologically supported act of hearing the recorded speech, in part or in whole. *Editing* is the technologically supported act of inserting, deleting, substituting, and rearranging audio pieces to form a composition well suited to its purpose.

2.3.1 Dialogic Instruction and Class Conversation

At all levels of literacy and writing acquisition, oral discourse effects writing. Because spriting is quintessentially composing with speech, it invites conversation as the heart of the composition process in ways that can only be treated metaphorically in writing. Discourse patterns in the classroom are implicated in knowledge creation and composition at all levels. The 'default' pattern of instructional discourse is *Initiation/Response/Evaluation* (IRE) (Cazden 2001). In IRE pattern, teachers ask questions to which they already know the answer, students supply the expected answer, and teachers give approbation or praise, accordingly. This discourse pattern reinforces that the teacher transmits knowledge, the students absorb it, and that evaluation is the exclusive domain of the teacher. In contrast, *dialogically-organized instruction* includes at least four kinds of interaction: (1) discussion; (2) authentic questions, which have no known or single answer; (3) uptake, for example, follow-up questions; and (4) high-level evaluation in which the teacher acknowledges and validates a student's response and puts it into the play of discussion. When students discuss together, they construct—not just consume—knowledge in the classroom. And they learn more. Students learned more and at greater depth in dialogically structured literature classes than in literature classes where 85% of all interaction is lecture, recitation and seat-work (Nystrand and Gamoran 1991).

Dialogic interaction is not easy to participate in or to engender. In classrooms where participants are not of equal status or homogenous history, especially, dialogic interaction can cause disagreements, conflicts, and anger to surface. This is not a bad result. Mary Louise Pratt pushes beyond utopian visions of conversation by defining what she calls the arts of the *contact zone*. Contact zones are "social spaces where cultures meet, clash, and grapple with each other, often in contexts of highly asymmetrical relations of power, such as colonialism, slavery, or their aftermaths" (1999). She believes that lecture in the contact zone is "anomalous and unimaginable" because, to deliver a monologue, one assumes that one's

words are equally true, coherent and revealing for all listeners. Rather, discussion in the contact zone is founded on different epistemic assumptions: “no one is excluded, and no one is safe.” All students have the experience of hearing their roots traced back to legacies of glory and shame. All students face ignorance, incomprehension, and occasionally the hostility, of others. Learning—and teaching—in the contact zone is not simple, but it is the basis of literate understanding in a multicultural, postcolonial world.

Sadly, one of the first things a child is taught in school is the IRE discourse pattern: follow the lead of the teacher, no matter how simple. Based on her three-year analysis of K-2 writing, Frances Christie shows how conversation between teachers and five-year-old children is limited to the reporting of simple sequences of personal events, without any of the “speculation or enquiry which are ostensibly part of the purpose of education” (1987, p. 12). She claims that the pattern of reasoning encoded into these chains of narrative sequences are then transferred into children’s writing practices, producing little more than chronological recounts of mundane personal experiences which do not improve with age. She believes that by underestimating the ability of five-year-old children to initiate new topics and evaluate their own personal experiences in classroom discourse, they learn not to initiate or evaluate in their writing composition as well.

High school classes are often no better. Defining *discussion* minimally as peer-to-peer talk, or at least three students and a teacher (without the teacher interjecting a ‘known-answer’ question), it averages less than 50 seconds per day in eighth grade and less than 15 seconds per day in ninth grade English and Social Studies (Nystrand and Gamoran 1991). More than 95% of English classes involved no discussion at all (Nystrand et al. 1997).

Discussion in the adult learning classroom is particularly important: it is correlated to their retention within the educational program, to the knowledge and skills they take from the class, and whether they can apply what they learn to their lives (Beder and Medina 2001). However, the majority of adult education programs still use teacher-controlled, monologic forms of discourse and activities (Purcell-Gates, Degener, and Jacobson 1998). In my own year-long observation of one adult learning class, students spoke only to request a handout or worksheet they missed. There was no discussion in class. And indeed, student retention was abysmal (over 90% turnover across each semester).

To conclude, learners’ cumulative experience with genres of classroom discourse limit and shape the kinds of compositions they make. For the purposes of this thesis, this conclusion operates on two levels. First, finding occasions to develop classroom discourse towards dialogic interactions would play to unique strengths of spriting composition, as well as benefit composition and learning generally. Secondly, since conversation effects composition at all levels, from sheer length to the writer’s engagement to the perception of what ‘writing for school’ means, it is important to include some evaluation of classroom discourse patterns both before, during and after spriting interventions.

2.3.2 Social Dialectic and Diversity

Dialog in classrooms is particularly important to prepare students to speak and write with greater language flexibility. For many educators and parents of minority children, teaching children how to speak ‘Standard English’ dialect is seen as important to their academic and

vocational success. But people learn greater language flexibility through interacting with people who speak differently, not by listening to those people. William Labov notes with respect to AAVE speakers who had facility with other dialects of English, "It is important to observe that all of these speakers were exposed to standard broadcast or schoolroom English for many hours during the day. The crucial factor that distinguished them was whether or not they had frequent personal interactions with speakers of other dialects (white or middle-class blacks) on an equal basis. As other studies of the mass media show, they have little influence on the speech of those who listen to them, unless that influence is reinforced by face-to-face interaction" (1995).

2.3.3 Composing as Construction

This thesis treats speech as a concrete material for composition. Seymour Papert writes, "Bricolage and concrete thinking always existed but were marginalized in scholarly contexts by the privileged position of text. As we move into the computer age and new and more dynamic media emerge, this will change" (Papert 1993, p. 156).

Composition is considered the apogee of the abstract. The National Committee on Preventing Reading Difficulties writes, "For the child, ...language is not an object of awareness in itself but is seemingly like a glass, through which the child looks at the surrounding world... not [initially] suspecting that it has its own existence, its own aspects of construction. Indeed, literacy growth at every level depends on learning to treat *language as an object of thought, in and of itself*" (Snow, Burns, and Griffin 1998, my emphasis). But it might be that emphasizing the role of language in thought over the construction of language in materially grounded and real ways stymies growth of more sophisticated literacy awareness.

When children begin to write they do not see any boundaries between drawing and writing. They build compositions with alphabet blocks and reams of colorful pencils, sounding out words, and slowly realizing how their written script segments sound. As they become more and more skilled with writing, their playfulness with text-as-image diminishes as they are schooled to attend more and more exclusively to text-as-abstract-meaning. With it also diminishes their sense of writing as play. In later education, students are to write text in neat undistinguished lines and columns, what Johanna Drucker calls *unmarked* text—text literally designed to be invisible, appear neutral and abstract. A 'mature' writer is supposedly one who treats writing as an object of thought, purely abstract, and the text itself as a transparent experience for the reader.²⁴ But all uses of words and words themselves have material histories, both social and idiosyncratic. And all words are produced in ways that 'mark' them, through which they gain material meaning that informs and maybe even transcends linguistic meaning. These histories are what give people 'feel' for words, pleasure in composition, and allow them to deeply understand nuances of words in context.

²⁴ There is an alternative history of treating text as performance in which the visual composition contributes in fundamental ways to the meaning and interpretation of the text (see Drucker 1994, 1998; McCaffery and bpNichol 1991; McGann 1991). At the Media Laboratory, Muriel Cooper and the Visual Language Workshop created work that focused upon typographical performance for computer (e.g. Ishizaki 1998; Small 1996; Wong 1995; Rosenberger 1998).

In Papert's *constructionist* theory, concrete and formal development characterize both children's and adult's relationship to different ideas at different times. The very idea of knowing might not begin concretely and move to abstraction; rather, it might proceed from formal (abstract, as it is unrealized in practice) to concrete (flexible and fluent, as it is known and experienced in many different ways) (Wilensky 1990). Because spriting has a different relationship to the body and the self than writing, the rhythm, timing and color of language become manipulable in spriting in ways they are not in speech. Spriting thus expands the possible ways to think about, learn about, and work with language, expanding definitions of literacy while making exploration of language a richer experience.

2.4 Questions and Predictions

This thesis sets out a conceptual framework for composition and editing as superordinates of modally specific writing and spriting activities, and then engages in specific empirical work with children and adults to evolve a primitive spriting technology and observe how it functions in a learning environment. My questions and predictions are for long-term investigations of spriting. They are meant to guide this conceptual, empirical and design inquiry, but should not be taken too literally because new forms (both conceptual and technological) will and should emerge.²⁵ My questions and predictions concern the following topics:

1. Developmental perspectives on composition, as they relate to spriting and writing
2. Developmental perspectives on talking, and how instructional discursive environments might accommodate spriting
3. Technology design for spriting and auding activities, and for how spriting might facilitate writing
4. Do students become better writers through spriting? Does spriting yield high quality compositions?
5. Is spriting a better media for the exercise of a *bricolage* composition style?
6. Student motivation and preference

(1) I expect that learners' composition development will fall into three stages. First, when composers begin spriting, their use of language in their spritten composition will be better and more conventional than their written translation, reflecting their greater fluency and comfort with oral performance. Second, as they learn to recognize the similarity between their use of oral language and writing through this proposed spriting-writing

²⁵ It is in the spirit of design research, presented in the Methodology chapter, that research questions emerge and evolve. Although I began the empirical work with these questions, new ones emerged as more salient as some of the questions I began with were rapidly proven the wrong questions to ask. Thus, the results chapters are indicative of the actual results and do not closely accord with the structure of these questions as presented, although each one of the original questions is addressed in some form in the results. The disparity between initial questions and final results is one indication that the design research was successful.

process, and gain more control over conventional written mechanics, their spritten and written compositions will move as closer to parity. During this stage, the learner will focus upon close, exact transcription. Third, as learners recognize differences they would like to capture between oral and written style, and concomitantly, recognize the unique material opportunities represented by each, their spritten and written compositions will again exhibit differences. This last stage will be characterized by a new compositional maturity, as composers feel free to push spriting forms towards things that would be difficult to capture in writing, and vice versa. Do actual developmental trajectories fit into these predictions?

(2) I predict that practice with oral composition will improve one's ability to talk. How does use of spriting affect an individual's oral language ability? Does students' use of oral language become more confident, versatile, and powerful? How does their oral participation within the classroom environment compare and contrast with their spriting composition?

How do classrooms accommodate spriting? The way in which any particular teacher integrates spriting into the classroom will vary. But as discussed, classroom discourse and writing are dependent variables. Therefore, it is important to characterize classroom discourse before and during the spriting intervention. Is spriting used to support peer work groups and whole class dialogue? Or is it used in individualistic contexts only? Does classroom discourse create new opportunities for spriting, and in turn, does experience with spriting feed back into classroom discourse practices? Do some discursive environments or classroom activities create more successful environments for spriting than others?

(3) How might technology best support spriting activities for school? My own design process for representing, creating user interaction, and underlying computational models will be a topic for much exploration and discussion. The pressure to make spriting possible for individuals and groups within a classroom environment will also impact my design decisions and discussion. How do students at early stages of literacy and letteracy interact with spriting technology? How do changes in the interface and technology impact individual and classroom use? What kinds of design alternatives did I consider? How can a talkument design address the kinds of things children are doing with spriting? What kind of auding technology would suffice for how children want to listen to their spriting?

Particular design questions involving the translation between spriting and writing are: (a) is it best to have students sprite first, then at a later point in time introduce translating to writing? Or, should translation be introduced concurrently with spriting? (b) Does manual or automatic translation better support translation between spriting and writing environments?

(4) How well do composing behaviors fit within the spriting literacy process and the spriting to writing proposed model of composition? Are planning procedures the single-most important skill to developing good compositions (Hayes and Flower 1980)? Do students create high quality compositions through spriting comparable to their writing? How does spriting function vis-a-vis the integration of ideas, more like earlier dictation or writing results (Scardamalia, Bereiter, and Goelman 1982)?

(5) Does spriting present a *different way* for people to excel at composition? Does it reveal different cognitive processes than writing? Some media are simply less plastic and editable than others, channeling composers into planning what they will compose prior to actually composing. Handwriting and typewriting especially are media that force composers more towards planning (Haas 1989). Yet, some people simply do not plan well, emerging from the writing process with a mess, not a composition. Would these people, who by all prior accounts are terrible writers, find that through spriting, potentially a more plastic and editable media than writing, they can exercise a *bricolage* style (Turkle and Papert 1990) with more success? Is it possible that spriting is a tool through which *bricoleurs*, who potentially do not even understand their *bricolage* learning style, might realize this strength?

(6) Since many students have difficulty writing, and some even 'dumb down' their ideas to their self-perceived writing skill level, it would be natural to predict that students would feel their talkuments better fulfilled their intentions than their texts. But the social value of textual work might currently outweigh these advantages. For example, older students who are creating written material for job applications and other such life tasks need to have evidence of their *written* performance to give to teachers or potential employers. Children may want to display work to parents who act prouder of their child excelling at important conventional tasks like writing than strange new ones like spriting. Thus I fear that our strong cultural preference for text and its ubiquity will bias my results, as it did John Gould's. Gould's subjects believed their written letters were superior to their spoken ones, while experts rated their spoken ones superior (1982). Given a predictable tension between convention and novelty, I will evaluate motivation to sprite and write, as well as satisfaction with spriting and writing products to capture initial reactions to this new technology and practice. I would expect that as spriting technologies and practices evolve and become more conventional, these results will be put into proper historical perspective.

3 Methodology

The empirical work undertaken in this thesis is founded in the belief that solutions to many kinds of problems in the world evolve through a dialectic between design and social response. Although many people would hope these problems could be answered in a deterministic fashion, both by finding the ‘ultimate design’ for spriting that ‘maximizes’ letteracy and literacy, experience shows that good designs always come through an evolutionary process.

Sometimes one engages in a process of design when one knows exactly what it is that the tool/artifact should achieve. Replacing the horse with a mechanical horse. Building a flying machine. Building machines to wash clothing, de-seed cotton flowers, and milk the cows. And indeed, this kind of theme can be found in this thesis: how can we make writing tractable for more people and more purposes?

But at the other end, this thesis recognizes that writing has served as a special human artifact that is not possible to simply ‘replace’ without corresponding changes in institutionalized belief and practice. An experiment in which one group is deprived of writing would be impossible and in any case ethically unacceptable.²⁶ A process of design then needs to consider the sociocultural implications equal in consideration and weight to technological limitations. In some respects, one sees the full complexity of this investigation when one realizes that the ‘end’ of design—the goal per se—is itself evolving. Designing certain kinds of tools that challenge many dear social values and require complex and sophisticated research, like spriting, might be seen as a process of evolving the ends of design as much as the means of design.

In this chapter, I describe the design research methodology that informed my approach to building and ‘evolving’ the spriting technology as well as to discerning the pattern of effect of that technology across different educational environments. I describe my initial exploratory and prototyping work with low-income adult learners who were at elementary levels of letteracy learning. This research suggested that spriting can be a useful tool for supporting certain kinds of learning central to composition and editing. I limit my discussion of adult spriting in this thesis to the three examples given in this chapter.

With more particular questions and a spriting prototype, I undertook a thirteen week long study with children at two elementary schools to explore how an improved spriting technology might contribute to their literacy and letteracy learning. I characterize important similarities and differences between the two schools in this chapter, and the forms of data collected, critical to interpreting the technological design and results chapters that follow.

²⁶ Design thesis like this should prepare the way for small kinds of experiments to follow and advance our understanding of the cognitive consequences of spriting and our development of technological alternatives to writing. But to manipulate a real experiment of what here is an exercise of mind, to deny a child or adult seeking education the opportunity to learn to read and write in a society so thoroughly textual without well-developed modes of alternative knowledge production and access, unless (like experimental cancer treatments) their very life is in peril, is wrong. In some cases, then, we must allow time for design and cultural change to evolve contemporaneously.

3.1 Design Research

If a time traveler from 1900 were to study our banking, insurance, transportation, and trade practices, she would be astonished at the changes, many made in response to new technologies and the changes we have wrought to take advantage of them. School, on the other hand, she would recognize immediately and be able to identify all of its attendant technologies. Chalk and board, desks in rows, paper and pencil and attention to handwriting still characterize most children's experience at school. The methods for teaching likewise have not moved much beyond the traditional 'banking' model that Paulo Freire criticized: the teacher says and writes what the children should know; the children receive it by listening and reading, and 'deposit' it into their brains (1970). How is it that education and school can be so resistant to change on so many levels?

Design experiments were introduced a little over a decade ago as a way to examine and transform this resistance. They are intended to evolve new learning technologies (Brown 1992; Collins 1992) and develop and refine new theories (Edelson 2002; diSessa and Cobb 2004) within real learning environments. More recently scholars have referenced the same goals with the term *design research*, conveying an openness to a plurality of assessment and methods. The focus of design research is to consider how children use technology for learning within the classroom and what they learn from doing so. Design research also considers very important how the technology can be adapted to the exigencies of teachers and their professional constraints, and how new tools can function in schools as particular, culturally embedded institutions. Success or failure is measured in terms of how and how well a student learned, and also (1) how sustainable the design is without researcher support; (2) how much the design develops active forms of pedagogy over rote learning; and (3) how the design affects teacher and student motivation.

Design research has roots in Action Research, a theory that seeks to eliminate the boundaries between the academic researchers and the so-called 'subjects' of research (Reason and Bradbury 2001). Action Research addresses problems that concern both the researcher and the subjects of research, who often have high-stakes interest in the research outcomes. As such, researchers hold the evaluations and assessments by participants (not 'subjects') of the work in equal esteem with their own. As applied to design research, teachers, students and researcher(s) collaborate in the co-design of a learning artifact. A design is systematically varied within a single site and across sites in cycles of evaluation, interpretation, and revision.

In this thesis, I revised the software in cycles that ranged from a week to several weeks, according to my observations of its usability and the enthusiasm with which children, ages 5 to 10, embraced it to do their work. As a researcher, I also acted as teacher in the spriting interactions, and thus was able to allow greater scope for literacy activities, changing not only the technology but also the classroom activities and forms of student participation (with each other and with the computer). I considered an activity successful when there was wide-spread energy and long-term focus by most if not all children, when children spent more time editing and revising their work, and/or when children requested more time. The definition of acceptable spriting 'work' was something that the students and I continuously

negotiated throughout the thirteen weeks at both schools as what could both sustain their interest and mine. However, the most unexpected results in this thesis emerge from observing children's great enthusiasm for activities that I did not suggest nor was I initially able to understand. Thus, a constant tension in this design research was the trade-off between desiring to understand what the children are doing and trying to move them towards activities and conventional behaviors considered more 'writerly.'

DiSessa and Cobb recently wrote that design research is like "building the plane while flying it" (2004) because of the openness design researchers have to unexpected emergent phenomenon. Indeed, a design researcher's focus shifts from technology to the social organization of classrooms and back again, as needed, to explore the possible causes of, and develop deeper theories to account for, good learning practices and activities. Responding to classroom phenomenon interactively like this leads to design *intuition*, a view consistent with Einstein's method of apprehending scientific truths: 'There is no logical path.... They can only be reached by intuition, based upon something like an intellectual love of the objects of experience.' In this thesis, I account for the development of my own intuition through comparisons, case studies and detailed quantitative and qualitative justifications for design choices. I intend these explorations to lead to testable theories and better spriting technology.

The openness to emergent phenomenon and the potential of changing focus quickly requires many redundant methods of data collection, which I describe in detail later in this chapter. Much of this data might go unused, but it might also prove invaluable if one is to trace a newly recognized pattern or interaction back in history (diSessa and Cobb 2004; Brown 1992). I used video to capture all spriting activities, collected daily versions of spriting work, saved records of interactions with the technology, collected students' writing examples from their regular classroom teachers, and wrote detailed field notes daily. While I used all *forms* of this data to prepare the results, I did not use every video recording or talkument, as expected.

Design research methodology was flexible enough for me to recognize things I had not expected, like the connection between spriting and singing and learning how to consciously pause and make composition plans in spriting. The scope of design research (technology, activity, classroom culture, school culture) was also wide enough to allow me to change focus when I recognized that certain initial assumptions were too limiting. For example, my initial hypothesis was to see if a spriting process could move students towards better textual products. In practice, however, students used writing and spriting in far more interesting, interactive and flexible ways. If the methodology had not been so flexible and open to student feedback, I would not have been able to correct erroneous initial assumptions and enhance the technology to support even more complex student composition efforts. For example, although I initially framed a talkument as an intermediate product on its way to becoming a text, the children firmly rejected that notion and embraced talkuments as final products. Their energy and interest in making talkuments in turn encouraged me to adapt the technology to produce a better talkument product and to involve writing in ways that supported their spriting process rather than the other way around.

Allan Collins et al. recently recommended that design research methods are not appropriate for doctoral level work due to the diversity of tasks involved and intensity of the intervention (2004). However, this doctoral level study using design research methods managed to test out numerous variations upon a single design across three sites, and through it, observe the emergence of a wide variety of patterned and interesting effects.

3.2 Spriting Prototyping and Pilot Tests

From September 2002 to June 2003, I worked with adult learners in New York City to understand some of the exigencies of adult learners in high poverty urban environments, and to design a spriting technology appropriate for their learning circumstances. The particular student group I was working with had test results that indicated their subject area knowledge was between grade levels 2 and 8. In the learning center where I was researching, this was judged above 'remedial' and below 'advanced.'

The student population was diverse. The student majority was from the Spanish speaking Caribbean islands, including the United States territory, Puerto Rico. There was a minority of Americans of African heritage and some very recent immigrants from West Africa, South Asia, Portugal and the former Yugoslavia. All of the students were studying in a second or third language or dialect from their first language(s), and educational problems were compounded with language learning and issues of translation. All of the students were pursuing a General Education Development (GED) diploma through programs offered for free by a historical 'Settlement House,' a full-service health and learning community center. Although the community center had two computer labs containing refurbished Pentium PCs, they were not integrated into the adult GED curriculum at all.

The 'Basic GED' class was a teacher-centric, lecture and worksheet oriented class in which the students expected to be—and were—largely silent listeners. That is, this class can be considered 'normal' with respect to most adult learning classroom environments (Beder and Medina 2001; Purcell-Gates, Degener, and Jacobson 1998). Contributing both as a consequence and cause of the lack of involvement in the classroom, student turnover was nearly 100% every three months and varied wildly on a day-to-day basis.

After observing the GED classes for one month, I started a supplementary 'computer' class that focused upon relevant GED topics using class discussion, dialogic inquiry, and exploration of literacy using computers and the Internet. The students who attended my class were amongst the most regular attendees to both classes; I required them to attend the regular class before coming to the computer class. They wondered out loud, however, why the time seemed to pass so much more quickly in the computer class.

Watching the students try to negotiate a successful path through the sophisticated literate genres they were encountering on the Internet and books, while at the same time struggle with literacy issues and computer interfaces, I began thinking about how spriting technology might help adult learners with composition issues.²⁷ They needed opportunity to

²⁷ Computer interfaces assume high degrees of literate and letterate achievement that cause extreme difficulty for many low-literacy adults (see Shankar 2003). For example, typing a website address

think through the high-level communication goals (amongst many other issues) involved in writing cover letters, resumes or essays. But most of them were so concerned with making textual errors (e.g. spelling, grammar, punctuation, etc.), they could not think about high-level goals or actively participate in a conversation that might help them do so.²⁸ Exploring these high-level issues through writing was simply not effective or expedient. Literacy commands enough importance in modern life today to have an important place in education. But it should not derail, precede or supplant the development of thinking and communicating skills.

I began designing and developing software that provided a minimal spriting and editing interface for these students. Several students who had been attending the class graciously agreed to try it out in the final weeks. Below I narrate some achievements that the students made through spriting. In the limited time remaining to us, they taught me three ways in which spriting might function best for adults: (1) spriting can help them bypass the often debilitating cognitive ‘monitor’ the students have internalized from previous bad school writing experiences; (2) spriting can be awkward and stilted when working off of a written outline; and (3) spriting can make space for conversations to occur about the personal and rhetorical aspects of composition tasks.

3.2.1 Spriting to Make the Process Less Self-Conscious

One young man, Eric, age 24, was so self-censoring of his own work that he simply would not write for nearly four months. Ironically, he was the most verbally gregarious and one of the most intrepid readers in the class. He agreed to try out the spriting technology to compose something. He moved my spriting apparatus in to a corner of the room, hunched over the microphone and began recording. He made several recordings but found himself relistening to them, censoring himself and deleting them rather than continuing the story. So he decided to simply record continuously until he was done. He sprited for ten solid minutes! He told a very private story—his own, which he had not shared in any way during the class. Eric told how he recently forced his sister’s husband to confront his drug addiction and inability to take care of his wife and four children. Eric told him to check into drug rehabilitation and that while he was gone, Eric would take care of the family. To do so, Eric was working three part-time temporary jobs as a doorman/night watchman plus attending adult learning classes during the day to prepare for the GED exam. He was tired and often wondered if he could keep going, but was torn between his love and care for his sister (‘family duty’) and his own dreams of going to college and making a better life for himself.

Unfortunately, by the time he had recorded this monster unedited talkument, there were only a few classes left. He did not attend the final class periods regularly, and I did not get the chance to show him in detail what I had to say about editing this into a college entrance essay. It was a very promising essay. The talkument had a lot of repetition because

requires not only knowledge of how to use obscure typographic symbols, but also how to use commas and periods in unconventional ways—as metaphorical ‘delimiters’ a computer can understand!

²⁸ Researchers have noted that writers who have not had success with writing, suffered harsh criticism, and/or have fallen behind grade level are often hyper-concerned with errors (O’Shaughnessy 1977; Perl 1994; Pianko 1979; Rose 1994).

of the process he had to engage in personally in order to bypass his own counterproductive self-censorship. Like almost every draft, he would need to edit and focus the work. But it was an excellent start, a start he had not been able to make for the previous four months by writing on paper or in a word processor.

In Eric's case, the spriting work he had done was also dependent upon the trust we had built up over the course of several months. Even at that point in our relationship, however, Eric was certain that this story would shock me so much I would never talk with him again. (We still correspond on email and he sends me notes from his cell phone.) Yet, I am certain that Eric would not have written this story down nor would he have been able to dictate it to a speech recognition system (it would have been too painful to read the results as he composed). Without the spriting prototype, Eric would not have had the opportunity to push our teacher-student relationship towards grappling with the significant and complex issues he was wrestling with, or to complete a full draft of a promising essay.

3.2.2 The Trouble with Outlines

One of the things I had the adults do was explore 'planning' tools used commonly before extended writing exercises, like outlines, mental maps, flow schematics and other more visual-verbal tools for thinking. Most of them had never encountered such tools before. Their questions were very interesting: what does it mean to draw a line between two words? How are words 'related'? How can you write just one word—isn't that ungrammatical? This last question proved particularly revealing of the kind of writing ('essayist literacy') valued in school to the disparagement of all other kinds (e.g. telephone books, grocery lists, signs, charts). It also shows the kind of damage that failing at school literacy can wreak in a person's intellectual life.

I noticed that while the students did not know how to use periods or commas to mark phrase and sentence units, they also did not understand what it means to write only one word to 'characterize' or 'capture' an idea. A Catch-22 dilemma. (This is an area deserving of much more research and attention.) Writing meant writing in *sentences*, even though they didn't know how to define or write a sentence. Thus, tools like outlines and mental maps were very confusing instruments indeed. If they managed at all, most of the adults wrote their outlines or schematics in full sentences.

Two students agreed to use their outlines to sprite their essay rather than write it, as I was experimenting at the time with the idea of using spriting technology as a step within a writing process. I was unhappy with the results, nor did they seem much inspired with what they had done. They simply read their outlines in the order they had written it. No extemporaneous thoughts were added. Writing that was vague and unclear remained vague and unclear. There was no opportunity to reflect upon it during an unsteady and halting reading process. They treated their outlines like a final product—they would not alter their plan, add or subtract anything during the actual composition phase. With a written plan guiding their actions, they remained literacy focused.

Watching the adults read their outlines biased me against having children use text outlines or other planning methods before spriting. However, I was forced to re-evaluate my bias when in later research some young children developed a keen interest in writing a script

and then reading it to the Spriter (see Emily and Madeline's story in Chapter Five). They also did not deviate from their written script, but explored the fullness of their text, plumbing its deeper meanings, by reading and rereading it very expressively. Thus, the experience with the adults ultimately served as a caution to not limit spriting to a single step in the writing process, but to see it more flexibly.

3.2.3 Spriting Can Make Time for Talk

One student, Sondra, wants to become a nanny, and wanted to reply to an agency ad. Sondra began her cover letter in Microsoft Word. It took her a half hour to write her own and the addressee's address. When she began the body of the letter, she picked out the keys, "My name is Sondra [last name withheld]. I have a lot of past expertness with children." When Sondra couldn't spell 'experience,' she chose 'expertness' from a spelling correction list, demonstrating the inadvertent damage of such 'writing aids' to low-literacy-skilled students. She erased the text and wrote, "I am writing about the Nanny ad in the Sunday New York Times/June 8, 2003." After we discussed this sentence, she wanted to revise the text to say, "I am applying for the nanny position advertised in the Sunday New York Times, June 8, 2003." Sondra read and reread the existing sentence, trying to figure out what to delete and where to add words.

Making substitutions, adding and deleting clauses and phrases to an existing sentence is a cognitive task most struggling adult students do not know how to meet, even when the target sentence is dictated. They often erase everything and start over to minimize the demands of the task. The keyboard and mouse interface to Microsoft Word complicate the already difficult editing operation. Sondra's skills with the mouse and keyboard were still minimal. When she pressed <Enter> instead of <Space>, making a new paragraph in her text, she muttered, disgusted, "Oh, I messed everything up" and deleted all her hard-wrought work.

After one hour, Sondra had written her own address, and that of the addressee, and composed and revised the first sentence of the first paragraph. Sondra, used to hard, low-rewarding work, was willing to continue. But I was worried. How was she going to focus on the complex rhetorical considerations of the second paragraph in a cover letter while worrying about text insertion points and spelling? She was so occupied with the demands of spelling, typing, and remembering the words she wanted to use that she could not focus on the content. Sondra moved to the spriting prototype software to continue.

I continued to work with Sondra as I had when she was word processing, asking her questions about her previous work experience (for example, You worked in home health care – what did that involve? You have three kids – what has that taught you about childcare? How do you believe children should be raised?). When writing she paid me little attention as she was so concentrated on typing. When spriting she was responsive and thoughtful, synthesizing sentences in her mind to record from our conversation. Relistening to her recordings, Sondra had firm opinions about what was 'good' or 'bad,' what to rearrange, and what to do over. After relistening to one of her recordings, she exclaimed, "I sound like one of my kids with all of my 'and then' and 'and then' – it sounds like a big run-on sentence," both diagnosing her own use of language and coming up with the solution. While she was

able to 'hear' this easily in her spriting, she did not similarly evaluate her use of language in writing.

[ok] [umm] [pause] the experience that I have working with kids is I'm raising four kids [pause] and I worked in a daycare and I've been working [pause] at a home health aid. [CUT] I'm currently babysitting an eight year old boy.

The daycare that I was working at I was a teacher's assistant. I work with infants and [pause] children ages 2 to 5. I like working with toddlers because I can [umm] play with them with their musical instruments and personal- helping them with their personal hygiene [CUT] Teaching them how to read.

Yes. I was working for the home health aid for three years and things that I used to do was [umm] [pause] cook, clean, and do laundry and running errands and just sitting and listening to what she gotta say. I engaged the patient with a conversation.

My own kids have taught me what's going to happen before it even happen. I will protect my kids from any harm.

When I pick him up from school [CUT] I bring him to my house [pause] [umm] he does his homework I check it then I ask him if he wants something to eat [pause] and then I bring him outside for a while then I bring him- I bring him upstairs and when his mom come to pick him up he goes home.

Thank you for reading and considering [pause] in my application. I'm available [pause] for the interview Monday through Friday in the morning. You can reach me in the afternoon and in the [uh] evening at 800-555-1212. Sondra (lastname). I will also follow- follow up the letter with a call.

Figure 4 A transcription of Sondra's spritten composition using Sausages

During the course of transcribing her letter, Sandra realized she had a fourth area of expertise relevant to a nanny position. She went back and recorded, "I'm currently babysitting an 8 year old boy." Compounding the description "8 year old" with "boy," along with the temporal adverb "currently," is not how Sandra usually speaks in conversation, but is an example of the compressed style of language valued in school literacy.

Sondra's speech composition, as shown above in Figure 4, was much longer, more syntactically complete and adventurous than any writing she had done up until that point. Even though Sondra was not an expert with this – or any other – software, she made several cuts in recordings and moved them to different positions (presence of a cut is indicated by [CUT]). She had definite opinions about which statements were addressing the same issues, and which one was the best one, exercising and developing her own ability to evaluate and assess her own work. She deleted the others.

The experincesIhave in working with children is I AM RAISEING four children iworked in a daycare and i been working for home heaalth aid for three years i am curently working with a eight year old boy the daycare were iwas woking at i was a teachers assitant i worked with infants and children ages two thew five i like working with toddles becace i can play musical instoment ,personal highgen, teaching them how to read i was working for the home aid for three years the things i did was cook, clean, londery ,runing errons, ingag the patente in a coversation my kids thought me whats going to happen before it happen i will prot my kids from any harem

thank you forreading conserdering my application iam avilable to interview monday-friday in the morning you can reach me at 1800)-555-1212 afternoon, evening also follow a letter with a call

Figure 5 Sondra's own translation-to-text of her spriting using Sausages

It took Sondra about an hour to transcribe her own speech, interacting very closely with her recorded essay and stopping the audio almost every third or fourth word. She was incredibly focused and rarely looked up from the task. Her textual composition, shown in Figure 5, is also longer and more sophisticated than most writing she had produced before, even though there are many obvious problems with it. Sondra is well aware that this letter is not finished (e.g. spelling, capitalization, sentence boundaries, etc.); after three hours of exhausting work, we resolved to finish the letter next week (she did not show up at the Center). But she provided more description of her background than she ever has before, and organized it into a rhetorical argument for her own qualification. She might also have learned ways of expressing her qualifications and background orally, helping her in future job interviews.

Many questions have emerged from the design and use of spriting technology in the adult learning environment. While Sondra preferred it to getting bogged down in syntax and spelling with the word processor, and others found it useful to speak of things they would not write, how it facilitates composition and editing generally, or learning to write specifically, is only as yet suggestive. How to move a spritten composition to a conventional textual product that Sondra could send to the nanny agency—and hear back from them—is also not clear.

3.2.4 Methodological Challenges

Results from my year in New York City were difficult to assess for two major reasons: (1) the adult learners were strangers to computers, requiring my class to be a learning ground for beginning levels of computer use while it was also a learning ground for composition, and (2) student participation was unstable—nearly the entire student population turned over every 2 months.

Also significant was that the teacher of the regular GED class was not willing to learn anything about computers that would have enabled me to embed the use of computers for

adult learning and my specific research program within the regular class time. It was because of this resistance that I had to begin a 'supplementary' class time in the computer lab in the first place. While the students may have benefited from the additional instructional and learning time, this separation did not allow any pedagogical or theoretical practices or discoveries to 'stick' in the adult learning program. When I left the program after one year, all design and pedagogical innovations were lost to the program there. This introduction of new technology and methods into a program, only to lose them one or two years later is endemic to all educational research, but it is particularly damaging for participatory forms like design research. In my view, how to transition the community requires ethical consideration. Because interventions like this in disadvantaged communities can build up classroom cultures, friendships, and individual hopes and dreams only to leave them cold when the researcher leaves, I thought it incumbent upon me to at least transition the students. I tried to place all the students who attended my class in a free computer and job training organization nearby. I invited a representative from that organization to come and address the class, offered to write recommendation letters and make phone calls if the student showed initiative in writing the required resume and cover letter. For one girl it worked. I heard recently that she has become a part-time computer instructor at this center.

Goals for my next study intervention were to separate the confounding effects of introducing new technology from long-term learning effects by working with children who had some computer experience. I designed a three-month study to evaluate the effects of spriting more generally rather than to defend the particular spriting technology instantiation I developed.

3.3 Two Urban Elementary Schools

I spent 13 weeks in two urban elementary schools negotiating with the children and to a limited extent their teachers an understanding of how spriting is done, what a product of spriting sounds and looks like, and how spriting can function on the boundaries of a classroom environment. At each school, spriting activities and products were realized very differently, as described below. Even so, similarities emerged.

Though the study involves two schools, comparison of the schools is not my purpose. The cultural, linguistic and even age diversity of the children as explained below provide a good research base to help evolve the spriting technology and understand how a wide range of students and different school organizations might learn with it. Differences between the students notwithstanding, if similarities in motivation and use across the schools emerge, these must be treated very seriously because of the great diversity between the two schools.

The students had a number of things in common. They were all between the ages of five and ten years of age, growing up in a major city in the United States in 2004. They all had loving families who desired that they reach their potential. And most importantly, they were very self-aware of how important language is to their identity. All of the children were bilingual/trilingual or bi-dialectal.

3.3.1 'Umoja' Elementary

Umoja Elementary, a private school founded upon African principals of community and culture (Nguzo Saba), is located in an urban-residential area of a major American city. The current students are inner city children of color from low to middle income families. The ethnic composition of the school is African American, Caribbean and African. Their parents are firefighters, family business owners, cab drivers, and professionals with high school diplomas and two year college professional degrees. Many families of the elementary-aged students use vouchers to pay the school fees; others are private payers. When voucher funds are not available or procured, those families who depend on them must move their children to a public school.

The school is an integrated daycare facility for newborns, a preschool, and elementary school up to grade five. The school is housed in two stately Victorian mansions set on a one-way street, high up on a hill and overlooking the downtown. The larger of the mansions has been recently refurbished and renovated to conform to disability access and safety laws, while maintaining the enormous windows, hardwood floors and banisters, cornices and plaster ceiling mouldings. Just across the street from the school is an orderly row of subsidized public housing. Some of the surrounding mansions are in dilapidated condition while some have been recently renovated.

When parents drop off their children in the morning and pick them up in the evening, they either take off their shoes in the foyer or pull on protective blue 'footies' to keep the floors and classroom facilities spotlessly clean for the children. Most of the children stayed at the school from early in the morning to evening, while their parents worked. School activities, leisurely structured, began at 8 or 9am and continued until the children went home. The school day rarely ended at 3pm for most children. Because the hours were so long, and because of its intrinsic worth for learning, the children had frequent and long trips to local museums, parks and gardens. Artists and dancers came in to teach weekly classes. They also had a lot of loosely structured time in which they were free to play chess (a favorite game at the school), card games, and other impromptu activities with social and physical dimensions periodically throughout the day.

I worked only with the elementary group of students, ages 5 to 10. The group was small, ranging from 6 students when I began to 11 students when the five/six year olds 'graduated up' to join the oldest group. Additional students arrived at 3pm for the after-school program, some of whom used the spriting software. I do not consider any of the afterschool students' work in the results reported in this thesis. Because of the small size, the elementary school functioned as a kind of one-room schoolhouse. The teachers pulled aside a few children at a time for lessons appropriate to their ability. The students were not in age-homogenous grade-level classrooms nor identified in that way; they were pushed and assisted to do work they seemed capable of doing; therefore, I cannot provide grade level assignments. To characterize the Umoja children and their abilities, I refer to them by pseudonym and age, provide detailed examples of their spriting, writing and speech.

In the results chapters, I often refer to the Umoja students as 'older' or 'younger' groups. The 'older' group is the original group of six, who were 6, 7, 8 and 10 years of age

(the ten-year-old left the school only four weeks in to the research). The 'younger' group were all five and six years of age, just learning to write characters and spell words.

The elementary classrooms at Umoja are a series of connected rooms on the third floor with orange paint on the walls and sunlight pouring through grand windows and skylights. The largest room where the children spend the most time, they have desks facing each other, a chalkboard, full bookshelves, art projects and educational toys. There is a strong focus upon science and math at Umoja Elementary. When I asked the children individually about things they had recently written, they mentioned only writing math equations. The school also put great stock in imaginative construction of physical objects, involving media and materials as diverse as paper, ceramics, wooden three dimensional dinosaur puzzles, kinesthetic sculptures, and computers.

Reading and writing activities were more traditional. They focused upon vocabulary words lists, standard worksheets, some personal reflection writing prompts, and occasional stories read by the teacher. However, they also integrated many oral games in to the school day, played under the teacher's direction. For example, phonological knowledge was enhanced by games where children would need to come up with some semantic category (e.g. food) that began with the last letter of the previous word. Frequent sharing times about weekend and holiday activities helped the children develop their communication and storytelling skills.

Computers were everywhere and used often for both recreational and learning activities in math, reading, computer programming, science and more.²⁹ The Macintosh lab had enormous mansion windows and sleek blonde wood furniture with one large-monitored PowerMac and six bubble-like IMacs. The Macintosh lab ran most of the software the children used, including Logo Mindstorms, drawing software, and many educational interactive storybooks. I set up the spriting software in the PC lab in the adjoining room, a less well-used facility. Although it had six second-hand computers, I could only get two to work reliably while a third had a sound system so loud and uncontrollable the principal requested I not use it for fear the children would hurt their ears. Therefore, I was limited to two children working independently, or four children collaborating in pairs.

As I began working with the children, I realized that their knowledge and experience with the compositional forms I was expecting them to produce was scant or nonexistent. I had to provide a lot of explanations and examples of all genres, and instructional scaffolding in order for some of them to approach the task at all. Because the children asked me for feedback and input very often, it turned out that the two computer limitation worked very well. I preferred to work with one child at a time, or two who were collaborating together. Although I did often permit two children to work independently at the same time, they inevitably pulled my attention in two different directions simultaneously. I much preferred working for up to one hour with a single child. As such, I spent two afternoons at Umoja Elementary each week, occasionally three, making spriting technology and myself available to the children for two to three hours or so each day.

²⁹ All of the computer equipment was stolen from the school only four months after my study ended, forcing the school to locate replacements.

At Umoja, the children were never ‘assigned’ to work with me—they had to want to write. I was free to enter the regular classroom at any time and consult with the teacher about who was ‘available’ to write. The teacher would sometimes suggest names and often ask me which child I wanted, giving me the opportunity to provide all the children with more even opportunity. Then I would ask the child(ren) if they wanted to write, and if they did, they were free to come with me. If they declined, they were never forced, and many of them declined at various times for reasons ranging from finishing their homework to not feeling like it. So merely sitting down to write, whether or not they had the time, inspiration, and persistence to actually compose anything, needs to be understood as demonstrating significant motivation and enthusiasm.

3.3.2 ‘Molière’ Elementary

Molière Elementary is a French-English bilingual school in an urban-residential area of a major American city. It has programs that range from Maternelle (pre-school and kindergarten) up to Upper School (10th through 12th grades). Each grade level involves subject area instruction and support in both English and French languages, often delivered by two different teachers. Examinations and assessments are both from the American system (through the Educational Records Bureau (ERB) for independent school testing) and the French national program. The school program is set out in detailed schedules with clear goals and expectations for each activity. Although I did not observe regular classes or have regular interactions with the teachers, I walked the hallways of the school many times. They were redolent with book reports, poems, reports, projected futures, drawings and other creative endeavors. Choruses of recorders and piano music echoed through the hallways.

The curriculum was rigorous, disciplined and traditional. While there were one to two computers available in each classroom, I was given the impression they were usually peripheral to classroom activities. Rather, computers are incorporated as subject area: the students begin working on computers one hour per week beginning in grade three. The curriculum guide says, they are to “learn responsible and efficient use of technology and its tools. Students begin in third grade by exploring the inside of a computer to gain an understanding of how it works. They will then move on to learn word processing skills and take part in internet based activities. By fifth grade, students will create their own multimedia research presentations done in concert with their classroom teachers.” The principal remarked to me privately, however, that the children love computer class and do not even realize all that they are learning through the integrated, creative reading and writing projects the computer teacher has them doing.

The children are instructed in regular classroom literacy and letteracy in both French and English. In grades 1 and 2 they learn to read and write in French and English. As handwriting is still very important in (especially) French, but also English, curriculum, they learn to write in cursive already in second grade. In third grade, the children continue to develop reading skills, conventional spelling, and grammatical structures. They learn to express their thoughts and intentions in writing through daily journaling activities, book reports, written poems and much more. By grades four and five, the curriculum states: “Extensive reading and writing are the primary means of developing language.” And the

teachers “emphasize the grammatical structures that underlie sound oral and written usage” and “expose students to a broad range” of readings.

Molière officials did not want to add experimental activities to their already crowded bilingual school day; they invited me to teach after-school classes open to any of the 3rd, 4th or 5th grade students.³⁰ It also would not have been possible to work within the English language arts classrooms with only two or less computers available. I sent out an advertisement to parents, as shown in Figure 6, and very soon eleven students had signed up, primarily third and fourth graders (the one fifth grader who signed up dropped out after the first week due to lack of similarly aged peers). Unbeknownst to me, the advertisement served to self-select those children who had family or other strong connections to research universities. Most of the children had parents who worked as research scientists, professors, doctors, bankers, salespeople. All parents of the nine children whose data was used in this thesis had college or, more likely, post-graduate educations. Many were familiar with research methods and even instructed their children in ‘proper etiquette’ for participating in research (“Do whatever she tells you to do”). These children ranked in the top half of their classes in both French and English language exams; their school ranked in the top half of all independent schools. As the principal herself said, “You had a good class.”

Creative (Computer) Composition

A Free After-school Workshop for 3rd, 4th and 5th Graders!

We are announcing a new after-school activity where children use computers to tell stories and essays. Creativity, freedom, technique of composition, and acquisition of literacy will be emphasized. The activity is run by Tara Shankar, a doctoral student in the Future of Learning Group at MIT's Media Laboratory, and will be used as a part of her doctoral research to explore connections between technology, oral language expression, and literacy. Class will begin February 26 and continue until June 11, either Thursday or Friday depending upon interest, from 3:40pm to 4:40pm. Classes are free of charge but children are expected to attend all sessions. If you are interested in having your child participate, please sign up with the garderie. Please specify if you prefer a Thursday or Friday class.

For more information:

Future of Learning Group (<http://learning.media.mit.edu>)

Tara Shankar (<http://www.media.mit.edu/~tara>)

Figure 6 Announcement of spriting class at Molière

³⁰ Two parents called me to confirm that the computer writing course was limited to after school because they were concerned that it would disturb classroom teaching.

The class was held for one hour on Thursday afternoons after regular school classes were out. The class was held in the computer lab in the basement of the school, windows up high on the wall at ground level. The lab had about fourteen computers, eleven were stable and the same model, just enough for each child to have one. The computers were pushed against the walls of the room, providing a central space for us to congregate and listen to demonstrations and examples I made for them on the school's digital projector. I would usually begin each class by playing a talkument that I had made and then introducing an idea they could choose to pursue, or not, if they had a better idea. I was not able to spend much time with individuals or pairs of collaborating students at Molière. Problems or questions emerged constantly from around the room, leaving me little time for thoughtful conversation or extended observation of a single child's work. The class almost always ran overtime as the children were so engrossed in what they were doing. I often had to force them to leave to keep their parents from knocking on the classroom door, wondering where their child was.

3.3.3 Notable Differences

From an experimental basis alone, the students' performance on spriting cannot be compared directly for three reasons. Firstly, the Molière students were on average older than the Umoja children. Secondly, whereas I worked with all the Umoja children in the elementary and preschool, I worked with a subset of the students at Molière, who were not a random sample. Thirdly, the structure of my interactions with the children was necessarily different because the two schools admitted me and spriting research into their school curricula with different agreements and expectations.³¹ For these reasons alone, we would anticipate large differences in performance. But there are additional differences that predict learning differences.

From education research we know to predict that poor children achieve less in school than middle class and wealthy children (Chall, Jacobs, and Baldwin 1990; Chall and Jacobs 1983, 2003; Dickinson and Snow 1987; Snow, Burns, and Griffin 1998). Poor children who speak a minority language or dialect have additional challenges to achieving school success

³¹ I provided examples of talkuments and instruction in different measures. For example, I provided more examples of different kinds of talkuments to the Molière cohort than to the Umoja children. I also provided more examples to the older Umoja children than the younger ones, principally because the older students were suspicious that there were things they did not know that could hurt them, like school genres and forms on which they would be judged but were implicit. I recognized and honored that they needed examples in order to model their own work after something that was considered 'correct.' Nevertheless, original genres did emerge—two girls in particular developed very unique talkuments late in the class. The younger Umoja students were most carefree at bringing their own personal narratives into the classroom—as they should be! I was pained to witness the older children's—some of who had attended public schools for a year or two—embarrassment and hesitancy to compose anything at all for fear it wouldn't be right. I struggled constantly with whether I should provide them with more or fewer examples, fearing they would reify them as models of correctness at one extreme, and fearing they would not be able to make the first moves without having some assurance that they were creating genres appropriate to school at the other. My dilemma is not unique, and part of a much larger debate about how to negotiate school when home and school literacies are different (Delpit 1995; Lee 1995, 1997; Dyson 2003).

because they encounter political models of correct writing that are different than the way they speak (Labov 1969, 1966, 1995; Gutierrez 1992). I observed great differences between the knowledge that the Umoja students had in comparison to the Molière students in terms of genre, language and school conventions. Nearly every conversation I had with the Molière students, from consonance and editing to dialogic collaborative talkuments to poetic and reflective talkuments, they claimed they had encountered before. Not only was their schooling in genre and varied literatures across two languages intense, these children had parents who had themselves a lot of conventional educational success. The Molière students are the “well read to” (Purcell-Gates 1991, 1988) and the (primarily but not exclusively) white, upper-middle-class children who have participated in instructional dialogues typical of school classrooms with their parents since birth (Snow 1983, 1991). Their parents modeled the kind of White, middle-class use of language, writing and narrative forms valued in many schools, passing on to them the keys to literacy success at Molière through their very interactions.

My analysis does not extend to the literacies implicit in the home life of Umoja children and interactions with their parents partly because of limitations of this study and partly because I do not have the right preparation and background to recognize and describe it (e.g. I have only a passing knowledge of AAVE lexicon and syntax). When I worked with them one on one, the children were by in large unfamiliar with the components in every form of written genre I mentioned, including letters, book reports, personal narratives, arguments, and plays/scripts. They had, on the other hand, very good models of fictional dialogues in television programs and interview genres on television and radio. In addition, many of them gave me hints of (and taught me a bit about) a rich home language and cultural knowledge, different from the language and conventions I was introducing to them, which I do not know how to understand or assess. Thus, my interactions with them was a tentative negotiation. It was important for me to provide them with respect, opportunity and freedom to appropriate spriting to express their knowledge of language and popular media forms. The more I allowed them to bring their own prior knowledge to the task of spriting, the more their exploration of new school genres I wanted them to learn became real and immediate to them.

On the basis of these significant differences: age, SES, and culture, I do not expect the children to produce similar kinds of products or engage in similar kinds of processes. The Molière children, on the basis of their older age, longer and more extensive training in genre and composition forms often taught in schools, would be expected to make more sophisticated spriting products than both groups of relatively younger Umoja children. Differences between them cannot be attributed to their interaction with spriting.

However, if certain behaviors, processes or products emerge in common between the schools—even against the predicted differences, these commonalities should be treated with utmost seriousness, subjected to further analysis, and interpreted in light of what spriting offers. In sum, my concern lies with all the children and how spriting might allow them to engage and exercise their current literacy skills as well as to develop new abilities and challenge themselves in powerful ways.

3.4 Forms of Data

In design research one collects far more data than one ever intends, or hopes to, analyze, and this research is no exception. My results are based upon five primary forms of data collection:

1. Videotaping of every spriting class session at Molière and every interaction with a child around spriting at Umoja. The video records were not useful for illuminating the simultaneous oral interactions of eleven children at Molière but were very useful to analyze the interactions at Umoja.
2. Writing detailed field notes after each class session at Molière, and writing during and after sessions with the Umoja children. I made particular note of questions the children asked me, if they were working with anyone and what kinds of things they were talking about, what they were doing when they seemed involved and self-motivated, conversations I had with principals, teachers or parents, important or unusual events and more.
3. Saving a copy of every child's spriting work at the end of every day they worked on it. If a child worked on a talkument more than one day, or worked with a partner on it one day and then worked individually another day, these multiple copies help to triangulate what editing changes were wrought on which day (using the list record of interactions) and to identify when any labeling/annotation work was done (since it was not recorded in the automatically generated user log).
4. Designing the SpriterWriter to maintain a record of interactions the children had with the SpriterWriter, listed with time stamps. Because the record does not save the entire state of the talkument at each point in time, there are limitations in what one can learn from it. The record is useful for knowing what kind of composition and editing action occurred (e.g. 'record,' 'play,' 'delete,' etc) and in what order. But the record is poor at distinguishing what object exactly each composition and editing action operated on (e.g. which recording was listened to). By comparing the record of interactions to the final talkument, it is possible to figure out when recordings were made. It was also possible to figure out which recorded objects were deleted or edited in some way, but it is difficult to figure out exactly when the edit occurred. While the record does track changes in the Writer, I forgot to make it track writing in the Spriter (e.g. labels and annotations). I compensate for the lack of these records with field notes as well as opening the interface itself to look in each composition if there were labels and annotations. A few records were missing or damaged (and were not used for analysis purposes). The record was designed to accord to a single talkument. If a child opens two talkuments simultaneously, both records are lost. This problem affects less than ten talkuments out of a total of 197.
5. Collecting writing examples the children produced for school. At Molière, the principal relayed my request to the English language arts teachers who provided the principal in turn with one example they judged to be a 'good' example of the child's work. I received seven samples. All examples were extended personal narratives. At

Umoja Elementary, the principal gave me permission to look through each child's Language Arts notebook and desk and make copies of all relevant examples of their writing work. Thus, I have diverse and numerous examples of writing from Umoja children but do not know how the teacher would have 'judged' it. I have very few and homogenous writing examples from Molière but know the teacher believes them to be demonstrative of the students' better abilities.

In addition, after the classes were finished and I had a chance to look through most of the data, I spent several hours with both principals of Molière and Umoja Elementary schools, showing them a selection of the most important achievements I thought the children made in spriting and eliciting their response. I also asked them for their opinions on whether they saw use for spriting in the curriculum as currently conceived. I used their responses in developing my own thoughts on individual case studies. I also consulted them on particular children's backgrounds and abilities throughout my analysis.

3.4.1 Transcription Standards of Talking, Spriting, and Writing

"These words and expressions are yet in some way discreetly dramatic: they are appeals, modulations – should I say, thinking of birds: songs? – through which a body seeks another body. It is this song – gauche, flat, ridiculous when written down – which is extinguished in our writing."

(Roland Barthes)

Throughout this thesis I use excerpts from talkuments and video recordings as transcribed text. The transcription is not designed to be transparent for two reasons. First, the transcription methods had to support the use of automatic methods to analyze the results (I wrote programs to parse the transcriptions to produce word counts, vocabulary comparisons, and other statistics). As such, I designed XML-inspired structures for transcription based upon recent work by Jane Edwards on the speech transcription of multi-party meetings (Morgan et al. 2001). Secondly, I wanted the annotations to capture as much as possible of the thinking process, as evident in speech production. In contrast to the common approach by literacy researchers to make children's dictated speech 'read' better, I want to make the experience of reading transcriptions of spriting and talking slightly alien so that the reader constantly remembers that this is a translation, imperfect and partial. In particular, I want to foreground the rhythm and use of breathe when the child speaks the words, with notation of false starts, incomplete words, and filled pauses. When children are thinking and trying the hardest to put thought, feeling and intention to words is when their speech is most fragmented (Goldman Eisler and Cohen 1975; Chi 2000). Through the transcription I seek to draw attention to these periods of intense linguistic construction.

To indicate sound that is not produced through vocal means, I use the notation, for example, (NVC air conditioner noise). Sound produced through vocal means but has no linguistic meaning is notated, for example, (VOC burp). Other important notations are (SUNG) and (BEAT) that indicate respectively words/nonwords sung with a tune or in a characteristically rhythmic manner. I note that my method of transcription, even refined over time, was not sufficient to transcribe or describe the children's frequent singing and beats.

Punctuation is used intentionally to indicate intonation, not syntactical completeness. A period indicates final phrase intonation. A comma indicates a continuation and is often accompanied by an inhalation and a pause exceeding one second. A question mark indicates final and rising intonation while an exclamation indicates emphatic and loud final intonation.

For more detail on the transcription of spriting and talk, please refer to Appendix E, Transcription of Spriting. For details on the transcription of children's writing, please refer to Appendix F, Transcription of Writing.

3.4.2 The Sense I Seek to Make

I bring all of the data collection to bear upon making sense of what the children do with spriting technology. The children often surprised me with their unexpected uses of spriting. During the study I struggled to understand what they were doing—and even fought against some powerful trends like singing that I initially saw as a diversion from the literacy focus—as even now I struggle to frame the children's activities in terms of their individual motivations while negotiating the complex social world of their classrooms. It is particularly important that I describe the children's values and social transactions that occurred in their sometimes surprising uses of spriting, for it is these values and transactions that will inform us of what more flexible models of literacy practice might look like. Ann Dyson asks:

“Building upon the observational traditions of early childhood, we must widen our viewing lens; that is, we must frame our observations of child texts with observations of child social worlds, detailing the situational specifics of children's oral and written language use: With whom do children interact? What topics and genres do they choose, or fail to choose? What responses do they value from—or offer—others? What links exist between children's texts and their in-school relationships and their out-of-school lives? ... When we do observe with a wider lens, we will discover the social intelligence of children, their sensitivity to the demands of situations they understand, and the complexity of the cultural resources they may draw upon. Moreover, our discoveries will yield new kinds of flexibility—allowance for differences—in early literacy theory and practice” (1993, p. 17).

Particularly since spriting is a new form—it has no 'conventional models of correctness' and there are no 'authentic purposes' because spriting is not yet a literate object of common currency—understanding the importance that children attribute to spriting and talkuments becomes even more critical for how it might inform current literacy practice and pedagogy and how it might presage future literacy trends.

4 Design of Technology

This chapter describes the design process I engaged with to evolve a technology for spriting. Emerging out of my interaction with adult learners, I made a spriting technology prototype through which those same adult students experienced some successes with composing. I refined this prototype, called the SpriterWriter, which I describe in detail in this chapter, before working with two groups of elementary school children. Particular attention is given to the iterative design process and design changes made while the children were using it.

Based upon observation of the SpriterWriter in use, I make particular and limited recommendations for improvements to this particular prototype. I pose questions and make more long-term recommendations for how technology can serve the composition and editing activities I observed in more flexible and interesting ways. I make general observations of problems with the design of computer technology today that if addressed would prepare the way for significant advances in spriting technology and its use. Lastly, the children engaged in some critique of the spriting technology and how it could better support their work. Their suggestions, some requiring simple changes and some involving complex technological development, are recognized and discussed.

4.1 Related Work

There is no commercial, consumer technology that specializes in editing recorded speech. As most efforts are focused upon transforming speech into text (speech to text recognition, speech transcription systems, etc), and treat speech as the 'detritus' of the process, relatively little thought has been given to the interfaces, enabling technology, or challenges in developing spriting technology. Audio editors, on the other hand, are plentiful and there are many connections between spriting technology and audio technology. But as the purpose ascribed to them is a general appliance for editing sound, they do not share enough "design genes" with the treatment of words and texts in word processors that a spriting technology should emulate.

Technologies to support the use of oral language in reading education is being recognized in the academic and teaching communities (Leu 2000), but mostly in ways that serve conventional literacy concerns: decoding, spelling, or reading aloud using Text-To-Speech (TTS) technology. Such software is often intended for special populations (e.g. 'at-risk' or 'learning disabled' students). For example, *Write:OutLoud* by Don Johnston Incorporated is a word processor with integrated TTS support for the Franklin spell checker and dictionary. *KeySpell* and *ScreenSpeaker* from KeyStone augment Microsoft Word and Dragon's NaturallySpeaking speech recognition system to notify the writer of spelling errors. It also reads out loud potential corrections for those errors while simultaneously highlighting the synthesized text to help struggling readers. *Co:Writer 4000* integrates subject area dictionaries with TTS technology to help students who spell words the way they sound

(phonetically) rather than the way they are spelled (orthographically), select the word they intended to use rather than a homonym (an all-too-frequent problem when beginning spellers have access to a spell-checker).

All of these programs, however, focus students upon literacy issues rather than giving them tools with which to think broadly about their content prior to narrowing their focus to mechanical issues. Nor do these tools help students gain an intuitive and concrete understanding of their own talk and help them improve how to use it.

4.1.1 Visual Representation of Time-based Media

A primary challenge to the successful design of spriting environments is how to represent speech. Most critics opine, why not just use text? The most important reason to not use text in terms of the empirical work engaged with in this thesis is that the authors were often not fluent readers. A textual interface distracts these learners from higher-level composition concerns. If, on the other hand, they were able readers, they might rely too much on the written presence of their words without evaluating the *prosodacy issues*: making certain that their spriting content sounds as intentional and musical as they would like. From a learning perspective, my intention was to have students draw their own distinctions between oral and writing styles, which can vary much more than is recognized in technological development communities. Providing exact transcriptions between spriting and writing seems to weaken that goal. And lastly, providing reliable textual transcriptions automatically is simply not yet possible. Speech dictation recognition, the technology required to make a textual interface to spriting possible, is not yet designed for conversations or noisy, unpredictable classroom contexts. It would simply translate speech to nonsense, an even worse outcome for poor readers. As recognition of spontaneous speech in natural environments improves, this might change. But I suspect that it will be through different approaches to speech recognition, like attention to intonation (e.g. Wang 2001) and allowing for selective recognition of speech, something like word- to phrase-sized 'islands of reliability,' that ultimately treat speech dictation recognition as only a part of a larger composition system in language, not the total solution, that this technology will become more compelling and tractable.

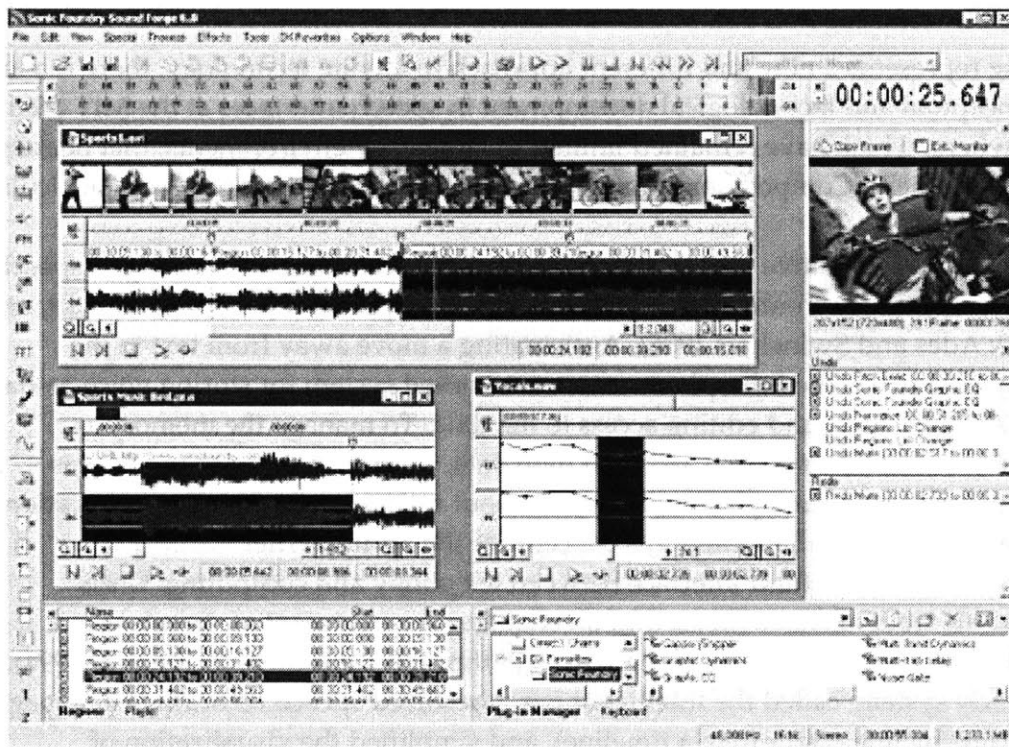


Figure 7 The Sound Forge audio editor interface

Aside from using text, what are other possible visual representations for speech? Instructive are the visual metaphors that have become prominent in audio and video editing. The most popular is a diachronic timeline, while the geological strata of ‘tracks’ indicate the synchronic relationships that hold between them. Each stratum of audio editing typically uses an amplitude waveform, as shown in Figure 7, to provide skeletal cues for meaningful speech editing. Zoomed out, amplitude provides more cues to the distance of the microphone to one’s mouth and the level of excitement in the voice. Zoomed in, one might see syllable structure since English vowels are louder than consonants. But these are cues too low in meaning to be generally useful for composition purposes. Thus, an amplitude waveform, while good at showing relatively louder portions of sound, is too much information—and of the wrong kind—when editing for linguistic and communicative meaning.

Audio editors currently have very complex and distracting interfaces, which can distract from editing speech as meaning, like Sound Forge audio editor shown in Figure 7. Making ‘cuts’ in the sound is unwieldy, as the sound is not automatically segmented in any way. The system makes no assumption about what the sound is, or helps in any way to indicate possible segmentation points within the speech. To make a cut, the author needs to indicate beginning and ending points and then register a ‘cut.’ This is usually done without any audio feedback during the interaction. Needless to say, editing speech is often left to professionals.

4.1.2 Speech Interfaces

While spriting represents a new and different approach to literate technology, there is a long history of conceptual and technological development in speech interfaces at the MIT Media Lab and elsewhere, which have remained limited to laboratory environments, that heavily inform its development. Composition is an application to which this work seems particularly well suited.

An early and innovative system for supporting the recording and editing of speech in a networked computer environment was Xerox Parc's Etherphone (Swinehart, Stewart, and Ornstein 1983; Ades and Swinehart 1986). Anticipating a move away from text in the computerized workplace, the Etherphone was a networked system for storing voice-as-data on servers with composing and editing access to the data. To manage the memory constraints involved in editing large arrays of byte data, a concept of 'voice ropes' was developed that index into data, play and edit it without memory intensive copy operations (Terry and Swinehart 1988). I adopted this concept for the SpriterWriter.

Anticipating a more fluid interface between telephony and computing, Chris Schmandt and his students have focused upon enabling the treatment of speech as a primary, first-class material for interacting with and through computers (Schmandt 1994). Schmandt's early system, called the Intelligent Ear, visualized speech recordings in a 'page-like' manner (line by line rather than a timeline), and simplified the visualization of amplitude as 'hills and mountains' rather than a more complicated waveform (Schmandt 1981). Systems that followed the Intelligent Ear have built on Schmandt's early vision of networked environments that bridge desktop computers and small hand-held computers, especially cell phones. For example, Audiovox (Arons et al. 1989) is an early spriting technology that permits speech recording, some editing operations through a GUI, and audio output. It was designed as a voicemail message editor. Audiovox editor displays visual patterns of speech and silence in the clip. Semi-structured audio (Hindus, Schmandt, and Horner 1993) represents the dyadic turn-taking patterns in telephone conversations in a visually explicit manner.

Anticipating different kinds of auding needs, the Speech Skimmer system provides an audio-only interface to browsing much longer speech recordings such as lectures, meetings and conversations (Arons 1994, 1997). It preprocesses the speech to locate structures of continuous speech spurts and silence, using the acoustic properties of speech. Speech spurts are further defined as more or less 'active' using the standard deviation of the fundamental frequency. A user can accelerate the playback speed using both signal processing methods and semantics of the 'found' structure. This found structure permits smooth acceleration of speech recordings up to the limits of speech perception, and then continued 'acceleration' into overviews of the material (e.g. summaries, overviews). The Audio Notebook (Stifleman 1997) combines paper-based note taking and recording of lectures and meetings; users of the notepad can index in to the spoken discourse structures recorded at the same time as they wrote notes by using a special pen to touch the notes. TattleTrail (Kim 2002) is technology to support an asynchronous audio Chat held through

walkie-talkies. The interface allows users to accelerate and ‘skim’ through the audio Chat using the structure of the cued messages. In unpublished work sponsored by IBM Research, I designed a prototype system to browse multi-party conversations at greatly accelerated speeds while preserving the turn structure of the conversation, which was available in marked-up form (Shankar 2002).

Recorded speech has been shown to aid writers in complex composition activities. Given digital access to recordings of important meetings (e.g. technology patent discussions), writers produce more detailed and clear texts (Moran et al. 1997). In education environments, although receiving the teacher’s feedback on writing is only loosely related to the issues considered in this thesis, it is interesting to note that novice writers prefer recorded, oral comments from their teacher over written comments because the voice expression helps explain the often skeletal critique (Neuwirth and Wojahn 1996).

4.1.3 Digital Talking Books (DTB)

The concepts of spriting and auding bear a strong family resemblance to talking books. A traditional Talking Book is an analog representation of a print publication. A Digital Talking Book (DTB) is a multimedia representation of a print publication. They are popular with commuters, people with a print disability, and pre-literate children. In both instances (analog or digital), the rendering of the audio is in human voice to avoid the persistent problems associated with synthesized voices: they sound unnatural and lack expressive variation. A less considered problem is that many written texts were not composed to be read out loud and can sound very awkward. Composing a text to *sound* good would need to be considered a new goal for written literacy.³²

In March 2002, the U.S. National Institute of Standards Organization (NISO) members passed a standard for the coding of DTBs, designed to make print material accessible and navigable for blind or otherwise print-disabled people (NISO 2002). Schools will soon be legally mandated to provide print-disabled students with these multi-modal structures—as of July 2004, the U.S. Department of Education endorsed the National Instructional Materials Accessibility Standard (NIMAS) that extends the Individuals with Disabilities Education Act (IDEA) from physical into intellectual realms. Thus, within a short

³² Written literacy, as much as it is touted as a universal standard, is an ever changing politic (see also Halloran 1993, 1987; Berlin 1996). Novels emerged in the seventeenth century as a ‘ladies pastime’ and became so-called serious work in the nineteenth. As much as the study of English literature has become a serious scholastic pursuit, the first doctorate in literature was awarded less than one hundred years ago at John’s Hopkins University (Berlin 1987). One can now witness the representation of conversation as constituting ever greater portions of novels and other written stories as ‘talkie’ movies and other dialogic forms of art/entertainment increased in popularity throughout the twentieth century (Lakoff 1982). Even academic writing is not immune to change, as a quiet war wages between those who admit a subjective frame and use first person with active verb tense and those who believe in the invisible hand of objective science and use passive verb form with indirect third person voice to report their findings. All of this goes to show that as spriting develops as a viable tool for expert composition, the sound and look of ‘literate’ language will continue to change to suit the purposes of the authors, ever within the constraints set by the tools they have available.

period of years, it is likely that school curricular materials will need to adhere to universally accessible design practices (e.g. multi-modal approaches).

However, considering the diversity of learning approaches amongst people generally (Gardner 1983), rich knowledge materials like DTBs should instead be positioned as a path in an expanding set of universal learning approaches (Rose and Meyer 2002). This standard is as useful to enable children who cannot read well yet to act efficaciously upon their intellectual curiosity, and for the 'abled' community in 'ears free' activities as it is for those with some print disability. I also argue in this thesis that DTBs can be beautiful—even aesthetically preferable in their own right—if we evolve 'native' ways to compose them.

One international consortium, Digital Accessible Information System (DAISY), has implemented the DTB standard in a flexible way designed to address *all* people (DAISY 2001). The standard features six different kinds of DTB structures:

Full audio with Title element only: This is a DTB without navigable structure. Only the title of the DTB is available as text - the actual content is presented as linear audio only. Direct access to points within the DTB is not possible.

Full audio with Navigation Center (NCC or NCX) only: This is a DTB with structure. The structure is two-dimensional, providing both sequential and hierarchical navigation. In many cases, the structure in this type of Daisy DTB resembles the table of contents of its print source. Some of these productions provide page navigation.

Full audio with Navigation Center and partial text: This is a DTB with structure as described above, as well as some additional text. The additional text components may occur where keyword searching and direct access to the text would be beneficial, e.g., index, glossary, etc. The audio and existing text components are synchronized.

Full audio and full text: This is a DTB with structure and complete text and audio. The audio and full text are synchronized. This type of production may be used to generate Braille.

Full text and some audio: This is a DTB with structure, complete text, and limited audio. This type of DTB could be used for a dictionary where only pronunciations are provided in audio form. As in the previous categories, the audio and text are linked.

Text and no audio: This is a DTB containing a Navigation Center and marked up/structured electronic text only. No audio is present. This file may be used for the production of Braille.

Figure 8 DAISY DTB structure guidelines

The DAISY standard is laudable because it recognizes the value of recorded speech audio and promotes an inextricable linking of speech and text. But even so, there remain major problems with DTBs in the way they are currently imagined and realized. A talking book or DTB requires another step beyond the production of the text: it must be read out loud by a professional reader to produce a quality, spoken version of the text. Thus, DTBs are seen as an additional cost to producing any title *precisely because they are viewed as a derivative of a written text*. The NIMAS guarantee of access to school curricular materials by

people with print disabilities will certainly force greater expenditures, which hopefully will spur technological innovation and greater openness to conceptual changes. But any DTB standard is inherently flawed as a model for literacy if it addresses only how people consume literate material. Simply put, any DTB standard that does not address how DTBs can be composed from the onset of the composition process as digital speech are half-way standards soon to be surpassed.

4.2 SpriterWriter Prototype

The SpriterWriter design pictured below in Figure 10 is geared towards users with little prior knowledge of computers, due to my empirical design research with learners who had elementary skill levels with literacy, letteracy, and computer use. As such, the interface features are designed to be easy to use and to reinforce user interface concepts that can be applied equally to text processing (e.g. lines, paragraphs).

The SpriterWriter represents each individual recording made as a bar/stick, shown in Figure 9 as containing one to many sausage-like objects. To make such a recording, composers press the red square RECORD button on the toolbar, shown in Figure 10 in the 'Spriting Interface,' and speak into a microphone plugged directly into the computer's mini audio-in. The system puts no maximum limits upon recording length, which is limited only by the size of the hard-drive. To stop recording, the composer presses the same button again. Composers are in complete control of the recording and playing processes to try to minimize problems with composers recording speech they did not intend to record.

The SpriterWriter treats recorded speech similarly to Western text conventions. At the end of the recorded 'line', the bars and sausages wrap around, similar to the treatment of text and in contrast to the usual representation of audio as a timeline. Each stick begins as a contiguously recorded spurt of speech. The length of the stick and sausages corresponds to the relative length of the audio they represent. The stick can be broken apart later into smaller pieces, rearranged and/or partially deleted, during an editing process. Since in this thesis spriting is linear composition, SpriterWriter does not support synchronic relationships between elements—nothing ever plays simultaneously.

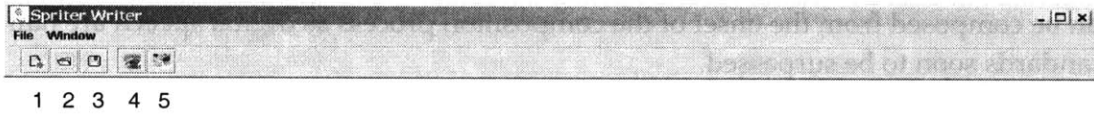


Figure 9 A single recorded 'stick' containing five acoustic chunks, or 'sausages'

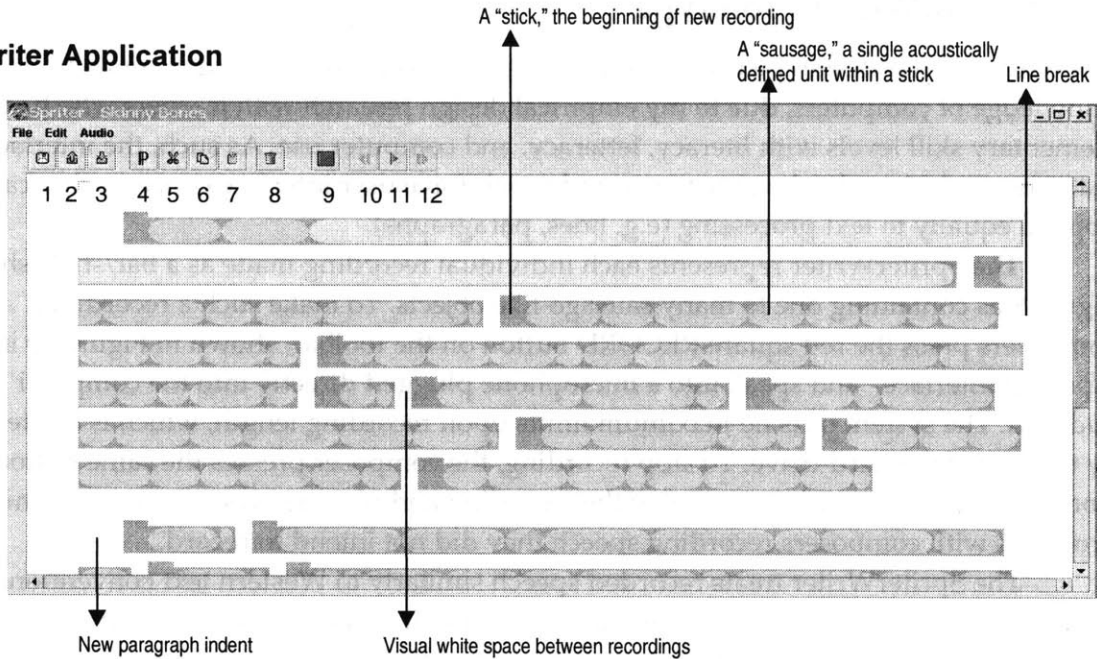
The 'sausages' within the stick represent acoustic chunks, usually some mix of speech to background noise. To create the sausage structure within a recording, the system performs a simple 'end detection' algorithm intended to distinguish speech from background noise (Arons et al. 1989). One sausage ends and another begins when the system detects a period of 'background noise' that exceeds some minimum length (e.g. 500ms). Thus, each sausage (except the first one) should begin with 'speech' sound. Currently there are two different settings in the SpriterWriter for treating sequences of samples deemed to be 'background

noise': (1) these samples are post-pended to the 'speech' samples before a sausage break, or (2) those samples that exceed some certain minimum duration (e.g. 500ms) are disposed of.

Main Application



Spriter Application



Writer Application

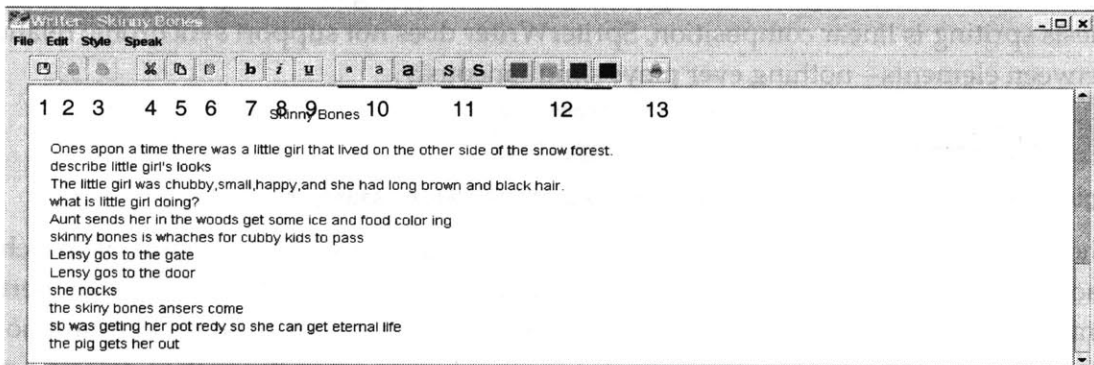



Figure 10 The SpriterWriter interface as of March 2004. Key to 'Main Application': 1 New document, 2 Open document, 3 Save all, 4 Open Spriter, 5 Open Writer. **Key to 'Spriter Application':** 1 Save, 2 Export to audio and applet, 3 Import sound files, 4 New paragraph, 5 Cut, 6 Copy, 7 Paste, 8 Delete selection, 9 Record/Stop bimodal button, 11 Play/Stop bimodal button, 10 and 12 are active in transcription mode to go backward and forward between sausages. **Key to 'Writer Application':** 1 Save, 2 Export, 3 Import, 4 Cut, 5 Copy, 6 Paste, 7 Bold style, 8 Italic style, 9 Underline style, 10 Small/Medium/Large font size, 11 Sans Serif and Serif font style, 12 Color style, 13 Press for text-to-speech (TTS) system to say selection.

Practically, the latter option frequently served to discard unvoiced stop consonants (e.g. /t/, /p/), soft liquids (e.g. /l/) or glide sounds (e.g. /w/); therefore I did not introduce the second recording mode to the children nor did they discover it. It is a pity it didn't work better, however, since some of them would have appreciated stable silence removal.

It is important that audio interaction with the bars and sausages is very quick and responsive. Therefore, simply clicking on a sausage plays it. Clicking on a recorded stick and pressing the play button  in the toolbar plays the entire composition from that point. One can discontinue the play mode at any time by clicking the play button again (it is a bimodal play/stop button).

In a noisy classroom environment with variations in microphone quality and microphone distance to the sound source, any speech algorithm used should be able to fail 'safely.' As expected, results of using the end-detection algorithm were highly variable: sometimes a recording produces a single gargantuan sausage, sometimes it produces many petite sausages as shown in Figure 9. Children overwhelmingly preferred many petite sausages. They were disturbed and angry when the SpriterWriter did not articulate such sausages. When all things worked together to produce petite sausages, the speech was automatically segmented into units that aided relistening and editing.

4.2.1 Editing

From a system perspective, all edits are nondestructive. The interface maintains pointers into the original recorded clips, a method inspired by the Etherphone system (Terry and Swinehart 1988), making editing changes very quick. When the composer listens to the entire composition, the system seamlessly joins these excerpts together by reading bytes nonlinearly from the original audio files and streaming them to the computer's speaker.

4.2.1.1 Split Edits

Editing in the SpriterWriter employs direct manipulation and novel rhythmic approaches. Setting *in* and *out* points, as required in video and audio editing software, is much too tedious for children lacking fine motor controls and inexperienced with the mouse pointing device.

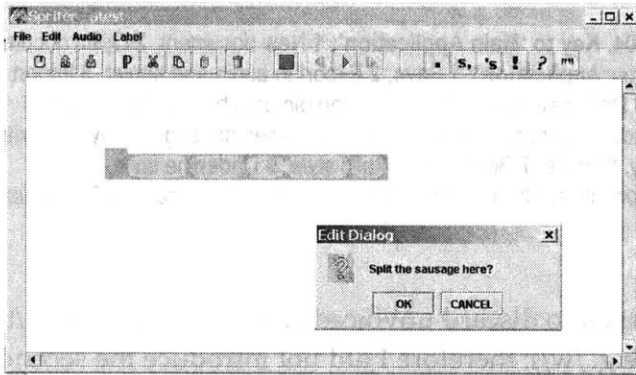


Figure 11. The "Split the sausage here?" dialog appears after a click-while-auding



Figure 12. Two bars result from making the split edit

Instead, in the SpriterWriter composers make splits in recording while auding. Splits are made in the following manner: while auding the recording, at the point composers want to make a split, they click anywhere on the spriting interface. The audio stops and a dialog emerges, as shown in Figure 11, asking if they would like to make a split. Figure 12 shows the two resulting bars after the split in made in Figure 11. Each of these stick and sausage objects can now be operated upon differently.

4.2.1.2 Deletions, Insertions and Paragraph Edits

Both sticks-and-sausages as well as individual sausages can be selected by clicking on them. When an interface object is selected, composers can operate on it in several ways.

Deleting unwanted bars or individual sausages is accomplished by pressing the Delete button (the garbage can icon in the toolbar) or the Delete/Backspace key. Both stick-and-sausage and individual sausages can be deleted in this way.

Adding paragraphs to the composition can be done by pressing the ¶ button in the toolbar or pressing the Enter key. The prototype only permits entire stick-and-sausage structures to begin paragraphs, not individual sausages. By incorporating a notion of paragraphs, composers can visually indicate topics in ways that timelines do not permit. In Figure 10, there are two paragraphs visible; in Figure 14 there are three paragraphs.

Composers can also insert new recordings into the composition by selecting the stick-and-sausage structure they want the new content to precede and pressing Record.

4.2.1.3 Dragging-and-Dropping Edits

By clicking and dragging upon the 'handle' of the stick – the leftmost portion, one to many sticks may be dragged and dropped on another bar in the composition. Dragging-and-dropping any stick-and-sausage-structure around the document reorganizes the flow of content.

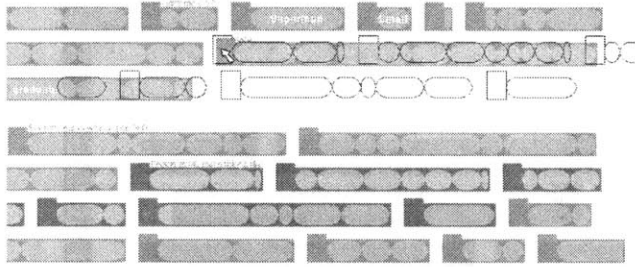


Figure 13. Dragging six recordings to a new location

In Figure 13, a series of sticks were highlighted and are being dragged to the middle of the paragraph above. They have not yet been 'dropped' into their new position.

4.2.2 Annotating

Composers can annotate any bar and any sausage with text by simply placing the mouse over the object and typing. In the example composition in Figure 14, a child annotated many of the sausages in the composition 'Boo,' each visually superimposed upon the sausage. If the recorded sticks were annotated, the text would be placed just above the stick itself, but the children never annotated the sticks, only the sausages.

4.2.3 Translating between Spriting and Writing

Translating between speech and text is an important part of the Sausages prototype and experimental work proposed. When I began the study, it was unclear to me how the computer should support this learning activity. Translating recorded speech to text ‘by hand’ is a very difficult task to do for novice writers. Because spelling and writing mechanics are far from automatic for them, by the time they have figured out a spelling (often erroneous) they have forgotten what words they wanted to transcribe.

I anticipated several outcomes, including that students would simply refuse to transcribe their spriting. If they refused, I proposed running a kind of Wizard of Oz experiment in which I would act as the speech-to-text recognizer, to see if students would engage with the resulting text I gave them. As described in sections 4.4.3 Making Writing Useful and 4.4.5.7 Translation, the children resisted translating their spriting into writing—they simply had no interest. For them, the talkument was the final product. They even used writing in service to their spriting! When I gave some children full transcriptions of their spriting work, they were excited, read through them, and improved some features of the written form. But they did not want to undertake conceptual revisions in text larger than single words, nor did they tend to share the text with peers as widely or readily as they did their talkuments.

Looking beyond, when spriting is a sophisticated tool for the development of multi-modal talkuments (e.g. both speech and text), translation between spriting and writing should be far more interactive. One can imagine a level of interactivity so closely intertwined that children could ‘automatically produce’ a textual translation of an edited talkument and then further revise the text through the spriting interface. If the resulting product is some bimodal form, the spriting should automatically change and adjust in response to edits made to the text. Making something like this happen raises many questions about how text and speech can and should accord. At one extreme, composers might desire a high degree of linguistic correlation between spriting and writing, and thus use automatic recognition that ‘tightly coordinates’ the speech to text. At the other extreme, composers may desire little linguistic correlation between spriting and writing, and prefer to be in complete control of the spriting and writing relationship. It is conceivable that the composer might want the computer to ‘step up’ the register across the translation rather than to transcribe it verbatim.

Close coordination between writing and spriting structures assumes perfect recognition of speech. But perfect speech recognition has not yet been achieved, and maybe speech will always resist being reduced to pure linguistic meaning. So then, how can we coordinate text to speech if they are not identical? If some parts of spriting resist translation to text (and vice versa), then one task of learning to compose bimodal talkuments will be to examine how one’s intention and purpose can be achieved differently in each mode, or to present both ‘incomplete-unto-themselves’ compositions simultaneously. This thesis makes some beginning contributions to the integration of spriting and writing in a multi-modal composition process.

4.3 Emergent Themes

One of the biggest surprises to me was the immediate connection all of the children made to music. I had unconsciously assumed that children would talk their spriting. But singing and sound making of all kinds occurred in both schools across all ages during the very first weeks. While I admired the ingenuity of some of these musical compositions and did not prohibit this form of spriting, I wanted the children to look at the microphone also as a tool for extended linguistic composition in genres that parallel those taught in school. I began to address the difference between these spriting behaviors as 'singing spriting' and 'talking spriting.' With children who focused purely on singing spriting, I encouraged them to talk their spriting as well. Sometimes I assigned required ratios they had to achieve if they were to continue being invited to sprite (e.g. 4:1 talking to spriting). Several wonderful talking-singing talkuments emerged from this requirement.

When I began, I didn't know if spriting would work for a group of children together in a single classroom. The combined noise level of a group of children could overwhelm each of their compositions and disturb their ability to concentrate. I found that children can compose out loud all together in a single classroom. It requires negotiation and respect for each other's work, and is not without moments of high tension. For example, at Molière Elementary, the third graders became extremely angry at two fourth grade girls for their consistent loud behavior. They ganged up on them as a group, yelling things like "Your voice is all over every one of my sausages! I hate you!" The third graders insisted they could not do good work if the girls remained in the class and asked me to kick them out. We discussed solving this problem as a class, and the third graders calmed down over subsequent weeks. I had the Principal speak to the two girls, who were very well-behaved afterwards. The class ended with all eleven children as good friends. The children and I suggest possible technological and social solutions to the issues of classroom noise, particularly in Section 4.5.3. But I note that the tapestry of classroom sounds that permeate the Molière recordings can be heard less as a disturbance and more as an audible clue to a vibrant composing environment.

4.3.1 Children Reverse the Process

My expectations for how children would use the SpriterWriter was encapsulated in the process model shown in Figure 15 The predicted Spriting to Writing process. First the children would engage in an iterative spriting process, involving recording, relistening, and editing. When they are satisfied with the way their composition *sounded*, they would transcribe it to text or I would provide a transcription of their work for them. Lastly, they would edit the text for mechanical and visual representation concerns.

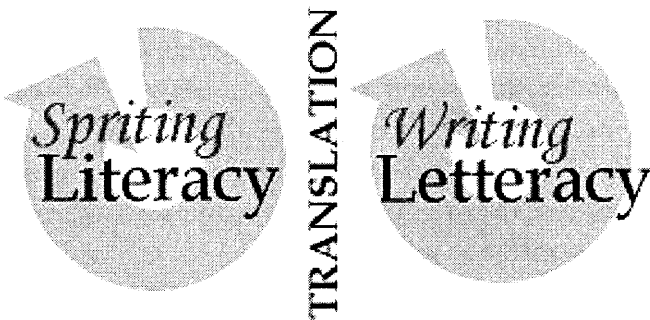


Figure 15 The predicted Spriting to Writing process

I expected that the act of translation between spriting and writing would be an exciting and new intellectual event where issues about how we talk versus how we represent our talk in print would occur. Since one school, Umoja Elementary, was comprised of a majority African American Vernacular English speakers, I predicted that during translation political issues about ‘standard’ language and ‘written conventions’ would surface and position the SpriterWriter as a technology around which socio-political conversations about representation could occur. The two times such conversations did emerge, my own lack of knowledge of the intricacies of AAVE and so-called ‘standard’ English did not allow me to pursue it. This reveals to me all the more how urgently we need better ways of looking at and talking about the relationship between speech and writing.

I was surprised at how much the children, at both schools and at many different developmental levels of literacy and letteracy, loved spriting for the sake of it. Most of them were unenthused about translating between spriting and writing themselves—even the accomplished writers. They saw only drudgery in the translation. If given the textual translation of their spriting, some surprising interactions emerged, like encountering the ‘say-mean’ distinction described in Chapter Five. But the talkuments acted upon the children’s social worlds in more powerful ways than did the texts made from them, which simply disappeared into the yawning mouths of their desks.

One child at Molière asked me very soon in to the study, “Can you put this (he gestures to the Writer) into that (he gestures to the Spriter)?” This request presaged how the children reversed the process I had envisioned. There were only two instances of translation, which occurred from writing to spriting, something I had discounted as a possibility! The children’s production was oriented towards spriting as a final product.

At a middle point in the study at both schools I began questioning the students about differences and similarities they perceived between writing and spriting. All but one student (who was from Umoja Elementary) saw spriting as completely different from writing. Writing, they asserted with surprising uniformity of opinion, is done with the hands and involves spelling and punctuation. Spriting is like talking. Only one student, from Umoja, arrived at the insight I began with and said that writing and spriting are really the same thing.

The children rarely composed serious things in the Writer. Most children just enjoyed playing with the Writer, for example, listening to the text-to-speech system say a string of random characters and numbers. They would usually erase what they wrote once they heard it because it was not important. There were less than seven instances across both schools (out of a total of 197) in which a composition incorporated the use of writing in a way that was complimentary to the spriting composition. Children that set out to write something in the Writer because I encouraged them to or because they felt it was a more mature expression switched to the Spriter to complete the composition in all but one case.

Only one composition, by an Umoja Elementary student, was ever begun and finished in the Writer itself; it never gained a parallel representation within the Spriter. Not surprisingly, it was a love letter, a genre that in elementary school functions like an icon within the environment. (I observed this same girl write a shorter and even more iconic love note in a sand pile with her finger during recess several weeks later.) She later erased the love note she had painstakingly and thoughtfully composed in the Writer because she no longer 'loved' the boy. Ironically, and in contrast to theorists who claim that writing is permanent while speech is ephemeral, her writing had a more temporary and iconic purpose in her life than her spriting.

4.3.2 The Tools for Spriting

I was curious which microphones children would prefer. For that reason I purchased two different kinds and picked up a variety of used microphones of different designs. Headworn microphones are known to capture superior speech quality. Lapel or desktop gooseneck microphones tend to capture a greater range of environmental noise.

The children so overwhelmingly preferred the handheld microphone design, they even used the headworn mics as handhelds, as awkward as that was. They claimed that headworn microphones hurt their heads and they had difficulty adjusting them to fit their small bodies. Some would go so far as to take them on and off between each recording, causing my conversation with the child to move regularly between issues of composition and issues of head comfort and microphone position. They liked to feel in control of the recording instrument itself, often touching the foam-encased microphone of the headworn, causing a THWUMP! THWUMP! sound that occurs often through many compositions. But by far, most children liked the handheld microphones because it allowed them to compose collaboratively with others. The issues with facilitating peer collaboration in spriting emerged as an enormous issue through the course of the school interventions. I was often cursing the monolithic design of the computer itself as a instrument for solo performance. Children often prefer to sprite together.

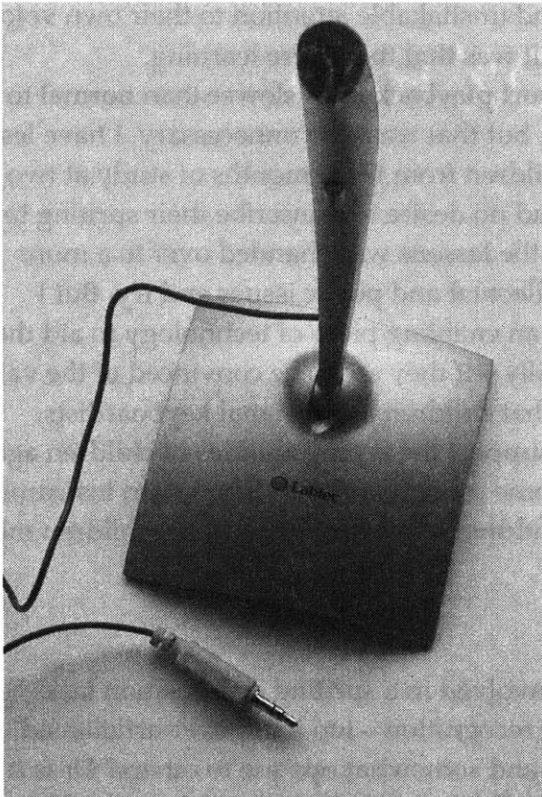


Figure 16 Gooseneck microphone used

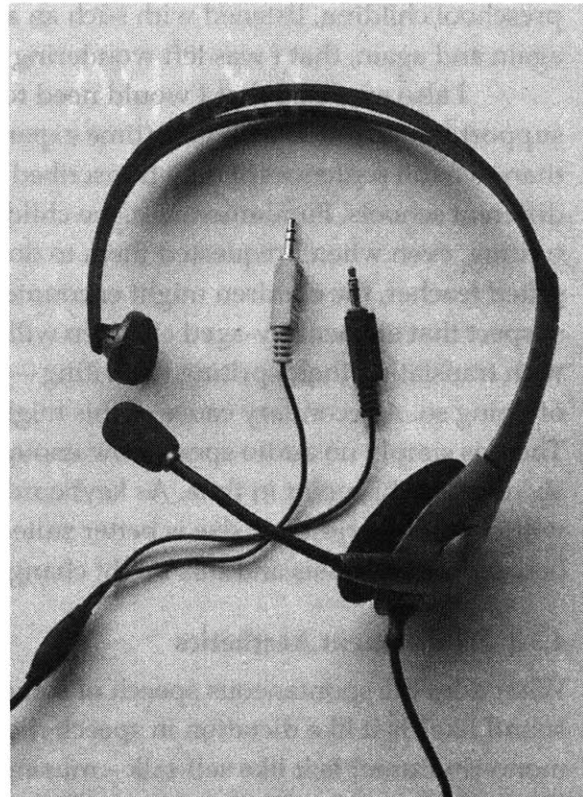


Figure 17 Headworn microphone used

Spriting has its own set of emergent ‘mechanical issues’ parallel to handwriting, spelling and other letteracy concerns. I thought that the speech captured by the headworn microphones—if they were properly worn—was superior to the gooseneck microphones; however, most children preferred handheld microphones. Very seldom did they comment on sound quality issues; I often did. I note with some embarrassment how I would often respond to the material quality of the recording before remarking on the substance of the spriting. My concern foreshadows sound quality and *prosodacy* as future mechanical issues—the spritten equivalent of character formation and neat handwriting—with all of the attendant dangers of superficial instructional responses.

4.3.3 Audio Interaction

When I began the study, I anticipated that I would need to develop ways of skimming through the recordings in less than the time it took to say the speech (time compression). From previous work with adult users of speech systems, we know to expect complaints about the amount of time required to relisten and the lack of sophisticated browsing techniques (Arons 1994, 1992). In contrast, the children were delighted to relisten to their compositions without skimming technology. I do not recall ever hearing a child embarrassed or uncomfortable with listening to his or her own voice (although one student at each school chose not to participate in public demonstrations of their work, their reasons seemed to stem more from overall shyness than the way their voice sounded). Some children, particularly

preschool children, listened with such an avid and unshakable attention to their own voices, again and again, that I was left wondering what it was that they were learning.

I also expected that I would need to support playback rates slower than normal to support transcription activities (time expansion), but that was also unnecessary. I have less than two full sentences of data transcribed by children from three months of study at two different schools. Fundamentally, the children had no desire to transcribe their spriting to writing, even when I requested them to do so. If the lessons were handed over to a more gifted teacher, the children might encounter intellectual and poetic issues and try. But I suspect that elementary-aged children will need an enabling piece of technology to aid them with translating their spriting to writing—playfully—if they are to be convinced of the value of doing so. A secondary cause of this might be that children are abysmal keyboardists. There is simply no audio speed slow enough to support the typing abilities of children aged six to ten at this point in time. As keyboards become more popular as inscription instruments within schools and their size is better suited to children's smaller proportions, children might become faster typists and this might change.

4.3.4 Talkument Aesthetics

What does the spontaneous speech of someone involved in a spriting composition task sound like? Is it like dictation in speech dictation recognition – too loud, over-articulated, mono-rhythmic? Is it like self-talk – musing, soft and somewhat opaque to others? Or is it like a conversation with the class teacher or a friend? Does the presence or absence of a listener affect the speech?

The children sprouted with every kind of voice they control, and some they are only experimenting with (e.g. cowboy drawl, man's voice—if a girl). The only rule was the very diversity of voices. For example, when a girl recorded a journal entry (only girls did), her voice was often light, musing and quiet. When children told a story, they often put on voices of a grand parade of characters, returning to their 'own' voices to represent the narrator. When they sprouted collaboratively with a friend, their voices became loud and boisterous, or low and intense. They were always, continuously full of expression and personality.

Several children changed their 'natural' voices intentionally to make their spriting more intelligible for the listener. They sprited increasingly slowly, more clearly enunciated their words, and made use of more dramatic devices like pause, accent and pitch range. While not all children changed their talk specifically to improve the intelligibility of their spriting, the ones who did so routinely were also the same children who carefully edited their spriting for prosodacy concerns. They also seemed to be the same children who paid careful attention to literacy issues in writing, especially their handwriting.

When speech material is more computationally fluid and editable, it may be that the resulting talkuments don't sound like any speech genre we are now familiar with. We are familiar with how spontaneous speech sounds. We are also familiar with how *read speech* sounds. But what would *edited spontaneous* speech sound like – and what *should* it sound like? Would it maintain some of the characteristics of oral composition or would it sound like read

speech? Would it be a more hyperbolic version of spontaneous speech, with “gasps, stutters, hiccups, burps, coughs, slurs, microrepetitions, oscillations in volume, ‘incorrect’ pronunciations and so on,” which Charles Bernstein proposes are a current part of poetic readings (Bernstein 1998, p. 15)? Would we want to automatically shorten the pauses to compress it and/or give the composer some control over the pause duration? As one Molière child said, “I like my pauses.” Would we want to eliminate all the false starts and incomplete phrases, or should they remain because they are informative of intellectual struggle? Or, again, should the author be able to control how their speech is represented based upon their purpose for the talkument?

The concept of spriting introduces many new questions for technology development, including how to edit speech. To explain through analogy, when a writer makes edits in text on modern word processing equipment, the ‘cut’ and ‘pasted’ words might bring along with them the font and formatting styles of their former environs. Verb tense or number also might not accord with the new environ. Most difficult to change are large differences in register and style in the introduced text, if the pasted bit originated from a very different kind of text. Thus, in this way, textual editing is a feedback loop, each edit begetting more editing in visual design, syntax and semantics. Similarly, to ‘acculturate’ edited speech into new environs, we will need to invent a new paradigm of editing functions and technology for spriting.³³ At this point, a spriter can end up with the order of words desired (the linguistic representation) but find that the words themselves (the paralinguistic representation) are not well-adapted to their new surrounds. The intonation of a now-embedded clause that was once an introduction may be too high and broad. The vowel duration of a substituted word may be too long for its neighbors and stick out of its context.

I was shocked at how seldom I noticed an edit in the children’s talkument—even when they were there! On the few occasions when a child edited a sentence unit together from two different recordings, I did not notice the break and depended upon the editing record to inform me that it was there. The children were able to make substitutions, deletions, additions and moves that created a seamless effect when auding. Although I anticipated this being one of the largest problems with rudimentary spriting technology, it turned out to be of little concern.

³³ Ultimately how speech is digitally represented is an important issue for editing. SpriterWriter currently treats speech recordings as PCM encoded, 16bit 22050Hz digital speech signal (a level that could be considered an ‘over-representation’ of the speech signal). There are so many ways in which the representation of speech could enhance the amount and kind of editing possible. More schematic representations, such as a model of the phonetic formant contours and a prosodic model, might make possible more fluidly edited material. Positioning such editing support somewhere on the user interface continuum of direct manipulation to automatic accommodation can only become clear as we understand more about how composers sprite, in what social contexts talkuments gain acceptance, and the structure and meaning of speech prosody.

4.4 The Evolution of Technology Design

Typically, any new software introduction in to a classroom requires allowing for technical problems that emerge from unexpected interactions. My introduction of new technology assumed a pattern over the course of the three months. On Tuesday and Wednesday I would spend afternoons with the Umoja Elementary children. I would often introduce a new version during these one-on-one sessions and observe any problems that appeared. I would often succeed in debugging any problems Tuesday and Wednesday evenings and create a new SpriterWriter distribution, in time to introduce a relatively stable version on Thursday at Molière Elementary, where my attention was often fractured between maintaining discipline in an intense after-school club where I was solely responsible for eleven active children just “released” from regular classes and trouble-shooting any problems with the equipment that surfaced during that time. These end-user errors became less acute through the semester as the software stabilized.

Parallel to the changes in the technology, I introduced new curriculum and suggested different kinds of participation to see how the children would use the SpriterWriter to create new kinds of things. For simplicity sake, I separate these two accounts into two different narratives. I emphasize that this is for communicative convenience only. The state of the technology affected what I suggested the children do, and what they did greatly affected not only the developing state of the software, but my critique of technology design (e.g. the shape of the computer, the audio interface to the computer) that extends beyond the scope of this design research project (see section 4.4.7 below).

I made changes to the software on a variety of levels. While some changes were reactive and required to address unanticipated problems that emerged, others were more experimental and designed to see ‘what might happen if...’. Below I characterize the changes made in following ways: (1) repairing errors in software, (2) simplifying and focusing the design to support the ways in which it is being used, (3) iterating on ways to integrate spriting with conventional literacy processes and products. A complete schedule of the technology changes wrought and when new SpriterWriter versions were introduced at Umoja and Molière respectively is available in Appendix D.

4.4.1 Errors and Expectations

The first couple of weeks were spent madly patching problems that I had not anticipated. I had to arrange interface size and features so that the entire interface was visible on small, older monitors. I found their use of the recording and editing buttons a relentless assault during these first few weeks. The most significant problem was children's tendency to delete recordings as they were being recorded instead of stopping them and then deleting them, as I had expected. I was shocked that they would delete an open and active byte stream. Of course, they knew not what they did, and I fixed the SpriterWriter so they could continue their facile manipulation of recording and editing. Many of these children had a ‘video game’ expectation of computer interfaces, rapid fire use of the mouse such that anything can be deleted at any time and changes are fluid and quick. Their manipulation of the interface

was an inspiration to me as a designer, and I was able to glimpse the spatial, layered and interactive sonic immersion possible with this generation.³⁴

There were a number of interface issues the children found that I could not fix during the course of the intervention. Some of the problems would have required too much of a system overhaul, or the problems were cascading and changing any one of them would have made the rest instable. When they encountered such a problem, such as the inability to drag an object to composition final position, I explained that the problem was mine and suggested a workaround. Once when two girls were avidly working under pressure to meet a demonstration deadline at the end of class, they typed a label on a sausage hurriedly. Due to some problems with meta keys, my system would represent these strange characters as a question mark. I told them the problem was mine – that the system did not respond properly. They stared at me and then said, Oh, we thought it was our fault. Young children are so often corrected on their wrong spellings, faulty punctuation and syntax, they will rarely search beyond themselves when looking for the culprit. Therefore, it is very important for a design researcher to honestly own up to interface and technological problems experienced. Since my intervention involved close scrutiny of their approaches to editing, I felt that children should also be privy to the idea that software—just like any composition—can be edited at both superficial and conceptual levels.

4.4.2 Simplifying the SpriterWriter

Some ideas I started with did not serve the functions I had hoped they would, nor did the children adapt them for some unforeseen yet valuable function. They were simply design ‘errors.’ Design researchers need to see the lack of utility in their own ideas and edit out nonfunctional elements to simplify designs.

³⁴ The children’s delight in producing vocal sounds that exceed the linguistic system of signification, and request for ‘sound effects,’ also suggest that a spriting system should permit a full range of sound editing, in which editing for linguistic meaning is but one part. I would recommend a more constructionist vision for providing sound editing capabilities more broadly, capabilities that have more in common with electronic music generation systems so that composers can ‘build’ their own sounds, a far more exciting vision than making available a ‘sound effect menu’ and ‘import’ function for ready-made sounds and songs, much as word processing systems support.

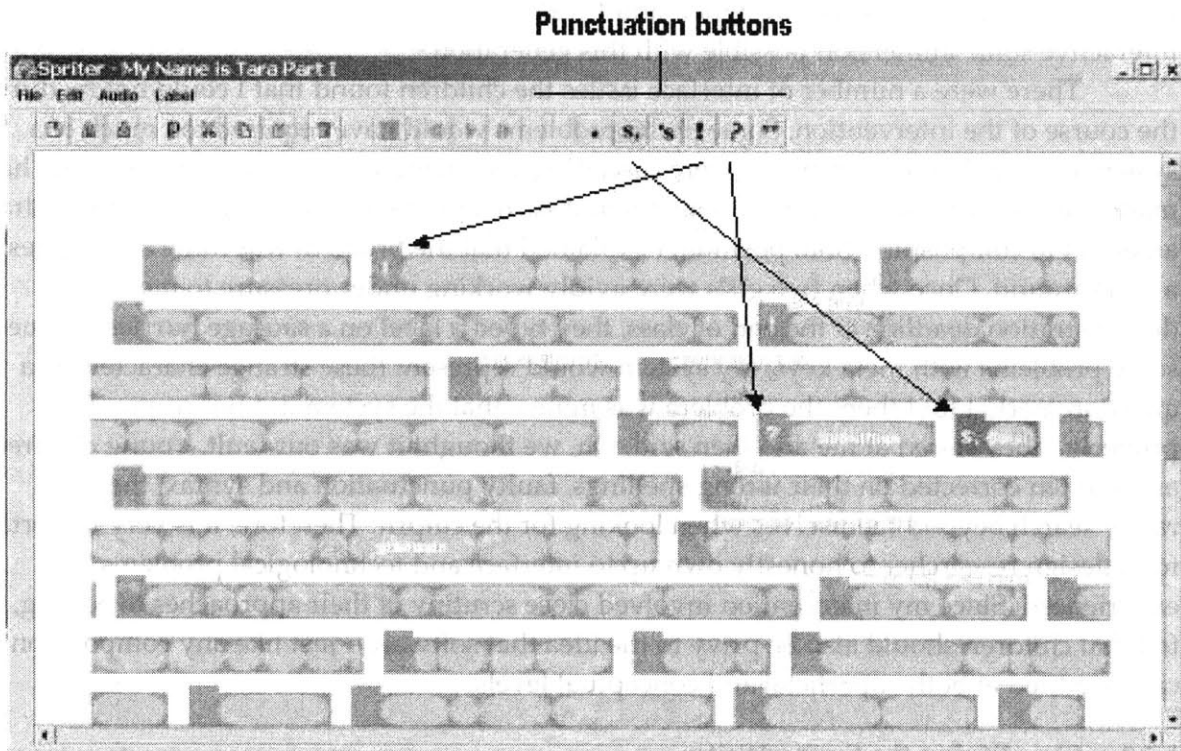


Figure 18 The Spriter interface in March includes 'punctuation' label buttons

The most significant example of this was my idea of using punctuation symbols to label recordings. In Figure 18 the Spriter interface from March 2004 is shown, including a set of 'punctuation' buttons. When a stick-and-sausages structure is highlighted, a composer can press one of the punctuation buttons to label the stick with that symbol. In Figure 18 I used several of these symbols to mark up a talkument I sprrote to introduce myself to the children at both schools.

I had imagined a number of possible functions for these symbols. When I demonstrated previous spriting prototypes to educators, they often criticized the systems for not incorporating some visual way to label interface objects. I thought these punctuation buttons could serve as fast and easy mnemonics, labeling the rhetorical function of the recording (e.g. statement, question, exclamation) or perhaps as a set of meta-edits the child would use to indicate how strongly they felt about including each recording (e.g. question mark for uncertainty, exclamation mark for strong conviction). Also recalling how difficult adult learners found punctuation, I imagined these symbols might be useful to a child in planning how to translate their spriting to writing.

After three or four weeks of observing that none of the Molière students found it useful for anything they were doing, and Umoja students only used it when I introduced it into conversation, I eliminated the buttons and began exploring other potentially more successful designs.

It is possible that the design flaw of the punctuation buttons was their very passivity—they did nothing but ‘label’ a recording, potentially useful when translating spriting to text, which the children would not do. Had the buttons affected the spriting in some meaningful way, for example, by transforming the recorded intonation to match the intonation implied by these symbols, they might have been very useful in helping the children achieve their goal of talkuments as final products.

4.4.3 Trying to Make Writing Useful

One focus of my design iterations was trying to create a new path towards literacy as it is conventionally realized now, as letteracy. After working for several weeks with the children with Spriting alone, introducing the spriting composing and editing features through different activities, I introduced several technical supports for transcribing one’s spriting. These supports were similar to linguistic transcription systems. The technology included a way to loop each spritten sausage N number of times, with a delay of N seconds between each loop, as shown in the Looping Preferences dialog box shown in Figure 19, exhibit B.

The children did not want to translate their spriting to text, although a couple made some half-hearted tries to make me feel good. Because of their reticence, I provided several students at Umoja with textual translations of their spriting work to see if they would make further edits. They read the documents (if they were able to read) or had the TTS system read it to them if they were not. If they were letterate, they tended to delete false starts and meta-comments they did not want in their text and changed words, such as television program names, I transcribed incorrectly. When I gave them printouts of their final work, they tucked these texts away in their desks and did nothing more with them.

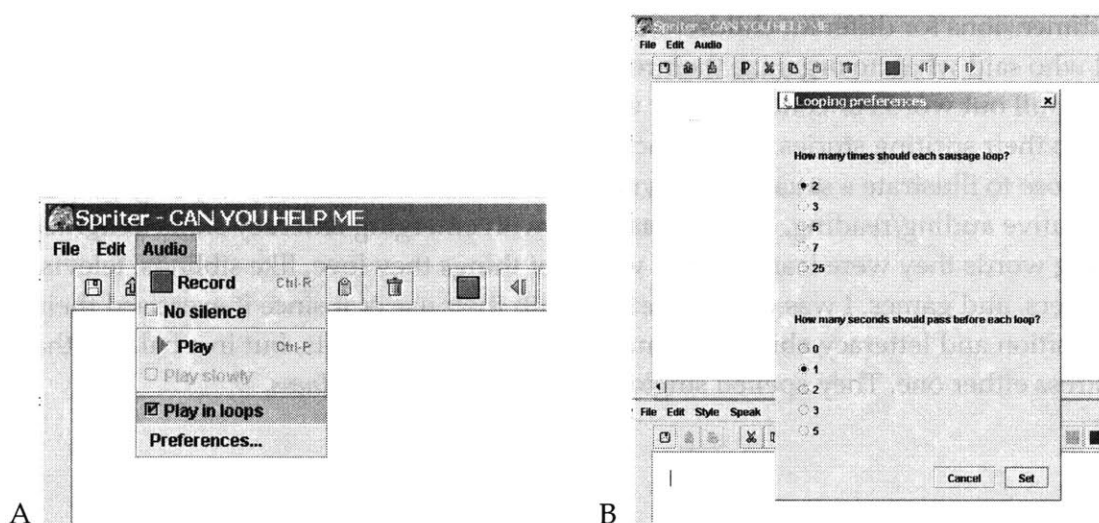


Figure 19 Turning on the ‘looping’ mode of play (exhibit A); the Preferences menu for changing looping number and delay (exhibit B).

As the children were focused upon producing talkuments—not texts, the last major design change I introduced was focused upon making writing subservient to the spriting process. Although the SpriterWriter supported annotation of sausages from the first week, the textual annotations had been passive mnemonics. They did not affect the spriting product.

The majority of talkuments were not annotated. But children occasionally enjoyed annotating sausages and integrated into their composition tasks. To support and encourage the use of annotation as the first successful bridge from spriting to writing, I designed a way to export a spriting composition as an audio-visual JAVA applet that animated their annotations in time to their spriting composition. When a child chooses to export her spriting composition, the SpriterWriter writes out a unique html document and copies a generic Talkument applet to the directory where she saved her talkument. Clicking on the html document opens the talkument applet. But because most children are not good at manipulating the computer's file system, the SpriterWriter opens and plays the saved applet-talkument immediately.

A screen capture of one such talkument applet is provided in Figure 20 below. When a sausage begins playing, any word or words associated with it are shown in red. When the sausage has finished playing, the word transitions gradually from red to grey, falls down the screen at an exponentially decreasing decay, and slowly blends into the background until it is no longer visible. These animation techniques provide auders/readers more opportunity to read the words by extending the visual duration longer than the sausage's audible duration.³⁵

Many children who had not labeled their sausages prior to that time began doing so. Some very creative talkuments were produced. This activity took on very different purposes and dimensions for different children. Older children used it in collaborative compositions to label who said what, to organize their responses to numbered questionnaires I handed out, and to pull out words or concepts they wished to highlight—conceptual summaries of a sort—in their spriting stories. Experiencing their bimodal talkuments, reading the words they chose to illustrate a sausage—a 'synopsis in a word'—makes for very engaging and provocative auding/reading. The 5-6 year olds with emerging literacy skills delighted in spelling words they were learning and words of things they love, like siblings, television characters, and games. I was deeply pleased with their use of it since it exercised their composition and literacy abilities at once and both to their limits, but in a balance that did not stress either one. They spelled single words with great *joyfulness*.

³⁵ I draw upon previous design research in Rapid Serial Visual Presentation (RSVP), which was first a device for reading experiments, and later used creatively as a way of designing new computer interfaces for reading (Wong 1995; Rosenberger 1998; Ishizaki 1998).

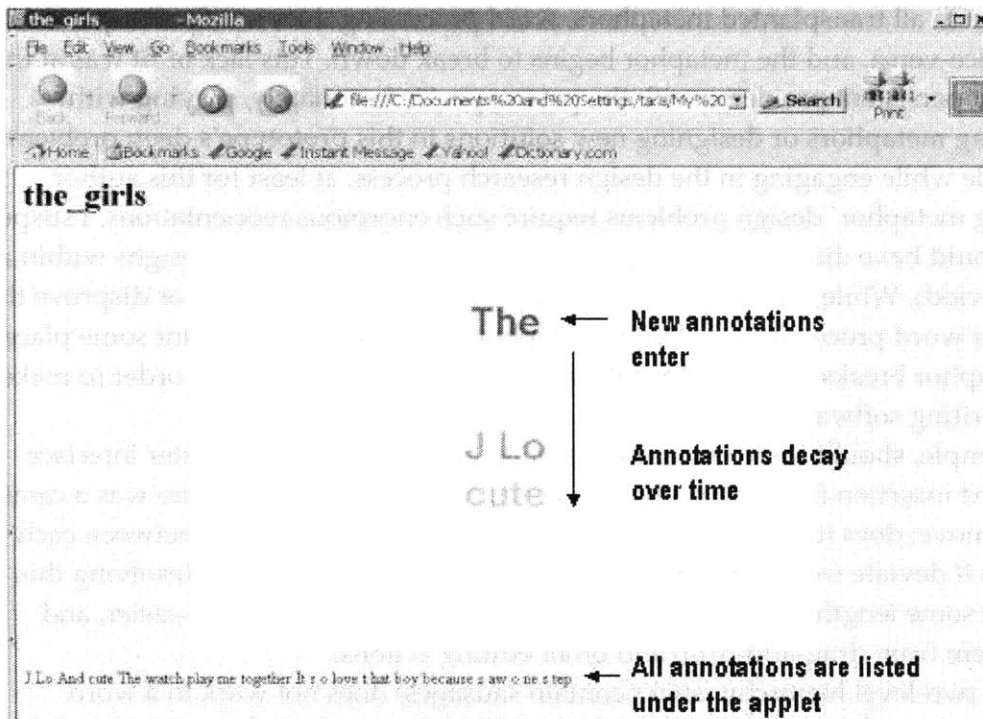


Figure 20 A screen capture of a moment in time of a talkument applet.

After the success of the applet export, I considered entirely dispensing with the Writer. But for a few children, who were spriting movie reports or some research oriented composition, it had limited use. Sometimes I would help a child do a web search and copy and paste reference information into the Writer for them to refer to when spriting (e.g. who were the major actors, director and producer, and when the movie was released). Rather than functioning as the 'end' of a spriting-to-writing process, the Writer served the spriting process, if any writing was involved at all. Future changes to this particular prototype would involve reducing the Writer's importance vis-à-vis the Spriter. Further, unless the rich formatting options in the Writer gain some active purpose in a talkument product, they too are unnecessary.

4.4.4 Word Processing Metaphor: Conceptual Bug?

Since one goal of the SpriterWriter was to improve literacy, it seemed a good idea to use word processing as a guiding metaphor for SpriterWriter design, rather than, for example, sound editing interfaces. The use of breaking the spriting representational line and continuing it on the next line, as well as functions like 'paragraphs,' were ideas borrowed from text. Internally to the SpriterWriter in the design of data structures I also followed ideas from text processing, maintaining all elements in a flat list like early 8 bit word processors.³⁶

³⁶ In 'flat file' word processing, the character vector is numbered *between* each character, such that the characters themselves are not numbered but the positions between them are, from the beginning of the file. This permits the first and last positions to have an address, enabling editing operations like

But as with all transplanted metaphors, word processing does not fit all aspects of spriting, and vice-versa, and the metaphor begins to break down. This lack of fit was at the root of the most persistent problems with the prototype. Unfortunately, playing with different guiding metaphors or designing new solutions to this prototype's deep problems was not possible while engaging in the design research process, at least for this author. (These 'guiding metaphor' design problems require such enormous reorientations, I suspect even a team would have difficulty pulling off several differently-inspired designs within a three month period). While the design research with children did not prove or disprove the value of using a word processor as a design metaphor, it did help me pinpoint some places where the metaphor breaks down and what aspects need to be rethought in order to make more usable spriting software.

For example, should there be a carat insertion point in the SpriterWriter interface even though text insertion from the keyboard is peripheral to spriting? If there was a carat, how should it move: does it follow word processing and land in the spaces between each object? Or does it deviate from word processing and land 'on' each object? Resolving this issue would go some lengths towards making the browsing of audio objects easier, and differentiate them from drag-and-drop and other editing actions.

Using a two-level hierarchy (sticks contain sausages) does not work in a word processing metaphor. I thought originally that embedding sausages within sticks would manage some of the complexity for the young students, especially since the interface units of spriting were not as visually rich and distinguishable as letters and words are. Thus, while deletion of individual sausages was permitted, I made it impossible to move or insert at the level of sausages. Those edits must occur at the level of sticks, thus forcing students to make splits in sticks before making other fine edits. This two-level data structure influenced everything from the way files were saved to interface interaction and would have been impossible for me to alter within the span of the research intervention. In retrospect, if the data structure were flat but heterogenous (e.g. stick, sausage, paragraph objects), a word processing metaphor might go farther than it did in this particular prototype.

4.4.5 The Use of Particular SpriterWriter Features

I discuss problems with individual features in the SpriterWriter, and identify which problems were addressed within the intervention and which problems were not.

4.4.5.1 Playing and Recording

Many children at one time or another pressed Record when they meant to press Play or forgot to turn off the Record button when they were finished. For playing such a central part in the spriting technology, the Record and Play buttons were too diminutive and subtle. The Record button and the state of recording especially deserves a visually more aggressive

insertions and deletions at first and final position in the document. It also permits the carat insertion point to be drawn in a straightforward manner between the elements, not on top of them.

treatment (e.g. large blinking green button). This might have helped the young children to better distinguish when they were recording, playing, or doing neither.

The problems with recording were not so endemic or damaging to the spriting process that I felt I should prioritize a design change. But the penalties for bad design in spriting are high. When one young boy lost a recording by not pressing the Record button properly, he was so disappointed and annoyed with the treachery of the Spriter, he went away to play with other toys for a while.

4.4.5.2 Open and New

Widely applied standards for document management were confusing for all children through grade four. The SpriterWriter upheld the common distinction between a document already existing and a new document, with New... and Open... menu options. Most children found this distinction very confusing and often could not open their existing documents or create new ones effectively. Charlotte from Molière in her final composition made the following recommendation: "I have a very important recommendation for people who might use Spriting and Writing after us. When you're opening a new document, click new not open. Don't forget." It seems a ridiculously small effort to merge the capabilities of these two common functions and one that we as designers should see happen.

4.4.5.3 Recording and Inserting

When a new recording is made, it is added to the talkument as a *selected unit*. This helps children recognize which recording they just made in a possible multitude of recordings and also allows the recording to be replayed by simply pressing the Play button. After it had finished playing, the recording would no longer be selected. However, if there is a selected recording when the Record button is pressed, it is interpreted as an insertion and this new recording will be placed before the selected recording.

There was an unintended and detrimental effect to this design. If students made several recordings in succession, their composition would be assembled backwards. This was a problem for children at both schools. Older children who tended to make several recordings in a row would ask me why their composition was backwards. I explained what had happened and that they could drag and drop them back into the proper order, which most children did without many complaints. A "smarter" interface that maintained more history might recognize that if several recordings were made sequentially, they should be placed sequentially.

4.4.5.4 Dragging and Dropping

Children expected stick-and-sausage units to drag immediately upon click down, whereas the prototype permits dragging only after initial selection, and that only on the 'sticks' not individual 'sausages.' When dragging-and-dropping, children would try to drag to the empty space between paragraphs, intending the stick to drop into first paragraph position, but instead it would revert to its initial position. I had to show them that they had to drop

the stick onto or directly in front of the stick they wanted it to precede. They got it after one demonstration. Due to an oversight in programming, the SpriterWriter does not permit dragging to final position in the talkument. Although children wondered at this when they discovered it, they adapted by dragging the last recording(s) forward instead.

4.4.5.5 Paragraphing

Many children used paragraphs to separate stories in multi-story compositions. Children sometimes had difficulty figuring out how to work with them. In word processors, paragraphs are visible only through the secondary effect of the blinking carat. But the Spriter lacking a cursor, so there was no way to see when a paragraph was added to a new composition on the white background. Students sometimes added so many that when they eventually made a recording, it was below the visible interface. Paragraphs can be highlighted when clicked, and deleted like any other object, so this problem was easy to fix when the child asked for help. Extending the metaphor of the word processor even farther into the SpriterWriter would permit the development of a spriting cursor, which would help disambiguate some editing actions.

4.4.5.6 Splitting

About half way through the design study I realized that the children needed more ways to split sausages than the unique temporal method I invented (by clicking during playback). An eight-year-old girl at Umoja, who had significant experience making splits and edits in her spriting, informed me that deleting pieces of writing was much easier than deleting sausages because you can simply take an eraser and scrub it out. In spriting, she said, you had to listen and click and click and click, listen and click and click and click. Of course, this is a matter of perspective, as not-yet-letterate children would find her ease with the eraser and letters difficult to match. Many children recorded such large compositions with so few recordings that to do any kind of rearranging would require making a lot of splits. Unless the child was deeply motivated to edit something out, they generally tended not to bother with any fine editing that would involved splitting actions, although most children found a need for the splitter at least once if not more.

While I had designed the splitting action to permit a mouse click anywhere on the Spriter interface so as not to require children or gummy school technology to hit very small interface targets, I decided later through my observations of some of the children and through my own use of the interface that this method interfered with browsing individual sausages. For example, when rapidly reviewing sausages by clicking on one and then realizing its not the one you wanted, clicking on another, the "Do you want to cut the sausage?" dialogue pops up, interrupting the browsing. Since I made many compositions for demonstration purposes for the children, I found this feature very annoying. Surprising to me was the children did not seem bothered by it. They tended to hear out the entire sausage with more patience before they clicked another one.

I considered several other ideas to supplement the temporal splitting method: a tool that could point to a recording and explode them into smaller stick and sausage pieces, or a lightening bolt tool that when clicked on a stick or sausage, splits it. Supporting this latter option would require providing a more detailed representation of the sound content in the sausages—not something as detailed as a wave form, but something that shows a rough idea of amplitude changes. This would allow composers to make more informed decisions about where to click using such a ‘spatial’ splitting tool.

4.4.5.7 Translating

No child at either school ever translated more than two sentences of their spriting into writing; however, I used it frequently to help me transcribe the children’s spriting into writing for them. This is, then, my critique of my own use.

The text-to-speech engine plays the most recent sentence worked on after final punctuation is added. Therefore, while transcribing there is some awkward interaction between the looped audio and the TTS voicing of the last sentence written. I like the fluidity and layeredness of the simultaneous audio, but the actual realization of overlapping sound does not have any depth or separation, which would enhance the experience.

4.4.5.8 TTS: ‘The Man’ Speaks

The text-to-speech engine (TTS), or “The Man” as it was referred to by the children, was very popular with the children even while their use of it was often unrelated to their spriting work. Since the TTS engine was not a central focus of my system and is a central focus in many word processors and educational systems today, my observations should be taken suggestively.

When I first introduced the TTS system to Molière, they immediately suggested that there should be two TTS buttons, one with a boy’s voice and one with a girl’s. What self-respecting boy would want a girl reading his words, and what self-respecting girl would want a boy reading her words? Over the thirteen weeks I worked with the Molière children, they rarely used the TTS capabilities except to see how it might read nonsense, mathematical equations, or particular words they would then erase.

At Umoja, ‘The Man’ assumed greater importance in the children’s work. Since the children were younger and less capable of reading, The Man was often their only bridge to hearing their writing. The children were very concerned about how the TTS system read their textual work. They wanted the opportunity to stylize the talk to a much greater extent than JAVA TTS permitted me to control. One girl said the way ‘The Man’ read her work (a love letter) was wrong – it was “too fast.” At that point she had no punctuation in the letter. I suggested she add periods to her composition to “slow it down.” She added a period after most words, giving no thought to (or probably having knowledge of) sentence structure. She put periods after the subject, verb and final phrase. Then she was happy with the way it sounded. After she was done, I helped her add commas and removed the periods in the wrong syntactical places to see if she would like the way it sounded when it was correct. She

still liked the “speed,” although having me present it as “correct,” I’m not sure she had much of a choice. Children at Umoja often used The Man to check their spelling, and as one would expect, they were better able to locate problems with spelling.

4.4.6 Proposed SpriterWriter Optimization

I describe changes I would make to the SpriterWriter prototype that would address some of the interaction problems. This design, as of the time of this thesis writing, has not been implemented, but every effort has been made to include only optimizations of the existing design that could be implemented within a short period of time by a competent programmer. I resist the temptation to mention design changes that would involve large and extended research efforts characteristic of many of the children’s requests (e.g. eliminating background noise, integration of speech to text recognition).

Flatten the two-level hierarchy of elements (e.g. sausage, sticks, paragraph, et cetera). Either this hierarchy was not communicated well through the visual interface, or children do not understand it well. Either way, it was a nuisance and a stumbling block to editing.

After flattening the hierarchy, permit all editing operations to apply to all top-level objects. This means that composers could drag and drop a single sausage from one recording in to the midst of another recording without having to make splits to ‘extricate’ it from the rest. While this change would create more potential for making a mess, it also permits more sophisticated editing possibilities with less overhead for small edits.

Invent a spatial splitting tool that would perform the same function as the temporal splitting method, but through a graphical interface. This would require some kind of visualization (and probably synchronous audio feedback) to help the children make the best possible judgment about where to make the split. This support is particularly necessary when children use gooseneck or poor quality microphones and the system cannot automatically segment the speech into petite sausages (because the amplitude of the background noise is not different enough from the speech amplitude).

Embed the Writer as floating window within the Spriter and remove most of the formatting options within it. The Writer has not earned an equal position relative to the Spriter. Children used the Writer as a tool to contain reference notes or an outline while spriting.

Enlarge a sausage or stick dynamically when a child is annotating it so that annotations are more visible. Make better textual editing supports available to the annotation of spriting objects (e.g. a carat would support nonlinear editing of an annotation).

Allow better supports for importing music and sound effects, as well as create a short list of sound effects that can be chosen from a list. I have very mixed feelings about how this might be used and would prefer that children collect, imitate and generate their own sound effects rather than choose ‘generic’ sound, but it would be worth taking these small measures first to see how they might use it.

4.4.7 The Computer is (Still) Not Ready for Spriting

There are many things that emerge as terrible problems when designing a spriting technology, but are so large or endemic to the current state of the technology in the world and even of the classroom itself that they must be taken as parameters within which the current interventions must operate. Nevertheless, as the technological landscape and environment are historical, it is worth making note of these parameters to situate the current study as well as point them out as problems needing design solutions.

The computer itself, as this device is realized in most schools, is not well-suited to supporting the audio-centric, collaborative and less physically encumbered activity of spriting. When children write, they are often bound to a desk or table surface, often sitting in a chair, their head focused down upon their work. Spriting is still bound to this model as well, as the computers available in most schools are monolithic objects shoved under tables, and the microphones are pinned in to a tiny colored slot in the back (pink for microphone in, and green for headphone or speaker out). This system tethers the child to the computer while spriting or auding and punishes those who spin on their chairs by binding them fast! Of course, children can achieve a little more physical freedom with spriting than in writing by standing in front of the computer and spriting, and many did—notably boys—while collaborating on a conversational composition. But there is no reason while children need to sit while spriting or stare at a desk or computer. Walking, talking with friends, or staring at the sky are equally well-suited to spriting composition.

The computer's handling of audio volume is too distributed and complex to make learning with audio a centerpiece in the classroom. When I was first installing the software at Umoja Elementary, the difference in realized audio volume between two different models of computers was wildly divergent: one was so soft it was barely audible and the other could be so loud it would damage the eardrums. In fact, the Principal requested me to eliminate use of the dangerously loud computer from the study so the children would not damage their hearing, as the children (at both schools) tended to listen at top volume no matter the potential damage to their hearing. At Molière Elementary, it took the combined efforts of the computer teacher and me four hours one Saturday to install the necessary sound driver updates, turn on the microphone inputs, and properly balance the audio input and output levels before I could even conduct the first class. Each week after that it took me one to two hours to make sure everything was still working—and often one or two computers had problems. I often had to re-install a sound driver.

Incorporating sound as a central part of classroom work requires more time and adds another level of complexity to keep classroom computers functional. If we had Macintosh computers, while they do facilitate the interaction between audio hardware and software, they present a different problem for designing, as developer resources for the Mac typically lag behind PC. Even when time is expended to prepare and maintain the computer resources for audio, the basic design of something as simple as the volume control can still cause problems. I wrote the following field note after one audio foible: “I cannot understand why something as simple as controlling the volume is so damn difficult on a computer!

Computers are simply NOT designed well for audio! I played my demo yesterday and we could barely hear it, though I had the speaker volume maxed. When I got home I remembered that I had turned down the *hardware* volume earlier that day, which must have been the input to the speakers. Why can't the last element in the chain control the FULL RANGE? Ridiculous."

While simplifying audio control within the computer has been addressed—but only this year (Baudisch, Pruitt, and Ball 2004), it does not address 'flat control' through peripheral devices like speakers or the enormous irregularity in how different computers realize sound.

The interface between the audio input/output plugs and the microphone, headset and speaker peripherals, do not facilitate the level of collaboration and the natural movement in composition from private work to a public audience that the children wanted. In the midst of speaking to a child about their composition, I often had to dive under the table to switch the output from headphone to speaker so we could listen to it together, or vice versa when the children wanted to do some more work by themselves. Rewiring the computer and peripherals to support private or public sound consumption was a constant and continuous interruption to spriting work. Furthermore, the kids at both schools were constantly asking me if they could have two headphones or two microphones to one computer so they could effectively collaborate. Although I did eventually buy splitters for the two computers at Umoja Elementary to enable two microphones or headphones into one computer (I couldn't afford twenty-two splitters for the other school), it didn't scale beyond two and the sound became even more difficult to hear. Nor did the splitters completely eliminate the annoyance of having to climb under the desks and switch plugs.

4.5 Design Requests and Feedback from the Children

I invited the children to share their thoughts, ideas, and critique with me from the very first and they did. One week in particular I asked the Molière students to give me feedback in the form of a talkument. Many of them generously shared their thoughts and visions about spriting with me. Although two of them claimed, to quote Elizabeth, "I wouldn't like any new changes. I like it how it is" and, "I'm really happy (.) that you're here to listen to me," several students did mention particular technological and social improvements they would enjoy. Their suggestions can be divided into three different categories: (1) speech to text, and bimodal compositions, (2) images and sound effects, and (3) signal separation and issues of background noise. Complete transcriptions of all responses are available in Appendix G.

4.5.1 Images and Sound Effects

Most children wanted more, rich media available to the spriting process. Andre, for example, enjoyed drawing very much. He often emerged with singularly unique talkuments or other computational objects with visual dimensions in response to my suggestions. Andre remarked to me several times during class and also srote the following, "*Tara gave us a sheet*

called can you help me to change the SpriterWriter to have to make um it to make it better and I choose that we can make a slide show with pictures with that what we said in the spriter." Indeed, allowing Andre to incorporate the many pictures that he sketched in the simple Microsoft Paint program would have given him more communicative scope.

Andre was not alone in his desire to show pictures along with spriting. Madeline, a third grader, had a bold vision of making movies with the SpriterWriter. She provides several examples, "I would like to change it to make it like (.) a movie. For example, if you made a story about uh (.) princess whose name was Cinder and she turned into a witch (.) named Wanda. Then (.) they would make like a movie (.) on the computer media player. I really think that would be great. I also have another idea. To have the pictures to go with it. Like - let's take the story about the princess turned into a witch. We would make pictures for each {VOC inhale} (.) sausage I made. Like (.) a princess when I said, there once was a princess who lived in a castle. (.) and then, at the end of castle we could put like another c- like a drawing of a castle, that we made by ourselves. These are two ideas I think are - that are good."

Many children, if not all, incorporated sound effects they generated with their mouths or any tools that came to hand. Edith suggested that home-made sound effects were not sufficient. She critiqued, "for the sounds - the sound effects that was kinda hard because like the only thing we had was maybe some hard thumps (.) and the mouse clickings (inaudible) but not really much else." Although I recognize the limitations of sound generation in the computer room where class was held, I disagree with Edith's solution. She recommended that I "...try to add in like sound effects? Like to have a little column that says like sound effects?" In the same way that the children so enjoyed drawing their own pictures and exercised such great ingenuity in doing so, I would rather search for ways to help them better make their own sound effects rather than give them a menu of generic ones.

4.5.2 Speech-to-Text Automation and Bimodal Documents

A few children mentioned their desire to have automatic speech translation to text built in to the SpriterWriter. Their recommendations varied depending on their comfort with, love or hate of, writing. Edith, who loved writing and was one of the two children who once wrote a story and translated it to spriting, recommended that a textual translation should be included because it would expand access to the composition. She sprites, "...everytime you say something, all the words get written down? So you don't have to like so if you would rather read it (.) then listen to it that could be cool too." For Edith, a textual translation provides multi-modal access to the same composition.

Andre, in contrast to Edith, hated writing. His mother remarked to me in passing one day that she had enrolled him in the spriting class because she thought that maybe associating writing (something he hates) with computers (something he loves) might cause him to like writing more. I do hope that for Andre's sake if there was a causal relationship it went in that direction. She said he resented the constant corrections involved in writing instruction and as a result, distanced himself from writing activities. Andre sprites, "I also like to have something that would um that would write on his own what you said that on the page where

the spriter - spriting is there's - there's a button that says next and if you click on it the - the next page with all what you said is written on it." His recommendation for incorporating a speech to text recognizer seems more aimed at putting distance between himself and the consideration of text by putting the text on a 'next page' and in this way fulfill his parents and teachers' requests for writing without having to deal with spelling, grammar, punctuation, and more.

There are children who have been so hurt by their interactions with writing instruction that they would prefer to have nothing to do with it anymore. Although Andre might perceive spriting to be a way around the problems he is experiencing with writing, spriting is not a technological solution to harsh literacy pedagogy. What we might find, however, as we join writing and spriting tools together in more creative ways, is a more creative dialogic space in which to talk about how text can (and can't) represent speech and sounds, and conversely how speech can (and can't) represent text. Andre's predilection towards unique interpretations might find a more comfortable home in such an exploratory and questioning literacy environment.

4.5.3 Sound Separation and Background Noise

At Molière, how much noise each child deserved to make in spriting class grew into a political movement that blew up into a crisis. Two fourth grade girls had been refusing to participate with the class and were enacting their own (legitimate and interesting) agenda with the SpriterWriter, but singing and talking and laughing often very loudly. Understandably, the other children became more and more annoyed with these two girls. One day their anger grew to a breaking point and they unleashed it as a group, yelling at the older girls, Your voice is all over every one of my sausages! The third graders pressured me publicly during class to ask these girls not to return to class, and complained that they were not able to do their own work due to the noise.

The issue was not as simple as the third grade children were seeing it. I observed that most of the children were loud at some point or another, but the lack of technology to separate the child's speech from unpredictable background noise put pressure on all of us to resolve these problems socially and organizationally (which we did). Not surprisingly, two girls made recommendations about issues of background noise, but each girl's rationale was different.

One Molière girl, Edith, recommended a more sophisticated approach to speech audio processing. Although she was aware of the history of tension within the class around noise levels, she makes her argument based upon a desire for a more sophisticated talkument, a talkument as a polished final product, not an intermediate one, "*Also maybe, if you take out the background and the breathing? And try to find a way to do that? Because (.) so that it sounds a little bit better when you're not the only one who listen - to did it and it gets kinda of like worse?*" Edith's point is well taken. The product of spriting now sounds raw and unfinished. Greater technological innovations could remove 'unwanted' sounds and create a talkument that sounded more like a polished final product. Technology that would separate the

speaker's voice from all other sounds could also reduce the problem of some people 'hogging' the sound space.

Another girl, Emily, points out the equally important issues of resolving problems that occur around sharing the same sound space through tolerance and understanding. She makes the following recommendation to students who use the SpriterWriter in the future, "...you should be a little quiet otherwise you'll hear (.) um (.) hear everyone else in the background and then someone would probably hear *you in the background and that wouldn't be nice because you know how it feels like." I think it's important to consider that when children are given greater opportunities to speak in a class, whether it be through greater dialogic opportunities as a whole class, group discussions, or in spriting, tensions will arise as different voices compete both in volume and in opinion. Emily's point about developing tolerance and understanding for other voices needs to become a more central part of dialogic classrooms as teachers and students find more ways to creatively resolve conflicts that divide students and set them against each other in sometimes vicious ways.

5 Children Composing and Editing in Spriting

Children engage in conceptual processes through spriting previously thought of as late-emerging and dependent on writing. Learning how to write has long been seen as a precursor to developing critical cognitive skills in several areas. For example, understanding the difference between 'meaning' and 'saying', or differentiating between the surface structure of language and its interpretation, has been seen as a text-dependent cognitive skill (Olson 1977; Olson and Torrance 1985; Torrance and Olson 1982), and one preliminary to the ability to make superficial changes in a composition. Furthermore, composing itself is seen as a goal-driven activity, requiring an awareness of how compositions encode purpose and make things happen in the world (Flower and Hayes 1980; Hayes and Flower 1980; Bereiter and Scardamalia 1987), which children are not expected to understand. Writing is treated as the catalyst through which children learn to recontextualize their oral language skills (Dickinson and Snow 1987; Purcell-Gates 1991) and over the course of many years learn to shape their words for a distant and critical audience. At many levels, both explicitly and implicitly, literacy abilities are seen as prior to and enabling of literacy skills, including the ability to edit.³⁷

It is not surprising then that research examining young children's editing practices is sparse. One Canadian Ministry of Education study, using a large data-set, found that students don't revise their writing until high school (Education 1993). But this is not a purely developmental issue. The tools used to compose have been shown to impact the editing practices of people at all ages. Word processors can positively impact more experienced writers' revision practices (Daiute 1986; Haas 1989) and even have a weak effect on children's writing as young as kindergarten (Jones 1998). There is a growing recognition of the ways in which young children demonstrate audience awareness in very early forms of writing (Wollman-Bonilla 2001). Maybe children are much more capable of shaping and re-shaping externalized thoughts and communication than we have been able to see given the writing tools available.

In this chapter I present data and observations that show how new modes of composition like spriting enable children as young as five years of age to examine and edit their compositions in significant and important ways. Individuals approached spriting composition and editing in extremely different ways, highlighting different kinds of possibilities for composing and editing in spriting. This chapter identifies several different approaches to composing and editing in spriting and proposes a tentative model to make sense of the kinds of edits that occurred.³⁸ These different ways of editing might be linked to

³⁷ Although distinctions have been made between revising and editing (Sommers 1994, 1994), I address all changes made in a composition process as 'editing.' Revision and editing, then, are used interchangeably in this thesis.

³⁸ I do not suggest that the patterns identified in this chapter represent a comprehensive description of composing and editing patterns for young children. Nor do I suggest that the identified patterns will survive the test of time. Spriting technology will evolve, and composing and editing patterns are dependent upon the kind of technology mediating the activity.

certain kinds of developmental opportunities, and/or they might be linked to different composition and editing styles.

Examining the spriting process affords new insights into composition generally. Their spriting process might be distinguished from a writing process in several important ways, a matter of speculation in this chapter. For example, planning processes in spriting are very different from what children seem to experience when writing. In spriting, planning becomes a time for *conscious pause*. Also, learning how to experience composition as an internal conversation with oneself (e.g. Sowers 1985; Snow 1983) can occur first in spriting as an *externalized conversation with oneself*.

Other characteristics commonly attributed to learning how to read and write also emerged in spriting interactions. Children learned how censorship functions. Others encountered the 'say-mean' distinction: that is, how one's words are recorded in a process of composition not as one *meant* for them to be understood, but *exactly* as they were produced.

In this chapter, I first describe the data set used. Secondly, I provide a quantitative overview of composite composition and editing moves to sketch some overall trends. Thirdly, I present four different case studies of child composers, each representing a different approach to composing and editing in spriting. As preliminaries to this section, I describe why these four case studies were chosen and define a set of composition and editing actions that appear to have salience across the subset of talkuments analyzed. Fourthly, I consider how we might better understand the composition process generally, presenting specific examples of children's process. Lastly, I discuss two features commonly associated with textual literacy, the 'say-mean' distinction and censorship, and describe how these occurred in spriting.

The quantitative descriptive overview, case studies, and examples are meant to suggest very different kinds of conclusions than those that have dominated literacy research up to the present day, particularly with respect to the ascribed importance of writing and text in literacy development.

5.1 Methodology

After a thorough examination of each composition made by each child over the course of the intervention (a total of 197 compositions), I chose three to four compositions to transcribe from each child (a total of 67 compositions).³⁹ I selected which compositions to transcribe based upon their resemblance to or distinctiveness from written genres; its virtuosity relative to the child's (or collaborating children's) other productions; and the importance a child ascribed to it, based primarily on how much time s/he spent on it and whether s/he showed it to friends or the entire class. Children did not distribute their time equally over all compositions. Some interested them far more than others. They returned to these pieces more, shared them more with others, and often demonstrated a greater orientation towards

³⁹ Two children from Molière were not considered because they wrote almost exclusively in French, a language this author does not know. Three children at Umoja Elementary were not considered, two because they were in the after-school program (even though they were extremely prolific with the SpriterWriter), and one because she spent only one hour spriting.

producing some final product. Not surprisingly, on those pieces that interested them most, they also exercised more independent composition and editing strategies and/or sustained an interest in editing them with my assistance.

Aspects of their spriting process were also analyzed. In addition to transcribing the 67 talkuments, all the recordings the children made in the process of making these talkument, even if ultimately deleted, were also transcribed.

These 67 talkuments should not be considered 'final drafts.' My instruction was biased towards breadth of interaction with many different kinds of talkuments and participant contexts; it was not biased towards polishing pieces. Note that several compositions, including two studied in detail in this chapter, appear unfinished. Indeed, neither the children nor I knew what a 'polished' final talkument was (or at least, I became progressively less certain as the research proceeded). Evolving 'what a talkument is' was part of the research. However, some pieces are not finished—and I believe that this is the case for the two below—because children were very ambitious and aimed to do more than they feasibly could accomplish given the time we had.

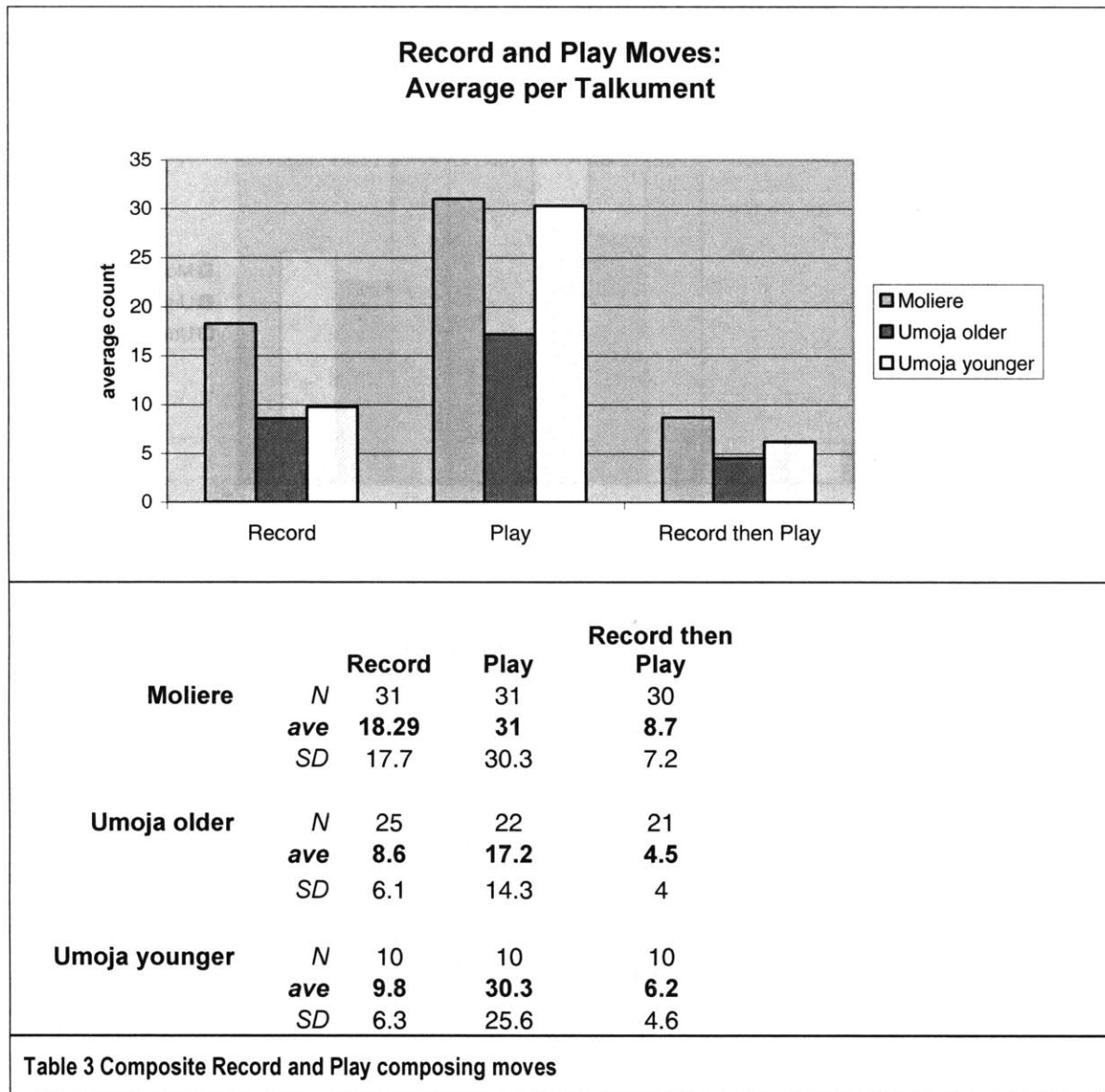
In most of the case studies below, I use a number of different sources of data to recreate the composition and editing process:

1. A 'user record' automatically created by the SpriterWriter technology of composing and editing user actions. This provides the means to link the sequence of composing actions with the sequence of editing actions.⁴⁰
2. All spriting recordings made in the process of making the final talkument, both as sound files and as transcribed to text for analysis.
3. The final talkument, both as a sound file and as transcribed to text for analysis.
4. Field notes
5. And, for one case study (Cole's Case: The Process is Literally the Product) video records of dialogic interactions around the activity of spriting

5.2 Composite Composition and Editing Moves

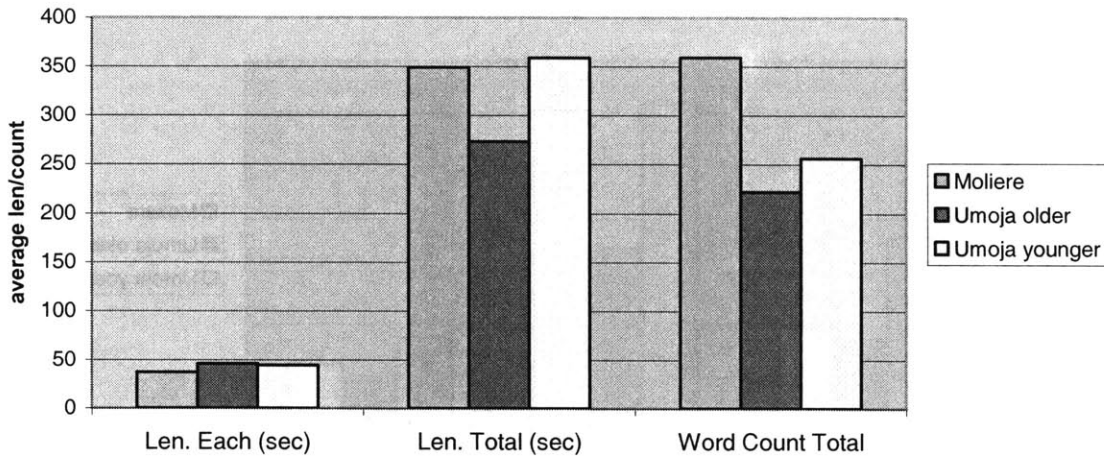
Looking across the 67 transcribed talkuments including both individual and collaboratively composed talkuments, there is strong evidence of editing behavior by all children, ages 5-10. Within this general trend, there are developmental differences. In order to see these developmental trends, the data is organized in to three different groups descending in average age: Molière children (ages 8-9), the older Umoja children (ages 6-8, 10), and the younger Umoja children (ages 5-6).

⁴⁰ Evolving a technology while studying the process and product outcomes of its use does have some negative impact on data collection. While analyzing the 67 talkuments, I discovered that some of them were missing a user record of how they were created (probably 3 to 4 compositions). Even if the user record was missing, the order in which the recordings were made, as well as what constituted the final document, could be determined from the file-naming system I used. Using these two sources of data, I can determine *what* was deleted at some point in the process, but I cannot determine exactly *when* it was deleted within a continuum of composition and editing moves. For example, in Section 5.3.3 Ruben's case is missing a user record. However, the work was so clearly demonstrative of a particular editing strategy, and the composition so compelling, that I based my analysis on the order of recordings, the final talkument, and my field notes to develop this case study.



In Table 3, the Molière children, older on average than both groups of Umoja children, made an average of 18 recordings per talkument, and listened to their spriting on average 31 times per talkument. While the Molière children tended to make more recordings, in Table 4 we can see that they also tended to make slightly shorter recordings (37 sec.), tending towards a more piecemeal construction process than the younger Umoja children.

**Recording Lengths and Word Counts:
Average per Talkument**



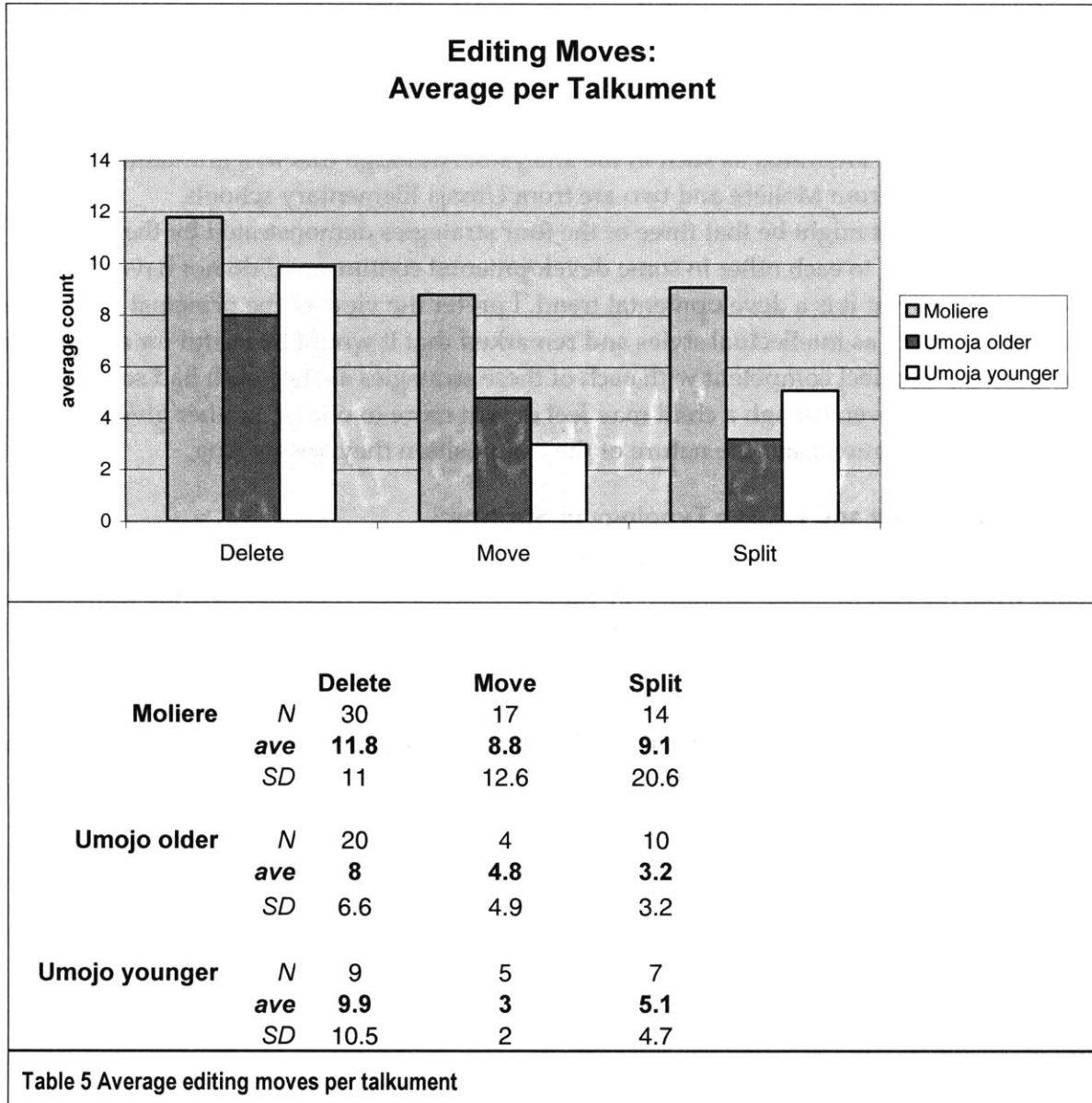
		Len. Each (sec)	Len. Total (sec.)	Words Total
Moliere	<i>N</i>	31	32	32
	<i>ave</i>	37.2	349.3	359.2
	<i>SD</i>	34.4	216.6	276.4
Umojo older	<i>N</i>	25	25	24
	<i>ave</i>	46	273	222.3
	<i>SD</i>	47.8	214	168.2
Umojo younger	<i>N</i>	10	10	10
	<i>ave</i>	44.4	358.9	256.2
	<i>SD</i>	30.5	268.1	207.2

Table 4 Composite recording lengths and total word counts

Total talkuments lengths ranged from 270 to 360 seconds—with the youngest children producing the longest talkuments! This is exactly the opposite of what one would predict in writing. When we consider how many words each talkument contains on average, however, and compare it proportionally to total talkument length, developmental differences emerge. Proportionally the oldest children averaged a little over one word per second (359 words in 349 seconds) while the youngest averaged more like 2/3 a word per second (256 words in 358 seconds).

Older children tend to have composition plans that exceed a single recording action. In Table 3, the 'Record then Play' column indicates the sequential relationship between recording and playing actions. The Molière children immediately listened to only 8.7 out of the average 18.29 recordings they made, while the younger Umoja children listened immediately to 6.2 out of an average 9.8 recordings—2/3 of all their recordings. While older

children might make several recordings consecutively and then listen to a group of them, the younger children tend to compose in a record-listen-record-listen cycle, the next move inspired by what they have just heard. The youngest children also tend to listen more often to their recordings—in Table 3 they play three times to every single recording action, while the older children tend to play twice to each recording action. Thus, there is a developmental trend towards making shorter, more numerous recordings that are listened to less frequently as composites, not individual recordings.



Children engage in editing moves through spriting even before they know how to write. As they get older, they engage in even more editing moves. Table 5 shows that the younger Umoja children delete and move content, and make splits. The Molière children make on average 12 deletions of some content and move things nearly 9 times *per talkument*,

and they make finer edits by splitting content when necessary.⁴¹ The older Umoja children fit somewhere in the middle of these two groups as they begin to compose lengthy and purposeful talkuments. Spriting might be treated now as a complementary process to writing in the elementary years, both spriting and writing processes eventually to equalize in length and complexity.

5.3 Case Studies of Children Editing

The four cases represent four very different dimensions of the entire pool of data across both schools. I chose them to illustrate the diversity of composing and editing approaches in spriting, not to represent a comprehensive picture of the data. Some cases represent strategies that were more common to one school than another, or particular children than others, and will be identified as such in the analyses. Although this was unintentional, two compositions are from Molière and two are from Umoja Elementary schools.

Although it might be that three of the four strategies demonstrated by the case studies are related to each other in some developmental continuum, I do not have strong data to suggest that it is a developmental trend. I prefer the view of the principal at Molière who viewed them as intellectual styles and remarked that it would be useful for all children to experience and feel competent with each of these strategies as they each had something to offer the learner, even though a child may feel drawn more to one or another given their personality, the context, and the nature of the composition they are spriting.

5.3.1 Composing and Editing Typology in Spriting⁴²

I built up an inductive typology of composing and editing actions in order to think and write about what the children did, as shown in Table 6. It is not based on any existing framework, nor is it intended to be final or comprehensive. It simply represents a first account of the different kinds of composing and editing actions in spriting, some of which are different from any account of writing edits, encountered in four very different talkuments by children. In this section, I present this composing and editing typology that I use throughout the case studies.

⁴¹ The standard deviation for split edits is very high because children had a need for making splits in only certain talkuments and certain situations. These numbers should be understood only suggestively. Particular use of splits is described in the case studies.

⁴² The rudimentary state of the SpriterWriter technology affects how a child composes and edits at all levels. One effect is that fine- and large-grained edits alike are made by deleting an entire recording or a portion of a recording, and then re-doing it 'better' (e.g. with the desired edits). For the purposes in this chapter, I label composing and editing actions on a recording-by-recording basis, and not some other independent unit size. Therefore, two or more types of edits are often evident within a single recording. Further, a single recording can exhibit traits of both composition and edit actions (e.g. correcting something and then forging onwards with the story).

Composition Types

1. Composition
2. Reflection: Adds, Subtracts, Substitutes, Re-performs
3. Mode Translation: Spriting to Writing, Writing to Spriting

Editing Types

1. Refinement: Adds, Subtracts, Substitutes, Transforms, Re-captures, Re-performs
2. Revision: New beginning; New ending; New character; New action, dialogue, or event
3. Unspecified

Unknown Type

Mistaken Capture Type

Table 6 The composition and editing schema

A child makes a recording for many different reasons. Sometimes a child makes a recording that represents something new from what has come before, a composition action. There are three different types of composition spriting identified: *composition*, *reflection* and *mode translation*. A detailed description of composition types is below in section 5.3.1.1 Composition Types.

Sometimes the child makes a recording that replaces a recording they have made before – a kind of editing action. There are three different kinds of editing actions identified: *refinements*, *revisions*, and *unspecified* edits. When a recording functions as an edit, I identify (1) the type of edit, and (2) the previous recording that is eventually deleted, or the probable ‘target’ of the edit. A detailed description of Editing Types is available below in Section 5.3.1.2.

Sometimes the child makes a recording that is too short and inexplicit to inform about the child’s intention. If a recording consists of silence or is too under-specified to judge as a composition or edit, then it should be labeled *Unknown Type*.

Sometimes the child makes a recording that was itself a mistake, a *Mistaken Capture Type*.

5.3.1.1 Composition Types

There are three types of composition identified: *Composition*, *Reflection* and *Mode Translation*.

The first type, *Composition*, labels those recordings that are seemingly ‘original’ in advancing the composition purpose at the point they were made. These recordings should be labeled simply as **Composition**.

The second kind of composition is a *Reflection*, which pulls inspiration from what it already present in the composition. It has much in common with the *refinement* edit type but the spriting intentions differ: while a *refinement* is meant to replace what came before, a *reflection* is meant to remind of what came before. Reflections change what came before in subtle ways and make it new again. Thus, a reflection functions like a *leit motif* in music, where a memorable tune can be heard at different times in a piece of music, changed in subtle ways (e.g. a tune might be played by a different instrument, in a different key, or tempo).

A Reflection must by definition refer to a previously recorded action that is present in the composition at the point the reflection is made. There are four kinds of reflection compositions:

1. **Adds** a small proportion of word(s)/concept(s) to (#)
2. **Subtracts** a small proportion of word(s)/concept(s) from (#)
3. **Substitutes** a small proportion of word(s)/concept(s) in (#)
4. **Reperform** material/words in (#) while material/words remain nearly the same, a new rendition necessarily changes aspects of the intonation, rhythm, tone or other paralinguistic aspects intentionally or unintentionally.

A *Mode Translation* act of composition is either translating *spriting to writing* or *writing to spriting*. In the case of writing to spriting, the writing might be the student's original work or a text authored by someone else. At its simplest, mode translations involve few linguistic changes (lexicon and syntax); at its most complex, mode translations involve multiple simultaneous editing behaviors, such as *refinements* and *adaptations*. Even at its most simple (e.g. reading a text authored by someone else to the Spriter), I argue that mode translation is nevertheless an act of composition and not editing: the composer must at least create the 'voice' used to represent the text.

Mode translation considers all acts of writing: on paper, in the SpriterWriter, and in other software. But understandably, only the writing done in the SpriterWriter can be accounted for in the SpriterWriter's user log. Therefore, if the mode translation act can refer to a past writing action (#), it does. If the mode translation involves text on a piece of paper to spriting, then I must rely upon my field notes. Two different mode translations are thus possible:

1. Spriting to writing [optional: to (#)]
2. Writing to spriting [optional: to (#)] It is possible for this type of composition to be used in conjunction with Re-perform Refinement, Recapture Refinement, and Material Adaptation Edits.

5.3.1.2 Editing Types

In writing, edits can be made at many levels: changing a letter, removing or adding a word, adding a sentence or paragraph, and rearranging entire sections. In text, these changes are made possible through many technological advances, such as pencils with erasers and word processors with insert and delete keys. Editing in spriting is more difficult because it is a new

technology. For example, making intra-word edits is more simply accomplished at this point by completely re-doing the recording.

Furthermore, although there are many similarities between editing in spriting and writing, there are some substantial differences. Children can edit for 'tone of voice' and other prosodic parameters like rhythm or pause, parallels to editing writing for handwriting issues. These are called 'material' subtypes of edits. They can also edit for quality of recording, for example, re-recording a song or tune to not overload the amplitude. These are called 'recapturing' subtypes of edits.

There are three different kinds of edits identified: *refinements*, *revisions*, and *unspecified*.

A refinement is a newly recorded token that functions as a close edit of some previous recorded token and will come to stand in place of that previous recording.⁴³ A refinement can accomplish some heavy conceptual or narrative 'lifting' with a few deft strokes. When choosing the target of the edit, if the current token resembles several previous recordings, then the **earliest** token that contains the target element(s) or feature(s) being edited is chosen. There are five possible sub-types of *Refinement*, as follow:

1. **Adds** a small proportion of word(s) to (#). An Add Refinement may be as minor as a new adjective or a new proper noun. The latter, from a narrative perspective, might serve to 'add' a new character or setting.
2. **Subtracts** a small proportion of word(s) from (#)
3. **Substitutes** a new word (or words) for a word (or words) in (#). For example, changing the name of a character, or substituting a sound effect for a small proportion of word(s), or word(s) for a sound effect.
4. **Transforms** the superficial syntactic or perspective relationships between the spritten words. This can be a grammatical transformation, or it can refer to exchanging the positions Subject and Object objects, or to changing a third person account to a first person account and vice-versa.
5. **Recaptures** same words/material to improve the audio capture quality of (#)
6. **Reperforms** material to improve expressive interpretation of (#). Reperformance addresses the repleteness of spoken words: tonality, emphasis, rhythm, emotion, and even speaker (if applicable). The linguistic structure (the words) should remain nearly the same.

Revisions add something new to an already existing narrative or sequence. As such, they cannot by definition refer to a single, previous recording action. They are a high-level contribution, and although they could be described as merely "adding words," they accomplish much more from a structural, narrative, or character perspective. The typology of revision reflects this. A revision can replace an earlier recording or recordings, as would be

⁴³ At this point in the evolution of spriting technology, a refinement is accomplished by actually redoing (that is, re-spriting) the entire recording. This will not always be the case. For now, a refinement by definition must specifically refer to an earlier recording action that it is intended to replace. In the future spriting technology will support the refinement of the token itself.

the case when a new beginning replaces an existing beginning, or a revision can be added in the midst of previously existing content without directly replacing anything. There are four sub-types of revision:

1. New beginning
2. New ending
3. New character
4. New action, dialogue, or event

There are some recordings that appear to be edits because of the close resemblance to some earlier content that is deleted at some point, but are not complete enough for a listener to judge them as one type of edit or another. These recordings should simply be labeled as **Unspecified edit to (#)**. It should nonetheless be possible to identify which recording this one appears to be editing (if it is not, then it is an **Unknown Composition type**).

5.3.2 Charlotte's Case: Bits and Pieces Form a Whole

In this section I analyze a composition made by Charlotte, a fourth grade student at Molière, titled 'Boo.' She spent two consecutive Thursday afternoons working on this composition for a total of (at least) 78 minutes. She made 52 recordings in the course of developing her 'Boo' composition, which taken together provide a small window into a process rich with a variety of linguistic, narrative, and material edits.

I had difficulty understanding Charlotte during the first weeks of class. With her serious, deep brown eyes, she tended to observe the class with a grave silence. It was only through her early sprints that she provided me with an introduction to her character and literate ability. Her first composition consisted of several sritten recordings: she stated her name, her love for reading, and how she wants a pet. She then erased these sritings and transcribed them to writing: "Hello, my name is Charlotte. I am in fourth grade, I love to read, and I want a dog." It is ironic to me that the only occasion on which any child fully translated a talkument to writing was in the first week, which also represented this particular child's most uncommitted and tentative effort. Afterwards, even when I asked, she never chose to use the Writer; thereafter she considered a finished composition a heavily annotated talkument.

In the weeks that followed Charlotte began to speak quietly in class. She suggested things to me that improved the social relationships amongst the class members (e.g. "It's Jasmine's birthday today") or that contributed to class discussion. When I met her mother and father, one of whom was a professor at a prestigious university nearby, they informed me that she was really enjoying the class. Her glowing smile in class confirmed this. When Charlotte said goodbye to me the last day her eyes brimmed with tears and she threw her arms around my waist. She also composed a talkument for me that she played for the entire class (the first time she played anything publicly) and organized everyone in the class to create a thank-you talkument for me. Charlotte liked me and thus tried to help me accomplish my research goals by doing what I suggested the children do, as best she could. She almost always used class time to sprite a document inspired by something I had shown

or requested. Thus, Charlotte is an example of a very academically prepared, high SES, independently-minded child in an after-school activity where she desired to do good work.

Charlotte began 'Boo' on April 1st, the day I demonstrated *The Camping Story*, a talkument I made collaboratively with my husband where we recounted the time we saw a white wolf on a rainy weekend in New Hampshire. This talkument example was most influential. For one, the idea of a wolf was very popular with children and infected nearly all of the children's compositions for days and weeks to come. Secondly, collaborative talkuments became serious work from that day forward. Charlotte did not choose to work with a partner; she worked alone on a fictional story about how she and a friend were caught overnight in the woods with howling wolves nearby. The next week, the week that I had encouraged the children to translate their collaborative documents to text, she expanded this story into a series of three scary stories—a triptych talkument—another concept I had introduced earlier on March 18th.

Figure 21 contains a transcription (and original sound recording) of Charlotte's final 'Boo' talkument. The entire annotated record of this composition is available in full in Appendix A. What is so remarkable about her work is how she sprote very short elements that alone do not carry much narrative weight. But experienced together these small elements construct a very strong and detailed-oriented spritten talkument that is so 'literate' it appears as if it were written down and then read.

Charlotte tended to work on these elements by 'editing' each one until she was satisfied. Then she would move on to the next. I call this kind of *bricolage* construction style 'bits and pieces can form a whole'.⁴⁴ This style is also remarkably similar to the process college students report as their preferred style of writing on a word processor (Honeycutt 2004). Honeycutt writes that dictation recognition "interfered with [the college students'] normal style of writing in which they type out a few rough phrases or sentences and then revise before moving on to the next section" (p. 23). This re-shaping at the cusp of the utterance, working iteratively between composition and editing processes to refine the unit before moving on, is not possible in dictation recognition systems, which expect full and final form sentences fluently executed.

Charlotte enacted this 'reshaping at the cusp of the utterance' through spriting and editing tiny bits and pieces. To demonstrate how her composition is comprised of small pieces, each paragraph in Figure 21 below represents a different recording.

{SUNG na na-na na na na na na na na:: na na-na na na na na na:: }

Esme and I (.) were walking through the forest when we heard {NVC loud scratching sound}

We looked around (.) but we didn't see anything.

⁴⁴ Two children at Molière, a fourth grade girl Charlotte and a third grade boy, Francois, demonstrated this kind of highly iterative and piecemeal approach to composing and editing that other children only adopted when working collaboratively, if at all.

{ NEW PARAGRAPH }

{SUNG na na-na na na na na na na na-na-na na na na na::}

A dark Halloween night (.) at the full moon I heard {VOC evil laugh}

I've got you my little boy!

I ran to - behind a tree and looked around.

There (.) in the cemetery, there was a witch (.) with some ghosts (.) holding (.) a boy (3.0)

I knew that boy. He was one from my block.

He was a very nice boy but he also pretty mischievous.

I hope you *all know that witches (.) lo::ve to eat wolf skin.

Just at the right moment (.) along came Mr. Wolf.

The witch ran towards the wolf (.) and (.) since the ghosts (.) were her servants, they followed her.

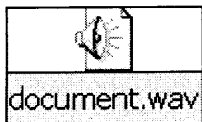


Figure 21 Text transcription of Charlotte's *Boo* talkument. A sound recording (4:04 minutes in length) is also available

Charlotte was a very active composer and editor. Table 7 is derived from the logs automatically saved by the SpriterWriter. In the course of composing her three stories, Charlotte sprouted 52 separate recordings. She reviewed parts or the entire composition 100 times—nearly twice as many times as she recorded some content.⁴⁵ Less than one quarter of her Record actions were coupled to a consecutive Play action. That is, Charlotte did not tend to Record and immediately Play that recording as many of the younger children did. She

⁴⁵ The log record of Play actions is not deterministic about how much was played, whether a single or multiple sausages or the entire composition. In the Item Selected column in Appendix A, if there is an end number specified, then the Play action was a single sausage (e.g. index=2 end=3). On the other hand, if there is only an index number specified (e.g. index=2), then the student listens until the composition finishes or until they press Stop. In this latter case, the time elapsed field in the Stop column will specify for how many seconds the child listened.

seemed to have a model in her mind of where she wanted to go, and a sense of whether she accomplished that goal without immediately relistening to what she had just spritten. That is not to say that Charlotte allowed for mediocre execution of spriting. As shown in Figure 21, Charlotte also deleted some unit of spriting content 32 times and moved some unit of spriting content 50 times. These numbers alone are an impressive statement of a fourth grader’s ability to revise content in an iterative fashion, but I want to look more closely at what these recordings, deletions and moves accomplish.

Action	Frequency
RECORD	52
RECORD&PLAY SET	21
PLAY	100
DELETE	32
MOVE	50
PARAGRAPH	3

Table 7 Frequency of each action in Charlotte’s ‘Boo’ process

There is a richness and diversity in Charlotte’s approach to spriting that rewards a close analysis with new insight. Her recordings functioned broadly to advance the narratives she built, develop characters, revise the story line and also closely edit content for prosodacy and other material concerns. And Charlotte was as deeply concerned for the way her spriting sounded, adjusting her speaking voice to be slower and more clear, just as she was concerned with the look of her meticulously realized cursive script. Edits like *recapture refinement* reflect material aspects of spriting: the prosody, rhythm and voice quality, that simply cannot be realized in a writing process because they are intrinsic to the speaking voice. In writing there are fonts, leading, page layout and more, which likewise have no realization in spriting. It is exceptionally difficult to communicate these material concerns in textual form; therefore, I present the composition and editing analysis of Charlotte’s composition process in full in Appendix A (if you, Dear Reader, are reading this chapter in electronic format, all recordings Charlotte made in the process are available to be heard as embedded sound files within this record).⁴⁶ Her story was meant to be heard, not read, and hearing is necessary to understand and better attribute Charlotte’s composing and editing intentions.

The first story in ‘Boo’ consists of nearly two-third of all composition and editing (196 different actions); the second and third stories comprise the remaining one-third (121 actions). The last story ends with the cliff-hanger, “The witch ran towards the wolf (.) and (.) since the ghosts (.) were her servants, they followed her.” Judging from the inconclusiveness of the narrative and differences in attention to editing, it seems probable Charlotte did not finish the story. If I had provided her the time and encouragement needed to continue this

⁴⁶ The SpriterWriter logs all interface composing and editing actions done by the child, as shown in Appendix A. All recording actions were associated with the original recording Charlotte made and each recording was transcribed using the Transcription Standard described in Appendix E. I have analyzed this consecutive list of recording actions and built up an inductive classification scheme to describe the edits performed.

piece, I have no doubt her composition and editing process would be longer still, and the second and third stories as finely developed as the first.

Let's look at the first story for what we can learn about Charlotte's composing and editing process. She struggled to begin in a way that felt situated and grand enough. She began, recording a little too quickly to catch her first character's name, to try to hook the listener with an initial bang:

(inaudible) and I were walking through the forest when we heard a bang!

Charlotte never let a detail like an inaudible word—and especially not a clear introduction of a character—slide. She makes a second recording but doesn't know what to say. Stops. She deletes both recordings. This third recording she clearly begins her spriting and introduces Esme properly. She slows her talk down, enunciates more clearly, and emphasizes the pronunciation of "bang" both lexically ("big") and prosodically:

Esme and I were walking through the forest when we heard a *big *bang::

Charlotte's still not satisfied. What about changing the companion's name? She makes a substitution edit (Jasmine for Esme) but rejects it before completing the thought:

Jasmine and I were walking through the forest

She presses record again but can't think of what to say. Stops. Tries again. Now she makes another substitution refinement edit intended to replace her first idea (action #24 in Appendix A). This time, she tries to achieve a more subtle effect by replacing the onomatopoeia ("bang") with a sound effect:

Esme and I were walking through the forest when we heard a *big {NVC scratching sound}

But alas, the scratching sound effect is not big and bad enough. She tries again, and modifies the sound effect itself also to a softer more mysterious scratching sound:

Esme and I were walking through the forest when we heard {NVC light scratching sound}

Finally! Charlotte has something she can work with! After 29 composition and editing actions to refine the first 'sentence' (which she will soon double back to replace again), she moves on to the next 'sentence'.

We looked around (.) but we didn't see anything.

This is one of the few bits Charlotte sprouted in the first story that she did not improve upon. Next Charlotte uses repetition to try and increase the suspense. She records, "We

heard it again.” And then attempts another sound effect but the girls next to her are too loud and ruin the atmosphere of perfect night stillness she wants to achieve. Charlotte has a new idea about the beginning. What if she tried something more formal? She sprites what I see as a large revision on the idea she pursued first. Amongst other things she references herself in the third person (rather than first):

Setting. A stormy night when everyone has already gone to bed. And Charlotte and Esme are walking in the forest.

Immediately after she records this new introduction, she deletes it. She practices another sound effect that would follow, a wolf—or maybe it’s the wind?—howling. Perhaps she’s trying to find a better sound effect for the ‘sound’ referenced in the first composition idea (e.g. “walking through the forest when we heard...”). She tries another kind of sound effect, something that sounds like the half-tonal steps used in *Jaws* to create suspense when the shark is moving in for the kill. She listens to what she has and moves a bunch of things around, thinking. At composition and editing act #71, she tries a new idea (“Hello. I am (inaudible)”) and then makes two different sound effects, still searching for the right sound that is ambiguous yet appropriate enough to be scary. At action #90, she advances the story with a composition she will keep:

We ran to a clearing and sat down and looked *all around.

She follows this composition with another composition she will keep:

In the clearing (.) there were blankets and *all sorts of things. We made ourselves a tent and a comfortable bed with *all the junk.

Then she doubles back to the beginning again to try and improve the material portrayal of the scratching sound—still too quiet to be heard clearly. Although the background noise is louder, Charlotte has the microphone very close to her mouth and her voice rings loudly and with declarative importance:

Esme and I (.) were walking through the forest when we heard {NVC soft scratching sound}

Unfortunately, the scratching sound effect does not match her vocal confidence, and she will eventually delete this material replacement edit. She moves forward to the current endpoint of her narrative and records three consecutive spritings that she keeps in the final talkument. The first recording reflects her growing practice of mixing linguistic and sound effects together to bear equal weight with telling the story:

Just then (.) we heard {VOC howls}

The second recording represents dialogue line spoken by Esme, who addresses Charlotte in second person. When spriting this, Charlotte does not change her voice quality

much, except for a large tonal range difference between Esme's line of speech (higher) and the tag line identification (lower). Perhaps because she doesn't use a different voice for Esme, she uses quotation form as exemplified in books to identify the speaker ("Asked Esme"). She even adds a clause to describe Esme's emotional state ("very scared").

Do you think we're going to be safe here? Asked Esme, very scared.

Charlotte replies in first person perspective, but still adds the tag line ("I said") in order to identify which character she is playing.

I hope so (.) I said, I hope they won't get close to us. We don't have any food to feed them, so they'll probably feed on *us.

She sprites a third person account, pregnant with deep foreboding of what the night holds in store, which she eventually replaces.

We got under the covers (.) and waited for something terrible to happen.

Then Charlotte redeems the listener and allows her characters to survive the night in the wilderness unharmed:

But we were surprised to see that nothing happened. We stayed under the covers *all night and were safe and sound.

But she is not yet done. All the experimentation with sound effects of various types comes to fruition. She discovers a cohesive device for beginning and ending these mini narratives: a song. She records a tune sung on the monosyllable 'na'. Quite a lovely tune. She is still not done. She relistsens to many different recordings. She singles out #124 "We got under the covers (.) and waited for something terrible to happen." Perhaps she feels the third person perspective was too removed from the heart of the action. She sprites a first person replacement in action #148 (with tag lines and a final clause that reveals her own emotional state) :

Let's get under the covers (.) I said (.) in a frightened voice.

And inserts a revision of content after it, into the middle of the story:

Esme thought (.) that was a very (.) good idea.

In action #164, Charlotte sprites another version of the same tune she sang earlier. This one she moves to first position to open the story. It is not until the very end of this laborious and detailed process that Charlotte discovers the key to her narrative: a better scratching sound effect. I have no idea how she created this sound. But she finally achieves the amplitude with just the right quality of 'scratch' and rhythm she desires! She moves a

few things around and ends for the day, her first story complete, her voice loud and sure, her words sound and proper, effectively communicated to her satisfaction.

At no point did I assist Charlotte with any of the choices she made here. Nor did any other child. Charlotte was able to exercise an integrated composing and editing style that moved from first to last segments, enacting revisions and refinements throughout. Charlotte also listened to herself and made changes in her own spriting production.

There is a micro-development also perceptible in her spriting production. Over time she slowed her rate of speech tremendously. She lowered her voice. She reduced her breathy voice quality associated with femininity (Klatt and Klatt 1990) and assumed a voice quality that projects better in the microphone and generally. She paused dramatically, especially before clauses and emphasized words—not too much (that would be kitsch) but just enough. In other words, Charlotte became a better speaker.

5.3.3 Ruben's Case: Chunk Insertions

Although the 'bits and pieces' style is impressive in its control over all aspects of the resulting product, it was not the most common method of composing and editing. Most children at both schools composed and edited in the SpriterWriter by making one to several long recordings. Upon relistening, they would 'interject' something new into the midst of these long recording(s). I call this approach 'Chunk insertions.'

The most poignant and straightforward example of this approach is a composition by Ruben, age 10, the oldest child at the time in Umoja Elementary. I only had the opportunity to work with Ruben one day, but his immediate grasp of how he could use the SpriterWriter to unify ideas and concepts drawn from different places to make sense of what was happening in his life impressed me greatly. I did not have to encourage him to sprite. I only showed him the tools and how they worked, placed the microphone on his head, and asked, "What would you like to sprite about today?" I was surprised at how compositions seemed to flow out of him, as though there was a profusion of words and ideas he needed to record but didn't have the space or tools before to do so. Since I spent only one afternoon assisting Ruben with his compositions, the powerful products he emerged with cannot be attributed to earlier interventions I had made, but it is possible that spriting gave him a powerful enough vehicle to compose what he already had to say.

That one day he composed two talkuments. The first talkument, "My birthday," was shared widely with his friends. It not only set the standard in the school for what a birthday party should be like, it also set the standard for what a talkument about the party (how fun and great it was) should sound like. His second talkument, named "April Vaction [sic]," he played to his classmates less than one week later before leaving the school for good. I examine "April Vaction" in more detail.

This talkument began like many children's did, as one long recording. The temporally linear narrative is often held together with "and" and "and then," features of early narrative development, with occasional "but" and "because." These features are perhaps more prevalent in this 'Chunk insertions' style precisely because it is made in one long recording. To remove these features, spriting technology would have to better facilitate making closer word-level edits.

Ruben declared himself finished. In Table 8 below contains a transcription (and sound recording) of the first recording Ruben made.

This is a story about my April vacation. On my April vacation, I shall go down South to see my father my Granddad, and my Nana, and (.) I'll spend (.) my whole April vacation down there and I'll come back, and I'll have a whole lot of fun down there. Cuz every year I go down there or every time I go down there, they always (.) treat me ve:ry special. And *I: like it. And I love the - all three of them. (5.0) But (3.0) {VOC inhale} I'll never ever ever ever e:ver: (.) wanna leave there. Becau:se, I just li:ke *staying there. Not because I don't have any schoo:l, but because I like seeing my father a lot. Because (.) um we:ll (.) not seeing your father for a whole ye:ar is really (.) tough. But I always get to talk to him on my mother's cell phone. And {PRN an} he's bought me: so much *stuff tha:t (.) we:ll (.) I can't remember th- the las:t th- th::ing that he gave me (4.0) but (.) that's why: I wanna go down (.) South on my April vacation. Because (.) my grandparents and my da:d, treat me (3.0) uh (.) same exact {PRN exerract} way, that any other paren:ts and (.) grandparents should. (4.0) An:d {PRN an} (.) they even teach me how to *cook (.) down South. And I *like cooking. And they always buy me lots of clothes that I like to wear every now and then, (3.0) so (.) that's why I wanna (.) jus:t (.) make this: (.) documentary: (.) abou:t (.) my: (.) April vacation. (5.5) An: (.) well, that's it. (4.0) The end. Anyway, P_S I lo:ve my Dad more than anything in the world.

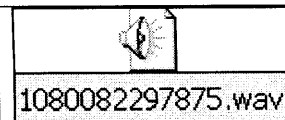


Table 8 A transcription of Ruben's first recording in 'April Vaction.' A sound file (RIFF wave format) is also included (3:03 minutes in length)

When children are new to spriting and do not have much experience with strong processes of composition, they often do not re-listen to their spriting without being asked to do so. I questioned Ruben.

"Do you want to add anything or change something?" I asked.

"No." He replied.

"So, it's perfect?"

"Yes, it's perfect."

This is a common response, and one that elementary school teachers seem familiar with, although it puzzles me. So I always ask the child what their criteria is for judging their composition to be "good" or "perfect," as they most often declare it to be. Ruben said, "Well, its true," reminding me of another student at Umoja Elementary who judges the worth of a composition on the veracity of representation to their own experience. Are his parents going to take him to play paintball this weekend? Yes! Is it before or after his two cousins come over? After! If experience can be literally represented, that is, narrated in order of occurrence, then it is good. But this composition was different. It did not recount the actual events of a

birthday celebration as Ruben's previous composition did. Instead, he generalized his experiences of going down South and selected features from interactions he had with his family there as special, like learning to cook and receiving gifts and clothing. Right up front, Ruben set the tone for this composition by describing how visiting his family down South makes him feel, an emotional and self-reflective feature that most children do not include in their compositions, even though he uses simple words to express his emotions like "like." I was drawn in to his story with the controlled line, "not seeing your father for a whole year is really (.) tough" and with the linguistic way he managed to achieve narrative distance from his own story, by saying it in third person singular objective (an American representation of indefinite third person, for example, "not seeing one's father...").

As usual, I suggested he relisten to his work anyway to make absolutely certain that he was happy with it. While he was listening to his "perfect" composition, he suddenly exclaimed, "Oh, I forgot something very very important!" I asked him if he wanted to add something. Yes. At the end? No, somewhere about (he points to the middle) somewhere about here. Well, I told him, then you're going to have to learn how to make splits in the sound. We played the smaller sausages around the area he wanted to insert. He easily located the place he wanted. He split the sausage where he wanted to interject something and erased a small sausage that contained an unfilled pause (making no difference in the transcription). Then he selected the stick where he wanted the new recording to go and wrote a 'new action or idea' revision.

A::nd (.) well (.) I learned something on Disney Channel (.) that can help me:: (.) learn the culture of why: {PRN why-ee} (.) about (.) family. This word is (.) *Ohana. Ohana means *family, and family means nobody gets left behind. Or forgotten.

By adding this second recording, Ruben merged his personal narrative composition to an abstract idea, 'ohana,' he had gathered from a completely different place and time. The full narrative is available in Table 9. Every morning at Umoja they perform an activity called *circle* where the children gather to sing songs and chant the African values of Kwanzaa, an African American philosophy that promotes unity ('umojā'), self determination, collective work and responsibility, cooperative economics, purpose, creativity and faith. Although Ruben has certainly participated in these circles for at least one year, instead of using the word 'umojā,' he appropriates a Hawaiian word for unity that he learned from his favorite television show, *Lilo and Stitch*. The lonely Hawaiian girl, Lilo, socializes the destructive space alien she adopts as her pet dog, Stitch. Disney Studios describes the character Lilo, "Through her love, faith and unwavering belief in 'ohana' (the Hawaiian concept of family), Lilo helps unlock Stitch's heart and gives him the one thing he was never designed to have—the ability to care for someone else." Ruben in turn takes this concept that he learned through his beloved *Lilo and Stitch* show and uses it to illustrate what he desires his own family to be like, quite different from the reality (Ruben lives with his mother far away from his father.)

Ruben did not want to make any more changes after the second recording. I asked him if he wanted to write his essay and he said, "No, that's what I wanted," meaning that his spriting essay was a finished product in his opinion. He immediately invited a number of

friends to listen to his compositions, who eagerly came as Ruben was both revered and feared.

First recording:

This is a story about my April vacation. On my April vacation, I shall go down South to see my father my Granddad, and my Nana, and (.) I'll spend (.) my whole April vacation down there and I'll come back, and I'll have a whole lot of fun down there. Cuz every year I go down there or every time I go down there, they always (.) treat me ve:ry special. And *I: like it. And I love the - all three of them. (5.0) But (3.0) {VOC inhale} I'll never ever ever ever e:ver: (.) wanna leave there. Becau:se, I just li:ke *staying there. Not because I don't have any schoo:l, but because I like seeing my father a lot. Because (.) um we:ll (.)

Second recording:

A::nd (.) well (.) {NVC microphone noise} I learned something on Disney Channel (.) that can help me:: (.) learn the culture of why: {PRN why-ee} (.) about (.) family. This wor:d is (.) *Ohana. Ohana means *family, and family means nobody gets left behind. Or forgotten.

First recording continued:

Not seeing your father for a whole ye:ar is really (.) tough. But I always get to talk to him on my mother's cell phone. And {PRN an} he's bought me: so much *stuff tha:t (.) we:ll (.) I can't remember th- the las:t th- th::ing that he gave me (4.0) but (.) that's why: I wanna go down (.) South on my April vacation. Because (.) my grandparents and my da:d, treat me (3.0) uh (.) same exact {PRN exerract} way, that any other paren:ts and (.) grandparents should. (4.0) An:d {PRN an} (.) they even teach me how to *cook (.) down South. And I *like cooking. And they always buy me lots of clothes that I like to wear every now and then, (3.0) so (.) that's why I wanna (.) jus:t (.) make this: (.) documentary: (.) abou:t (.) my: (.) April vacation. (5.5) An: (.) well, that's it. (4.0) The end. Anyway, P_S I lo:ve my Dad more than anything in the world.



Table 9 Transcription of Ruben's final talkument. The final talkument is also available in RIFF Wave format (3:34 minutes in length)

His final talkument is deeply moving. Through juxtaposition of memories of belonging to an extended Southern family with a vicariously experienced Hawaiian concept of extended family, it expresses Ruben's deep longing for the unification of his family's physical and emotional distances. For anyone, least of all a 10 year old, this is a sophisticated idea to realize, reflect upon and have some facility to communicate.

The principal of Umoja Elementary told me that the one thing that Ruben did before leaving the school less than one week later was to play these talkuments for everyone at Umoja. Ruben was so proud of them that he wanted to share them as a parting gift to his friends. The principal said, trying to relate the importance that Ruben ascribed to these pieces, "Those are very valuable compositions! Very valuable!"

5.3.4 Emily and Madeline's Case: There's Meaning in How It's Said

One can imagine also how 'bits and pieces' and 'chunk insertions' have parallels to composing and editing in writing. Charlotte's approach would be akin to perfecting each phrase and sentence, sometimes redoubling back to add a new sentence, change a word, or rearrange the order. Ruben's approach is pounding out a quick draft and then accommodating the need for improvement by simply adding one crucial thought at a particular point in the text. In this section I consider something that has no direct parallel to writing, something that requires thinking differently about composition and maybe even language itself.

The way children say their spriting is an integral part of both their meaning, their composition, and even their editing efforts. As Dwight Bolinger would say, how they say what they say is critical to what they mean (1989). In other words, the changes in rhythm, tone, quality, duration and placement of pauses, are all tied to a child's intended meaning. Although many children edited for *how* they said something, including the examples in Charlotte's case, the most explicit example of this behavior was a collaboration of two girls at Molière, Emily and Madeline, who wrote a script of a story and then engaged in an iterative process of reading and editing this script in the Spriter. While this example is profoundly illustrative of children working hard to say the same thing in different ways, in some ways it is unique to the data set. There were only two to three instances across both schools in which students wrote something and then sprited it. In fact, such a process is the mirror image of what I predicted would occur. There were multiple instances of students, almost exclusively from Umoja Elementary who were younger and less experienced in letterate development, reading a book to the Spriter. Emily and Madeline's composition is the sole known example of 'reading spriting' at Molière. It is also the only case across both schools in which children first write a complete text in order to sprite the final talkument. In Emily and Madeline's case, they considered the final product to be a talkument, not their text. And they spent two additional hours beyond the one in which they wrote the text perfecting their spriting of it. Clearly the time that the girls spent and their enthusiastic persistence to the task requires me to reassess and value the issues they were so concerned with.

Emily and Madeline were both in third grade, but their personalities and level of maturity were distinct. Emily was the leader in the pair. With her outgoing and verbal nature, she often assumed leadership of the entire class. She was self-confident, verbal, and consistently demonstrated high-level knowledge of the tasks required of her in school and an ability to complete them. The principal of the school described her, with emphatically raised eyebrows, as "very gifted" on standardized measures but, she added, Emily might need to hone her social skills. I found Emily's performance in my spriting class hard to work with. She was not a pensive child; she tended to quickly made decisions and move on to

something else. When she declared herself 'done'—always one of the first students in the class to finish—she rarely went back to the composition. Although these qualities may prove very valuable for succeeding in traditional school settings, it did not raise her work above the others in the spriting class.

What makes Emily's work so unique, however, is the attention she paid to writing within the spriting class. I am not convinced that she wrote out of joy. There is nothing wrong with enjoying the process of writing, and indeed I encouraged that kind of expression several times, but Emily seemed to write less for the love of it than her belief that it was the appropriate answer to any question. For example, when I suggested (amongst other things) that the students could translate the spriting they had done the week before to writing, Emily simply bypassed the translation step, whipped out a paper and pencil and dutifully scrawled an introduction and itemized list of her day's activities—in the *most* letterate manner—and handed it to me. Surely this is what I wanted! Perhaps it was that my suggestion opened no new vistas for her imagination. Perhaps it rang too familiar of class-based assignments or dinnertime required reporting. But her written composition seemed somehow a forlorn and pitiful example of another kind of place with values different from the spriting class, and was not at all how I wanted the children to interpret my suggestion. Needless to say, Emily had deeply internalized the requirements of succeeding in school and was able to produce what she thought was required almost without thinking—even in an experimental composition class where the same rules for success may not hold true. Emily herself may have realized that she did not explore the new potentials of spriting as much as she might have. When the children chose the composition they felt represented their best work on the last day of class, Emily demonstrated a talkument she had composed as early as the fourth week.

Madeline seemed much younger than Emily even though they were both in the same grade. I might have this perception because of the physical differences in size at this age or because Madeline was less inclined to assume a leadership role in the classroom. Her first language is Russian, but she scored well in standardized tests of French and very high compared to her classmates on American standardized measures (ERB) of auditory comprehension and writing mechanics (91%). Madeline never required another student to translate from French to English for her in spriting class. Nevertheless, it was my impression that her ability to sprite emerged more slowly than the other students. She was often engaged in the class but did not tend to produce as many, or as long, compositions as the other children. In the sound files in the table in Appendix B, notice that her reading out loud skills are slow and halting even after several repetitions of the same text. Madeline herself felt she accomplished her best work in collaboration with Emily, and chose to demonstrate a selection from the second piece they made together on the final day of class. (Emily also greatly enjoyed her collaboration with Madeline and moped and wasted time when Madeline was absent.)

The entire editing log of 'EM Voice' is available in Appendix B. The content was transcribed to text and color coded to foreground different features that will be discussed in this section. For those reading this in electronic format, the sound files are also available as embedded resources in the log.

Emily and Madeline's 'EM Voice' cannot be described using the categories developed for Charlotte's work because their composition process was so unique and unexpected. Indeed, I invented the composition 'writing to spriting' mode translation to account for their work.

They wrote their story on paper first, as pictured in Figure 22. Although I was unable to closely observe them doing so, the single piece of paper they used reveals an iterative and thoughtful process of composition and editing. Several sentences or beginnings of sentences are crossed out and words in tiny script crawl above and next to lines where they interject content. Writing occupied them for nearly one class period. Their narrative shifts between third and first person, with "he said/she said" tagging the dialogue turns.⁴⁷

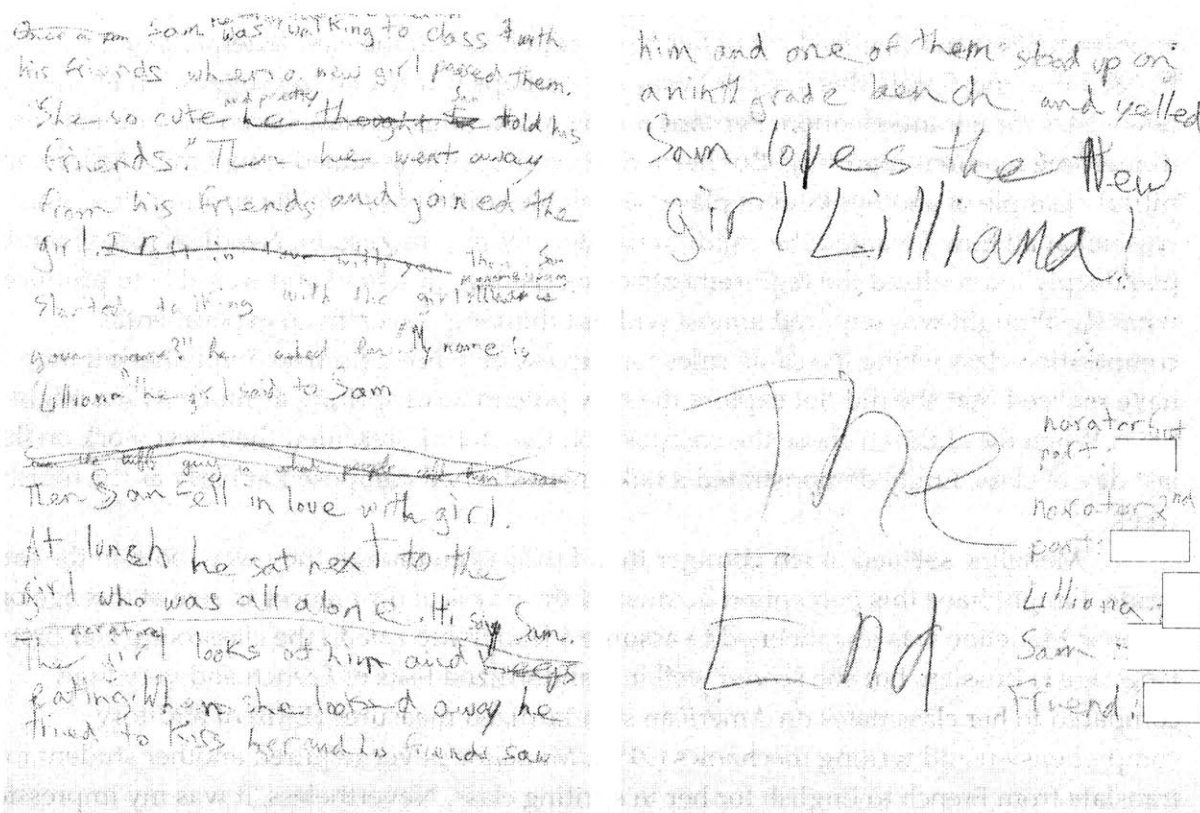


Figure 22 Emily and Madeline's written script, page 1 and page 2

The following two weeks they spent interpreting and understanding their own text in a different way. They did this by reading it to the Spriter in dramatically different ways until they were satisfied with the way it sounded. The important contributions they make to this study are two-fold. First, the girls considered the spritten talkument to be the final product, not their writing. Second, they considered the central work of spriting to be giving their text both voice and character.

⁴⁷ The dialogue tags (e.g. he said/she said) appeared in both writing and spriting examples the children made and cannot be considered a fundamental difference between modalities. Further, Emily and Madeline faithfully sprited these dialogue tags—with great difficulty—even though they could have achieved the same effect in spriting through consistent changes in voice quality and speaker.

The story is about a boy Sam who is walking with his friends, notices a new girl Lilliana and leaves his friends to court the girl. It's notable for its lack of development of the courtship. Lilliana, when questioned, says her name, whereupon Sam promptly falls in love with her and attempts to kiss her while she eats lunch. When one considers that both girls are in third grade, and have vague ideas if any about what would attract a boy to fall in love—and probably not sure if they want that to happen now anyway—it is not surprising that they do not develop this further. But while their text lacks in development of character and motivation for the kiss, it is through their iterative approach to spriting that they realize this and attempt to bring greater depth to the story through their vocal expression.

Reading the text itself was problematic. Their iterations reveal a pattern of moving through increasingly larger portions of the text. It took them up to action #31 in the table in Appendix B—the sixth iteration of the dialogue—before their recording encompassed the entire scope of the text. They recorded the text a total of seven times (not including the two additional recordings of the 'credits'). Each time they recorded the story, they introduced some new approach, either by dividing up the text or dramatizing a character's voice differently. They divided the speaking parts across the (first person) characters and the (third person) narrator in different ways and at different scales of granularity. Both had a chance to read each of the different parts as they decided which voice suited which parts best.

I find it curious that, even though they were very creative with dividing the texts in to separate speaking parts with vastly different expressive requirements, they did not spontaneously discover the technique of 'bits and pieces can make a whole' and just record each piece until they were happy with it and then move on to the next. Neither of them used the 'bits and pieces' approach in their individual work, so they could not transfer this approach from elsewhere. But why did they not discover it? Lack of technical skills was not the reason. For example, they were capable of making splits as evidenced by their editing of recording action #68, where they made a split and then deleted a false start from the beginning of their "chapter one" recording. Perhaps this is the wrong question. Instead, let me ask, what were they exploring by treating the text as a whole? The parallel to acting and live performance is significant here. It is quite possible that one only learns to write good dialogue through thinking about what it takes to portray good dialogue. And even though Emily and Madeline were working with a medium that permits the temporal segmentation of performance, like film and video, I think their (subconscious?) choice to work with the entire scope at once has parallels to whole text comprehension. In order to be able to think about an entire text, it might help to think both through writing and spriting about what unifies and holds a text together across changes in time, space, narrator and action. We are left to wonder what might happen to their process if they had continued on to chapter two and three, as their "chapter one" recording (action #68 in Appendix B) insinuates.

They had difficulty saying the dialogue tags. Emily stumbles across "'Hi.' said Sam - said - say - said Sam" (spriting action #51 in Appendix B). She stumbles because she is remediating the error in their written script, "Hi. Say Sam" with her oral competence that knows "Say Sam" is incorrect in both number and tense. In earlier recording actions Emily says without a hitch, "'Hi.' Said Sam" and "'Hi.' Says Sam" variously, showing that reading the same text over and over still offers challenges as one begins to mull over the details,

transforming implicit understanding in the form of oral competence to explicit knowledge of what is wrong and why. At a certain point in this transformation of knowledge, previously good performance fails (Karmiloff-Smith 1992).

The girls also have problems reading the dialogue tags and pronouns correctly. They like to have the dialogue read by one person and the tag enunciated by the other, to make the character lines even more clear. But the person saying the tag line often has difficulty performing the complete formula (e.g. “Asked - asked her.” Instead of “He asked her”) and choosing whether to use the pronominal or the character’s full name (e.g. “The girl said to th-uh (.) The girl said to Sam. (.).”). At one point in action #31 in Appendix B, Madeline changes the gender of a pronoun and is quietly corrected by Emily:

Madeline: The girl looked at him and - k- keeps eating. When *he looked away

Emily: when she

Madeline: when *she looked away...

Keeping the story on track with all referring expressions in line, as well as imbuing the characters with a voice quality emblematic of their gender and role within the story is a complicated coordination act requiring constant vigilance and creativity. Emily probably ended up with the lion’s share of the reading because she was able to navigate these responsibilities better (at this point) than Madeline.

But reading ability was not the only reason for composing the talkument as they did. They appeared to change reading roles as much to accommodate which one of them produced the best gender stereotypical ‘desirable boy’s voice’ and ‘desirable girl’s voice.’ Their attempts at creating a desirable boyfriend persona touches on the broader cultural debate of what is deeply masculine. In action #11—the second iteration of the script—Emily tells Madeline quietly on the recording to make her voice sound like a boy. From this point on they work dramatically with the words to create the paralinguistic images and ideas they wish to evoke. Madeline is the first to try. In action #11 she puts a heavy stress on each word but this was apparently not enough. In #16 she adds a long drawl reminiscent of cowboy movies on the word “pretty,” evoking a kind of lascivious character, which they also eventually reject. Emily tries next and creates a Sam character that appears stuffed up and muffled, presumably because she tries to make her voice deeper by making her mouth cavity larger. Gradually over time she develops a voice quality for Sam that is called “creaky” in the phonetics literature. Interestingly, this quality is often perceived as masculine (Klatt and Klatt 1990; Hanson and Chuang 1999) just as a breathy quality is perceived as feminine (Hanson 1997). Because moving back and forth between her normal voice and creaky voice settings is difficult, Emily continuously edges towards creaky voice while narrating (see especially recording action #51).

There is an ‘edge effect’ in their initial portrayals of a character’s voice. When they begin uttering the character’s words, they ‘slide into’ the dramatization of the character’s voice. This practice seems to diminish over several trials as they become more comfortable with the structure of their text and how to interpret it. To demonstrate how difficult it is to keep track of decoding words and voicing them with a natural intonation, plus attributing to

them a narrative role in a story through changes in voice quality and other paralinguistic factors, consider in recording action #47 how Emily forgets to lower her voice when she first begins Sam's first "She's so cute and pretty" utterance. She manages to end the utterance on the properly low note.

The central work they are doing seems to center on coming to grips with how similarly looking words on paper can represent communications between very different people in a fictitious or real world. It is possible that to read effectively and with an interest that is self-sustaining across a lifetime one has to engage in this type of role-play in order to be able to construe voices for an author and each character in a fictitious world for familiar and unfamiliar texts alike.

How can this kind of iterative oral interpretation of a written text be accounted for in a typology of composition and editing moves? I use the word 'interpretation' intentionally. What Emily and Madeline did has much in common with certain kinds of musical performance. For example, when a singer or pianist spends time learning, refining and developing their understanding of a piece—often through repeating its passages endlessly to master both the technique and the expression—they are called 'interpreters' of the written music. The singer or pianist is not the original composer of the music, but in a sense they have to re-write it to make the contours and relationships established within and by the music real and present for the performer and the audience alike.

Musical aficionados often relish the opportunity to hear the same piece performed by different artists, or even by same artist with a gap of several years or in a different setting. They enjoy listening to how each performer merges their own physical-cognitive being and technical prowess to an indefatigable sense of themselves in an acculturated, historicized moment. Interpretation cannot and will not remain static. My voice teachers have often cautioned me that sometimes you can return to a piece you have worked extensively several years later and find something completely different in it; but with other pieces, maybe bound to a period of youthful enthusiasm for example, you can not return to the piece with any real conviction. Over longer periods of time we observe change in styles of musical interpretation, the influence of different musical traditions, changes in instrumental technology and the pedagogy used to teach the next generation of musicians. The stuff that interpretation is made of, even the duplicitously simple task of spriting one's own text, is actually rife with deep and rich choices, making connections from one's own unique self to a broader society. Therefore, I see what Emily and Madeline are doing more as an act of composition (e.g. *writing to spriting mode translation*) than of editing.

5.3.5 Cole's Case: The Process is Literally the Product

Children just coming to an awareness of literacy, and possibly not experienced in the diversity of literacy forms they will encounter at school, nevertheless can engage in sophisticated acts of composition and editing through spriting. I worked with six children, ages five and six, at Umoja Elementary for six weeks with spriting. Many of these children attended preschool at Umoja through the support of vouchers. Although the children could attend Umoja for elementary school, most were likely going to attend kindergarten in the Fall at a public school as vouchers for elementary school were more difficult to come by.

Cole is an avid fan of several cartoons, especially Pokemon, Yugio and Transformers. He also enjoys spending close time with his mother while watching World Wrestling Foundation (WWF) matches on television and is familiar with several wrestlers, the relationships they enact on television (e.g. brothers, enemies, et cetera), and how the matches proceed (locker room time, what kinds of acts constitute cheating, who won, et cetera). In total Cole composed five long spriting compositions, several of which I will draw upon to demonstrate the skills Cole brought to the activity (his competencies), the skills he was developing while spriting (skills and knowledge within his zone of proximal development), and the new skills and knowledge I demonstrated to him through our mutual work on spriting. Thus, spriting enabled me to scaffold Cole's learning of many conceptual processes considered much too advanced for a child just learning how to form letters.

The first composition Cole made he wanted me to save as a file called "A smiley face." In his first spriting composition he sprited about an exciting wrestling match he had watched the night before. He listened to each spritten recording immediately after recording it. While he listened he would say with impatience, "Oh I forgot something!" and immediately move to record again. Each time he made a new recording it would involve some repetition of previously spritten content as well as introduce something new. It is much less obvious on the surface what Cole was 'editing' for than in the work of the students who were more experienced composers.

For example, Cole recorded the first six recordings shown in Figure 24 in rapid succession. The first two appear to be a title of sorts. Most of the recordings contain the same phrase, "last night." The episode where Kane cheats in the ring is retold twice (#3 and #4). Recording #5 begins with "last night" and appears at first to be about the heinous act of cheating and the final outcome of the wrestling match, but changes to something else (which, due to my inability to understand all of Cole's words, remains cryptic). Recording #6 follows the pattern and intention of #5. Recording #7 is the best description of the event that Cole developed. With the "last night" beginning, it emulates recordings #3 and #4.

A spriting product by an emerging literacy preschooler is a concatenation of their process much more so than a product by a more literate child. I call this 'the process is the product.' Cole was iterative in his approach from the very first. He tried repeatedly to shape his recording to suit his experience of watching the wrestling match the night before, and in the process, repeats some things even while he adds new things. But while redundancy grows, he does not of his own volition erase previous recordings. Cole did not end up with a conventional product as we would understand it but rather a full concatenation of their entire iterative process—every 'restatement' attempted.

Though Cole did not want to delete content, he does engage in other kinds of editing. After this series of attempts to describe the wrestling match, Cole sprited 16 recordings on other topics: cleaning the house, his friends and family members, and things he can do well (e.g. ride a bike without training wheels, ballet dance like his friend). At the very end he wanted to add something to the earlier wrestling topic. I helped him locate where the wrestling content was and he inserted the recording labeled #7 (in Figure 24) amidst the other wrestling content. Although it is unlikely Cole could have accomplished this insertion without my help, it was Cole's quality of thought and desire to represent an event as best he

could—through iterative trials—that permitted me to show him ways of rearranging content and editing. From a Vygotskyian perspective, Cole had a wide zone of proximal development with respect to the literate task of composing and editing.

At this point in his life, Cole probably engages in few activities where he achieves an incremental improvement in the final outcome by reshaping the intermediate materials. In conversation he achieves improvement by saying something again to redress the developing global discourse model. Thus, his approach to spriting is much like making changes to a conversational discourse model. Because one cannot go back to actually alter the ephemeral utterances, one attempts to repair content through other means. Cole is deliberate and persistent in his attempts to repair and improve his utterances. But in spriting Cole is encountering, perhaps for the first time, the ability to relisten to and repair an externalized and concrete representation of his discourse. Over time this changes his approach to speaking. For example, Cole often struggles to remember when he is merely 'talking' with me (meta-discourse) and when he is 'recording' his talk (spriting). In the transcript of #6 in Figure 24, he says, "Can I record it?" In following weeks he becomes more able to negotiate his casual conversation with me as a friend/teacher, his spriting, and our meta-conversation about his spriting.

1. (4.9) Wres::- oh. (.) Wrestling. I mean (.)
2. Alright. {VOC inhale} Wrestling!
3. (7.0) Last night, I saw (.) gu::ys that were wrestling {PRN wrastlin}. And - th- And then another guy came out of his locker room, and then he came in the ring and he ha- he helped Kane win. And then (.) the other guy, and then Kane (.) cheated - Shawn Michaels cheated. So (.) so um- Kane was doing her and that's it. (4.0) That's a- alright
4. Push this? {SPKR Tara: no you just keep talking } Last night (.) I went (.) inside the living room, and then (.) I:: saw (.) Shawn Michaels went in the roof of his locker room and then - and then, he helped Kane and then, and then Kane cheated - Shawn Michaels cheated. And then I went to bed (.) and then m- I- and then I w- and I watched cartoons and that's it. Can I play it? {SPKR Tara: you gotta stop it first.} Alright.
5. Hi. {VOC inhale} Last night (.) I g- no wait - I got (.) I got Rock (inaudible) I got - I got (inaudible) (.) right
6. I got Shawn Michaels and (inaudible) and um- I got and I got um - I got - Bow T. Can I record it? Oh alright.

[Much later, Cole inserts #7 after the previous six recordings]

7. (4.5) Last night (.) I went (.) in the living room (.) and I saw:: wrestling (.) that j- that - (.) and my:: and I w- and I saw Triple H (.) get busted (.) out of the ring (.) cause his brother Shawn Michaels came in the ring and helped Kane win, and then Kane got the title and then (.) and then gam- and the w- the g- and then the show was off, and that's it.

Figure 24 Seven recordings about wrestling from Cole' first talkument.

Because spriting is so much easier than writing to produce physically and does not rely upon learning a new visual code, we can see aspects of early composition development through spriting that are obscured or completely absent in 'emergent' writing development. During my interactions with Cole, I found him to be such a joyful compositionist and able to converse at such a high level about his work that I resolved to challenge him with topics that I was asking children two or three years older to do in order to make developmental comparisons. Cole's reactions to these topics was very revealing about what he could do and could not yet do with language and thought. Of course there are several developmental differences between he and they. He was five; they were seven through nine. He was just learning his alphabet and the alphabetic principle; they were writing multi-syllabic words. He misread names of his friends and relatives; they were reading short stories. It would be difficult from this study alone to account for observed differences by pinpointing some aspect of literacy growth, letteracy growth, prior knowledge, additional school experience, or

even physical growth. And in fact, because in the past we have tied literacy skills so closely to letteracy development, we do not yet have the socio-cognitive framework on which to account for literacy development that might proceed independently of letteracy development.⁴⁸

In this next section I present how several dimensions commonly attributed to literacy emerged through spriting with Cole. I intend this to contribute to the growing body of research, so-called 'disability studies,' about how literacy development might proceed differently in people who cannot (yet, in this case) read or write. I use transcriptions of the video record in addition to records of spriting because our meta-conversations for spriting purposes are often very informative about Cole's process.

5.3.5.1 Much Meaning Remains in the Process

Literacy emerges in complex ways through interactions children have with parents, teachers, and peers. Much of the meaning children compose during these early stages of literacy is left 'unrecorded,' not represented beyond the composition environment and social context in which writing occurs. For example, when children write a letter or a word and draw a picture, for example, they talk about what they are writing or drawing about. This talk does not get written down in these early stages of literacy development, but is nonetheless a critical part of their meaning-making activity.

I saw parallels of this 'emergent literacy' in my interactions with Cole. Much information remains in the context of producing the talkument and is not recorded in the product itself. Cole represented our detailed conversations in his talkuments as a kind of summary statement. Here he introduces the subject of starting school:

- Cole:* I got a ride to school. My Daddy bring me a ride to school and next week I go to a new school I'm gonna take a ride on a bus!
- Tara:* Wow! Which school are you going to?
- Cole:* um. Kindergarten. Kindergarten.
- Tara:* Kindergarten. That starts next week?
- Cole:* Yeah.
- Tara:* Really?
- Cole:* Yeah. they go-
- Tara:* Are you sure it doesn't start in September
- Cole:* No.
- Tara:* (.) really!
- Cole:* Yeah.
- Tara:* Ok. so you're not coming back anymore.
- Cole:* uh uh. //Someday -
- Tara:* //Well Cole I'm gonna miss you.
- Cole:* I know. Only - only a couple days (.) then (inaudible) So. Som- Some people call - some people - (inaudible) that's what I (inaudible) vacation back over

⁴⁸ One exception to this is Sticht et al's auditing and reading developmental model (Sticht et al. 1974).

here (.) elementary. I might come back over to elementary. Is- if - if you be here I - I'll come back here cause - cause I'm gonna come back four days. Can only - only here for school

Cole then asks,

Cole: Can I say what I was just thinking?

Cole differentiates our conversation from spriting. He announces his intention to sprite about going to elementary school by asking permission. He refers to spriting as “say” and our conversation as “thinking.”

We then have a meta-conversation about where in the developing composition he would like to place his new thoughts. His certain responses, anchored to the composition by his pointing gestures, demonstrates an ability to move from conversation about his life (an anticipation of going to elementary school on a bus), to a desire to record these thoughts, to a meta-conversation about where the best place might be to put the representation of this conversation within a developing composition:

- Tara:* Yes. Yeah. Do you wanna put it before the bed or after the bed. {Tara gestures to a place on the Spriter interface.}
- Cole:* After the bed.
- Tara:* After the bed? Ok. Then we gotta find where it should go then. Where should it go.
- Cole:* It should go:: right here {he gestures with his finger toward the bottom of the visible Spriter interface.}
- Tara:* At the bottom
- Cole:* Right here. {He moves his finger up a few lines.}
- Tara:* You want it to go at the bottom?
- Cole:* Right here. {He continues pointing at the spot up a few lines from the bottom.}
- Tara:* Alright. Go here - why don't you press the start when you're ready.

After this complicated negotiation, Cole does not click the record button squarely enough and the Spriter failed to record what he said. Surprisingly, children were often loath to redo their talk and very angry at the Spriter if it failed to record. Cole liked his rendition at that point in time and did not attempt to record the same thing again.

5.3.5.2 Recontextualizing Conversation

Children need practice using and adapting (*recontextualizing*) the language they hear around them, particularly their parents' language, to their own perspective and voice. Writing has been a medium for accomplishing this (Cameron, Hunt, and Linton 1996), and spriting seems to be also, as this example shows. In the following transcription from the video record, Cole makes several recordings in response to a prompt I suggested: Is it better to be an only

child or have brothers and sisters? Cole feels strongly that it is better to have brothers and sisters.

[1086034388372.wav] Its better:: (.) to be a sister (.) a brother (.) even one brother even three sis- brother two sister

I found his response very confusing.

Tara: Did you - did you understand that?

Cole: mm hm

Tara: What did you say.

Cole: I said - I said its better:: to be:: a sister (.) two sisters (.) three brothers (.) and that's better to be a family (.) brother, that's a - a brother, like a brother another brother like a brother, like a brother like me (.) and, and - its fun to have friendship {PRN frientship} so::

Tara: Fun to have friendship.

Cole: hm hm

Cole uses a word that a friend of his used recently, "friend." He joined it with the suffix, "-ship." He begins to try it out in his spriting composition freely. His use of it reflects a very tenuous grasp of what the word means and how it functions.

Tara: Did you just learn that word?

Cole: Uh hm I learned it from Zackary

Tara: From Zackary!

Cole: He said you're not my friend so - so I said friendship (.) my brother is my friendship

Cole tries again to sprite that he would rather have brothers and sisters than be an only child. Here he demonstrates how he is coming to terms with how perspective and speaker can change the way one says things (e.g. number and count). Notice in the recording itself that Cole engages in meta-communication ("I wanna add something") though he would not need to announce his intention since he is already recording. In his next sentence—his 'redoing' edit—he introduces the number 'three' and eliminates 'friendship':

[1086034493185.wav] It's better:: to be a friendship a brother:: (.) I wanna add something to that. Its better to be a - a three brother (.) two sisters and its better to be one brother (.) friendship that loves a big (.) tall (.) big brother (.) that's thirteen (.) an::d (.) and that's it

Cole's use of the word "three" in "three brother" is ambiguous. We do not know if Cole is referring a brother by his age (he does to refer to his three-year-old sister as "three sister") or whether he has three brothers. Cole plays the recording he just made. I ask him again to clarify for me what he meant. Cole explains that the three brothers is a count that

includes him. He refers to himself from a third person perspective, much like he would hear a parent refer to him.

- Tara: So is it - what - what you're saying is that its better to have three brothers and two sisters? Or its better to have just one brother.
- Cole: Its because I got three brothers (.) cause my brother (.) CJ he - he one my brother Lamont he's two, my - me (.) I'm three. There's three brothers.
- Tara: //ah.
- Cole: //And there's two sisters that's Dominique this is Dominique and this is Desiree that's three Desiree is three and Dominique is eight.
- Tara: Hah. So:: but *you have two brothers and two sisters.
- Cole: No I have three //brothers
- Tara: //No you have *two brothers. Who are your two brothers.
- Cole: CJ and Lamont?

It is through this spriting activity that Cole has the opportunity to recontextualize his parent's words about him rather than simply imitating their words. He encounters a situation in which he must develop his own unique perspective and have words and syntax available to communicate it. Although Cole could learn the same thing through conversation, it was through his desire to sprite about his family and to improve his representation of them in an iterative fashion that this conversation occurred.

5.3.5.3 A Different View of Coherence

Cole had a different view of what makes a composition coherent than I did. I was a slave to topic-centered narratives (Michaels 1984) while Cole preferred to maintain coherence between the composition and himself as a young boy in all the richness of relationship, activity, and skills and passions he possesses. According to Cole, a composition is internally unified when everything mentioned and described is 'good' or 'liked.'⁴⁹

In the final week, I asked Cole if he would like to sprite about whether Yugio or Pokemon is better and he was willing. I was trying to accomplish three things: (1) introduce Cole to the technical tools for editing spriting, (2) demonstrate to him how he could make incremental improvements in his spriting record by removing some of the remnants of the thought process in human speech production process (e.g. false starts, long pauses, et cetera), and (3) demonstrate how to rearrange recordings to achieve better coherence. We have the following conversation about moving a 'thesis statement' like spriting to first position:

- Tara: Can I show you something? I'm gonna click on this and highlight it and now I'm gonna drag it
- Cole: Up there?
- Tara: And I'm going to drop it (.) first.
- Cole: Up there?

⁴⁹ Cole's view also differs from what his elder classmates said. Ruben, age 10, and Derrick, age 8, said a composition is 'good' when it is a diachronic facsimile of some activity.

Tara: {QUAL smiles at Cole} yeah!
Cole: =uh

In the next part of the transcript I proceed to delete some empty sausages and false starts. In retrospect I dearly regret having taken control of the mouse at all or called any recording—even silence—nonsense. While my intention was to demonstrate to Cole a kind of editing-by-deletion of spriting material that does not serve to advance his point, I assumed command of the mouse as I very rarely did, and made some executive decisions. I do not believe now that Cole's learning interests were served. I include this part as a pedagogical counter-example precisely because it shows there is the potential in spriting for teachers to focus too much critical attention on mechanical aspects of spriting in ways that parallel the critical attention on mechanical correctness in writing (e.g. letter formation, handwriting, spelling, et cetera). Pedagogical pitfalls do not go away in spriting, they merely assume different forms. While I still believe mechanics are important in both spriting and writing, we must be careful to focus feedback on the efforts of children to make meaning first.

Tara: =and this! (.) I *think is nonsense

{Tara clicks on a sausage. They both aude Cole saying}
<<Its better:: (.) to:: (.) wait.>>

Tara: That's nonsense.

{She erases the fragment}
{Tara clicks on an 'empty' sausage and they both aude silence}
<<(.)>>

Tara: That's nonsense.

{She erases the empty sausage and clicks on another}
{They both aude Cole saying}
<<Its better:: to be:: (.) wait.>>

Tara: That's nonsense

{She erases the fragment}
{Tara clicks on another and they both aude Cole saying}
<<Its better to watch cartoons and that's it.>>

Tara: What do you think about that. Should we erase that one?

Cole: Uh uh! Its good.

Tara: Why - why do you think its good.

Cole: Becau::se (.) its about cartoons.

Tara: Its about cartoons and *therefore it is good huh?

Cole: Yep.

Tara: Alright (.) well shall we at least not put it first?

Cole: Yeah.

Cole asserts his desire to keep a recording that I saw as a mere step in his process. He appreciated it because it lauds the importance of cartoons in his life. In keeping with this view of coherence between his spriting and himself, he wants to add just a single mention of a third beloved cartoon (“Can I just say Transformers?”) into the comparison essay. To him, this essay has coherence because every mention is something he loves.

5.3.5.4 Politics of Composition

Children as young as Cole develop their compositions as strategic political tools, creating friendships where none might exist, and maintaining alliances between schoolmates of differing age. Television programs were very important to Umoja children and it was not secret that programs are targeted to specific age groups. At Umoja, the pre-schoolers were devoted fans of Pokemon while the older elementary children were Yugio fans, appreciating both the television show as well as the card game. When the young five to six-year-old preschoolers ‘graduated’ up to join the elementary class in May, they learned very quickly that to be accepted into the older group meant moving their allegiance from Pokemon to Yugio. (Two preschool boys, however, were very good friends and perhaps did not feel as strong a need to impress the older boys. They persisted in their outspoken love for Pokemon.)

I was searching for a comparative topic that Cole would feel comfortable and competent to address in detail and hit upon Yugio and Pokemon. It was only in retrospect that I realized how even talking about Pokemon and Yugio—especially those!—involves considerable political acumen. At the time, Cole did not feel he had any friends. The week before we had this conversation:

Tara: Do you have a friend who is an only child?

Cole: uh uh

Tara: No you don't have any friends who are only children?

Cole: No cause nobody wants to be my friends

Tara: {laughs} I'm sure they want to be your friend

...

Cole: They don't want me. (.) They don't like me anymore.

One week later, while Cole is working on justifying his initial thesis that Yugio is better than Pokemon (“I {VOC mouth sounds} - the only cartoon I like is Yugio and that's it”), he records the following:

[1086641022609.wav] Yugi has friends their name is Joey and um th- and the other boy and a girl and that's it.

I ask him whether Pokemon doesn't have friends too:

Tara: So Pokemon doesn't have friends.

Cole: Yes. (.) A- An-

Tara: Pokemon *does have friends

Cole: Yeah. he- {inhale} like (.) cause Ash has a - best Pokemon got Squirtle Charizard Charmander Bulbasaur Pikachu, and - and - her name - and he has friends. Ash. His name - his

Tara: //This is in Pokemon? Or Yugio.

Cole: in Pokemon. Pokemon //h-

Tara: //oh.

Cole: Ash has friends like Brooke and um

Tara: hm So (.) but you said that (.) and I *thought that you meant that you liked Pokemon better - No. You liked *Yugio better because it has friends. And that means that Pokemon *doesn't have friends.=

Cole: =no.=

Tara: =But Pokemon *does have friends.

Cole: Yeah

Tara: So you like them both because they have friends.

Cole: Yeah cause Pikachu has a friend too. No. Only:: Ash has a friend named Pikachu. He's (inaudible) {QUAL screams} Pikachu!

When Cole screamed "Pikachu!" I recalled conversations I had had with other five year olds at Umoja who screamed about Pokemon.

Tara: Yeah I think Zackary has imitated him quite a few times.

Cole: He likes Yu- He likes Pokemon oh my goodness he really -

Tara: //He *really likes Pokemon he tells me about it every time.

Cole: Me too!

Tara: He really likes Pokemon

As Cole talks with me about this, he sees a political opportunity to gain some friends. He suddenly decides to change his topic to appeal to both the older boys as well as the boys his own age. He says:

Cole: I like Pokemon too and I like Yugio.

After we discuss this change of heart—and composition thesis, Cole then sprites the same ("I like pokemon and I like Yugio and that's it"). By doing so, he demonstrates an awareness of how his spriting composition can have real effects in the flesh-and-blood world of children's social relationships. He takes a shrewd political perspective and states an appreciation both for the older boys' and his peers' valued cartoon.

5.3.5.5 Repetition as a Form of Emphasis

Gertrude Stein did not believe that there was any such thing as true repetition, for any repeated element registers with increased insistence. Cole felt the same way. The weekend after he went to the local aquarium he wrote a long piece about his experience there, particularly the toys he came away with. He recorded a short narrative beginning (catching a bit of my talk first).

[1085426670388.wav] {SPKR Tara: then it stops, now it's recording} Ok. {VOC inhale} I went to the aquarium {PRN acurleen} and I got (.). I got a ma:n and a starfish and I got: a shark and that's it.

Cole immediately listens to what he just wrote, announces he forgot something, and presses record again.

[1085426724466.wav] I sa:w a lot of fishes like whales (.) and penguins f- fwa- sw- swimming and eating and I sa:w a jellyfish toy so I went to get a man and a starfish and a shark. {VOC mouth sounds} (2.1) And that's it.

I pointed out that he repeated "a man, a starfish, and a shark" to see if he could account for this in some way. We had the following conversation, pointing often to the spriting interface to ground our references:

Cole: This is the part I was saying (.) this is the part where I was saying {Cole gestures to a point on the Spriting interface.}
Tara: Say that again?
Cole: This is the part I was saying {He gestures again to the same place.}
Tara: This is the part you were saying *here. {Tara gestures to the second recording.} yeah?
Cole: Yeah
Tara: Yeah cause I think you said *this {She gestures to the first recording} here first and then you said it again here {She gestures to the second recording} right?
Cole: Uh hm.
Tara: So do you wanna say it (.) twice or do you want to erase one of them.
Cole: I wanna say it twice.
Tara: You wanna say it twice?
Cole: Uh huh.
Tara: Ok
Cole: I //saw::
Tara: //Why- why do you wanna say it twice.
Cole: Because I never seen fishes before. I saw a lot of fishes at my Daddy's house we got fishes for fishcake. He has a tank for fishes? And I saw a lot of em I saw three of em but he - he killed em.

Cole did not want to delete the fact that he got “a man a starfish and a shark” because it was an important and novel event. He considers repetition to convey the importance in the same way that people talk louder or write more about an important event. His understanding of exposition (expansion) of an event at this point is grounded in repetition. It might be that the ability to expand a description and incorporate many new referents (novelty) while maintaining local and global coherence grows out of repetition.

5.3.5.6 Qualifying Ambiguous References

I was still confused about the man, starfish and shark. I asked Cole to provide more details about what these objects look like and how he uses them.

Tara: So we have - we have - we have this problem here. We have this *man. You got a *man. {VOC sniff} You have to describe to who listens to this - whoever listens to this, what this *man is. Cause there's a lot of men in this world. Some of them are real some of them aren't real. Some of them are really big some of them are really small and you have to describe to me what that *man is that you got. Ok?

Cole: uh huh

Tara: Alright I'm gonna press this - I'm gonna press this record and what are you gonna say⁵⁰

Cole: I'm gonna say (.) I went - I'll - I'll go to the bath with him starfish so today I'm taking a bath with my starfish (.) my shark and my man and I'm taking - I'm taking a bath with my - and watching cartoon when I get out of the bath when I get out of the - when I get out of the bath.

With this description it becomes more clear to me that the man, starfish and the shark are bath toys. We work on ways to make this more explicit.

Tara: Ok. What does your man look like?

Cole: He looks like - oh! He looks like - he's like one of um - he's like one of um - masks like those goggles they put on - the flip-

Tara: He has - he has flippers and goggles?

Cole: Yeah and he has on (inaudible)

Tara: And how tall is he.

Cole: He's like - he's like one two three Oh yeah he's like four

Tara: He's like that {gestures with two hands apart about one foot.}

Cole: Yeah

Tara: He's like a foot tall. Can you say that? foot tall

Cole: Foot tall

⁵⁰ Although in previous examples Cole was in control of the Spriter interface (he controlled the mouse), sometimes, as in this example, I would lean over and operate the recording function. On his signal I would start or stop the recorder. I also demonstrated a new editing action for him in situ, rather than 'training' him on all functions before letting him sprite.

Tara: Yeah. foot tall. So do you wanna say:: He's a foot tall and he has flippers and goggles on. Can you say that?
 Cole: He has flipp-
 Tara: Ok. here you go I'm gonna cue you ok?
 Cole: Ok.

When Cole makes this recording he incorporates nearly everything we had discussed. He elaborates on the man's diving paraphernalia. But when he recontextualizes the height of the diver, he reverses two words and makes 'foot' plural.⁵¹

[1085427876966.wav] He has flippers:: and goggles and a pump {PRN pumx} thing that he put on from there (.) on his body (.) (inaudible) get some air, *and he got - and he got flippers. He's a *tall man (.) tall feet man. That's it.

Through the activity of spriting Cole encountered the need to make his composition more explicit because of my confusion and questions. He first satisfied my questions through our meta-conversation about particular words ("I got a man"). He then took action within the composition itself: made a split in existing content and sprote new content that makes ambiguous references more accessible to audiences who are not intimately familiar with his possessions or activities.

5.3.5.7 Editing for Local Coherence

Inserting content into the flow of a composition often requires making more linguistic changes to maintain local coherence. When Cole added a new description of the man ("He has flippers ..."), the series of recordings that had made sense no longer makes sense. We relisten to the diver doll recording that Cole just inserted into the talkument (for clarity, different recordings are separated with a paragraph return--they would be heard as continuous talk):

<<He has flippers:: and goggles and a pump {PRN pumx} thing that he put on from there (.) on his body (.) (inaudible) get some air, *and he got - and he got flippers. He's a *tall man (.) tall feet man. That's it.>>

<<a starfish and I got: a shark and that's it.>>

<<I sa:w>>

One edit often begets more edits, as Cole is finding. I help him sprite words that will anchor the now floating fragment, "a starfish and I got: a shark."

⁵¹ But Cole did manage to say it, in contrast to other words or syntactic forms I encouraged him to adopt in his spriting. A week later I introduced embedded clauses to him by rephrasing his words, "My sister Desiree, who is three years old, loves me." He maintained his description in his subsequent spriting, "My sister is three years old and she loves me." Frankly, I like his way better.

Tara: Ok. So now - now that you've described let's listen to this now that you've described what your man looks like (.) then this starfish and shark you need to introduce (.) this with something like I *also got a starfish and a shark.... So (.) can you add something here {Tara points to the starfish and shark sausages} that says (.) I got. Can you just say I got? I *also got. I *also got.

Cole: I also got (.) a star-

Tara: Go ahead

Cole records this small fragment much like an edit one would make in writing:

[1085427957810.wav] (.) I also got

When Cole and Tara relisten to the spriting sequence again, the fragment added serves to unite the description of the diver doll inserted amidst the original statement of "I got a man, a starfish and a shark":

<<I also got a starfish and I got (.) a shark. //I saw::>>

<<whales and penguins swimming and eating>>

Editing can have a cascading effect. Through spriting, Cole experienced how one might need to mend small local relationships that have been broken through large edits.

5.3.5.8 Reorganizing Spriting for Global Coherence

Auding always served to remind Cole of things he wanted to add to the composition ("Oh! I forgot something"). Thus, Cole's process of spriting was much like a some theorists believe the writing process works (Young and Sullivan 1984): writers externalize ideas in text and then review them in order to generate new inferences that perpetuate and extend the process. In this example below, Cole wants to add something very important (about where each one of his siblings was physically located in his home) to the composition after we auded what he has done already.

Cole: Wai- I didn't say the part where my sister was sleeping. Didn't say the part where my //sister

Tara: //Ah.

Cole: was sleeping.

Tara: Why don't you record the part about your sister and then we'll move it in here (.) ok? ...

Cole sprites the following recording:

[1085429003623.wav] {VOC mouth sounds} Alright. {VOC inhale} My sister Desiree she was sleeping on my bed (.) and that's it.

This iterative invention process puts a heavy burden on editing, as development is meandering and founded on periodic moments of insight. One of the main tasks I identified for myself when working with Cole was to point out how his local changes affect the global composition structure. Now we begin the difficult process of figuring out how to embed this new critical insight into his talkument. We determine where each of the sisters are mentioned in the talkument. Cole uses the spriting interface just as a letterate child would gesture to words on a piece of paper. He points to one recording and says, "That's Dominique," and points to another below it, "That's Desiree."

Tara: Now where does Desiree go?

Cole: uh

Tara: //Does she go here?

Cole: No she's right here {He gestures to the sausages he just spritten about Desiree sleeping on his bed.}

Tara: I know she's there but we gotta move her (.) we gotta move her um:: into position. (.) Ok. Here we go. Listen.

I replay a portion of the talkument where we believe the new spritten recording will fit. We both listen:

<< My brother was sleeping on the couch and Desiree my sister, a:nd >>

Tara: Right there that's it that's where it goes! Right here.

I replay it again and make a split right after "and Desiree my sister."

Tara: Right here. We're gonna drag this, watch that,

Cole: Yeah

Tara: Drop it in there,

Cole: Yup

Tara: Now listen. Let's see how this flows.

I replay the edited talkument section and we aude:

<<I::>>

Cole: Oh it half of it. There's half of it right here!

Tara: That's alright.

<< My brother was sleeping on the couch and Desiree my sister My sister Desiree she was sleeping on my bed >>

Tara: Ah (.) perfect! Stop it stop it. If you delete this (she gestures to the sausage containing "Desiree my sister") it will all work.

Cole: Alright.

Cole deletes a sausage and then he replays the section of the talkument we edited all the way to the end.

<<My brother was sleeping on the couch (.) My sister Desiree she was sleeping on my bed and then my - my - my - my sister Dominique she was sleeping on the top of the bed and CJ and I came up they were playing ... >>

Cole uses the spriting interface to create and manipulate relationships amongst large and small structures of spritten language. He begins to recognize that this object, a talkument, should have an internal logic to it to guide potential listeners through his ideas.

Through the spriting tools and the scaffolding I provided him, Cole was able to talk about language (meta-communicate) in ways that are predictive of later literacy skills (Young and Sullivan 1984; Snow 1983, 1991; Pellegrini and Galda 1996; Dyson 1983). But I think the concepts and activities Cole engaged with, as illustrated particularly in the sections *Editing for local coherence* and *Reorganizing spriting for global coherence*, are not just *predictors* of later literacy skills, but are the actual exercising of what is considered literacy skills. It will take many more years before Cole will engage in editing activities like this through text. But with scaffolding that moves Cole towards conventional composition activities yet respects the language he already controls, Cole engages in sophisticated cognitive operations with elements of language through spriting. He considers the socio-political ramifications of his compositions and chooses them to appeal to the widest possible audience he can imagine. He practices recontextualizing his parents and peers words to suit his own purposes, and he uses strategies like repetition to emphasize and develop ideas important to him.

5.4 Experiencing the Process

For the purpose of this discussion, let's distinguish two different kinds of learning. The first is actually learning to do something; for example, learning how to sing. The second kind of learning is to be conscious of *how* one actually does that thing. This distinction might be related to Karmiloff-Smith's concepts of implicit and explicit knowledge (1992).⁵² She writes that the ability to do something (implicit knowledge) can disappear for a time as the knowledge of how to do this thing shifts to making hypotheses about how one actually does this (explicit forms). Although both types of learning are not required for action (obviously, just learning how to do something is sometimes enough), it is sometimes critical to know how one actually does it. And certainly for people who really care about doing something well, it is a requirement to understand one's process from an analytical perspective.

I heard my first opera during a summer music class held in Vienna, Austria when I was 19 years old. I stood in line for six hours to get standing room tickets for Mozart's *Così fan tutte* because it was something new, and everyone I was hanging out with at the time thought it was cool. That evening when the mezzo-soprano singing the character of Dorabella began her aria "Ah scostati...Smanie," front center stage, I stood mouth agape as her voice rang through the core of me. I enrolled in voice studio that Fall, determined to make my voice sound like Dorabella's. It took me several years, probably eight, to realize that the goal of learning to sing is not to duplicate someone else's fabulous voice, or even to make an enormous sound, but to learn to do simple things all over again: how to inhale, how to exhale, how to open my mouth, how to walk, how to stand — all things I thought I knew how to do already! Prior to formalizing my singing technique, I only breathed, walked and stood. I didn't know *how* I did them, and as a result, I could not change or control them when I needed to.⁵³ Focusing upon how one goes about doing something even as natural as breathing can turn into an intellectual pursuit lasting for one's lifetime. If one cares deeply about the doing as I did and still do about my singing, then it is not a choice, it is a necessity.

For a singer, it is important for the perpetuation and perfection of one's art to learn how one sings. A singer's instrument is the body and mind itself, subject in a unique way to the vagaries of weather, sickness, tension and stress, alcohol and smoke, lack of energy, hope and will. There are days when you have to perform but your voice is weak and scratchy or you have a flu that fills your head so that you can't hear yourself. On those days, when the voice is not effortlessly and simply *there*, you have to approach the singing very technically, with a conscious knowledge of how it is you produce a trained sound. All normal and expected bodily and acoustic landmarks are missing, so you have to know how to activate them if they should be involved but respond sluggishly, or keep them deactivated if they are actually superfluous to the singing process. When you can sing well even with a flu or raw voice, this is when you have learned to sing, and learned *how* to sing.

⁵² Sometimes this knowledge is referred to as meta-discourse or meta-awareness.

⁵³ My ability to breathe, walk or stand never disappeared for a time as I developed hypotheses about how I did them. They did, however, become awkward. There are probably many more ways of externalizing internal knowledge than Karmiloff-Smith accounts for.

Likewise, spriting allows students to discover habits of the literate mind that they may already do when writing, just as standing and breathing are parts of the singing process, but do not understand or identify as actions involved in composing. Spriting forces them to think about—and potentially develop new hypothesis for— how they go about composing in new ways.

5.4.1 Pausing to Think Makes Different Sounds

Many children become frustrated when spriting—and even frightened away from trying to sprite—by the immediacy of the task. They find that the words they expect to be there are *not* there. They fall into a silence they find uncomfortable, even unbearable. Because children talk easily when they respond to adult questions or when they converse with their friends, they seem to expect that words will always emerge to accomplish the task they have set out for themselves. When they watch television, they see people who seem to know what to say upon being asked. They see politicians answer questions with little to no pause. We have few visible, public models of people actually pausing and thinking before talking. Therefore, it is not surprising that children, even if they have very little experience writing or spriting literate compositions, do not expect that words might take time to come, or even could fail them.

In writing, the time to get something down on paper or screen is much longer than speech (300% to 400% longer even for an expert typist let alone a child learning to control a pencil or keyboard). Therefore, the time spent thinking and planning comes for ‘free’ while a child struggles with mechanical production. As such, writing may be less conducive to recognizing how one takes time to think while composing. Conversely, the spriting composition process is so fast that children must make thinking much more conscious, a deliberate part of their composing process.

I saw many children struggle initially with the fact that they could not say everything they wanted to in one long, synchronous recording, as they felt they did when writing. Very few children were able to sprite for long periods without stopping to think, although some invented some unique ways to compensate for their inability to invent and produce spriting continuously. They would get frustrated at their self-perceived lack of fluency, erase everything and start over again. I encouraged many of them to take intentional and conscious moments for thinking.⁵⁴ The idea that thinking is doing something had not seemed to occur to them before. Writing may be less conducive to cultivating the habit of mind to pause consciously and take time with composition. Thus, spriting seemed to help students

⁵⁴ This kind of thinking activity is often called “planning” in the writing process literature, but has unfortunately been co-opted in most school settings with highly structured activities for purposes of global planning (e.g. outlines, templates, concept maps, et cetera) that should occur “first” in the composition process. Though these devices can be useful, they do not supplant the need for consideration throughout the composition process, sometimes called “local planning” in writing composition research. Furthermore, the value of these kinds of global planning devices might be more recognizable, and even more necessary, in the spriting process than in the writing process, when children discover for themselves how useful broad composition plans are when writing mechanics are not the primary obstacles.

learn aspects of composition that they may have performed implicitly while writing, but had not realized they did so in such a way as to use it flexibly.

In spontaneous speech pausing is a variable phenomenon, dependent at least on what one is trying to say and the familiarity of the conversant. Frieda Goldman-Eisler claims that pauses in speech provide an external window on internal cognitive processes (1958). She showed that pause lengths increase with task abstraction and 'explicitness' (a product of how familiar the conversant) required. For example, subjects spent almost twice as much time pausing when explaining the meaning of a picture as when describing the picture. Subsequent studies on pause in speech have found evidence of at least two different classes of pauses (probably many more), a bewildering level of individual variation in data, and interconnections amongst social, cognitive, memory and language variables to speech production (Kirsner et al. 2002).⁵⁵

In the next sections, I describe high-level observations of pauses in children's spriting production that pertain specifically to composition. I use different student cases, each of which looks at the phenomenon of pause in spriting from a different and surprising perspective. While none of them illustrate the general case that students have to learn how to pause, they are intended to complicate our notion of what 'pausing to think' should be. These cases make clear that a single, global approach to pauses in spriting (pedagogically, technological support, etc.) would not only be difficult to achieve in practice, but might also be undesirable from a child's perspective.

5.4.1.1 Madeline Likes Her Pauses

In the fourth week of spriting class at the Molière Elementary, I devised a fun activity in which I hoped the children would learn to edit their work, particularly to remove what I considered as long and unnecessary pauses. They were to create a talkument with three short stories. If any story exceeded four spriting lines in length, they were to edit it down. Friends could be used to help figure out what might be eliminated. A paragraph was to divide each story. The best story was to be placed first in the composition (by dragging and dropping). Although complicated, the children understood these directions and produced some material that was amongst their best work for the entire spriting class.

Eight-year-old girls, Madeline and Emily, finished quickly and were the first to listen to each other's compositions. I instructed them also to point out long silences to their partner. Emily must have commented to Madeline that her composition had too many long silences. Madeline motioned me over to discuss this.

My composition has many long silences. Do I have to remove them? She said.
Actually, I like the silences.

Why is that? I asked.

When I talk I often use long silences.

Well, just because your talk has long silences doesn't mean you want your composition to be exactly the same. The person listening to this will not be able to look at your face when hearing your talkument, they can only hear your voice. Sometimes when you

⁵⁵ Goldman Eisler divides pauses into two classes, long and short, as much for the inability of her equipment to distinguish pauses lesser than 100ms as any theoretical or experimental motivation.

aren't saying anything, your face says something instead. But in a talkument you can't use your face. So make sure that the silences are useful. (Obviously I didn't get her earlier point, so she tries to restate it differently for me).

I also use a long pause before something scary. So, I prefer to keep them.

It hits me. She's referring to the use of pauses for dramatic effect, a performance issue an oral storyteller would be very concerned with. I said, You provide some good reasons for having silences. If you like them you should keep them. Listen to it once more and notice if all the silences are good, or if you want to remove some to make the remaining ones special. Anything done too often becomes repetitive.

She nods and turns back to her work.

Using pauses for dramatic effect demonstrates a mature sense of verbal storytelling. Pauses are not always emblematic in spriting of an internal cognitive struggle to produce words. If these dramatic pauses were removed—or even shortened—automatically by spriting technology, children like Madeline might be resentful.

5.4.1.2 Niesha's Beats as Pause

Niesha, an eight-year-old child at Umoja Elementary, had a gift for beats. These beats consisted of lip smacks, purses, sucks, kisses, clicks, hummed bars from songs, and more, all merged together into a drum rhythm that accompanied her talking spriting. It is not coincidental that Umoja students studied drumming in music class. Many of them were able to create inventive, spontaneous rhythms with their mouth and vocal instrumentation. Certainly a familiarity with rhythmic talk as heard in rap, hip-hop and varieties of jazz music also add to their ability to improvise these sounds. But Niesha was particularly gifted amongst her classmates. She enjoyed making her compositions a continuous, unbroken weave of rhythm, talk and song.

I like (.) hmm {VOC mouth sounds} (7.4) I like spaghetti, {VOC mouth sounds} I like chicken {VOC mouth sounds} spicy chicken {VOC mouth sounds} I like Chinese food, the rice the Chinese rice and the (.) red - no the orange chicken (inaudible) they are so good if you eat em your mouth bam! if you eat the orange chickens. {VOC mouth sounds}



Example of beat.wav

Table 10 Transcription and sound file (in RIFF Wav format) of an excerpt from Niesha's sprittings.

She sprited the first in a series of talkuments in which she uses descriptive and journal-like talk coupled with these drum-like mouth sounds and excerpts from songs. I asked her what the rhythm was called and she said, "It's a beat." Her beat is impossible to transcribe to text—there is no linguistic translation. In Table 10 I provide a textual transcription and a sound file of an excerpt of Niesha's composition. The textual

transcription inadequately accounts for what Niesha was doing. The (inaudible) mark in particular, and the {VOC mouth sounds}, often stands for sections of spriting that simply have no textual equivalent.

Table 10 demonstrates a segment of one of Niesha's talkument in which she recalls foods she likes and its effect upon her. In between each mention of a food, she made a little 'beat.' Niesha seems to use beats as pausing time. While she performed a beat, she could think about what to sprite next.

Niesha intended to make long talkuments. She bragged about the great length of her spriting multiple times to me and to her teacher.⁵⁶ Her composing approach was more like 'chunk insertions' than 'bits and pieces.' Children who took this longer, more spontaneously intensive approach devised different ways of dealing with the need to plan what they would say next. While Niesha did have silent pauses in her talkuments too, she used her nearly automatic ability to make 'beats' (including sounds she makes with her mouth, song excerpts, and small bits of Americana like Peace, Ho Ho Ho Merry Christmas) to fill in between talking spriting statements. The effect is a kind of stream of consciousness flood of verbal and sound images from Niesha's life experience.

5.4.1.3 Time Enough to Undermine Oneself

The first day I met Tupac, age seven, at Umoja Elementary, he was a part of the group of students spriting a story in round robin style. I used this game to acquaint the students with the SpriterWriter. Tupac had gone to public school the year before and it was explained somewhat mysteriously to me that it had not gone well. He was a sensitive child with low self-esteem, compelled to follow the lead of his more gregarious classmates. When it was Tupac's turn to speak at the microphone, he paused and tried to think of what to say. Most children pulled lines from favorite television shows or sang some lines from a favorite song. There was little order and certainly no coherence in this story he could draw upon to structure a response. By the same token, he was free to say absolutely anything. Tupac couldn't think of what to add to this. As the silence mounted, his eyes grew wider from fright and panic. He quickly repeated what one of the other children had gotten a laugh out of and passed the microphone away. For the next three weeks, Tupac flirted with spriting. He would sometimes volunteer and I would sometimes ask if he would like to do something. He would inevitably run away screaming, "This is too hard! I can't do it!" But the fact that his friends were interested and having some success with spriting pulled him back again and again.

Nearly a month after introducing the SpriterWriter to the Umoja students, Tupac again volunteered to sprite. We sat down at the computer and he said, "Do I have to write a story?" I said of course not, you may sprite whatever you like. I asked him what he would like to do. He didn't know. We talked of several things, we opened the SpriterWriter interface, and talked about word spellings and other sundry details. And as suddenly and

⁵⁶ It seems ironic how ridiculous our aims for writing are when we see children move our superficial developmental measures into another media like spriting, in which they are easily achieved. Clearly we are propounding the wrong aspects of composition when we are so fixated on size rather than quality.

unexpectedly as Tupac volunteered, he announced his composition intention. He missed Ruben, a student who had departed two weeks earlier, and wanted to write him a letter. He also made very clear that he wants to *sprite* his letter, not write it. Composition is difficult enough for Tupac without introducing the secondary issues of spelling and letterforms.

Tupac: Well I wanna write about Ruben and send it to him.

Tara: You wanna write about Ruben and Cindy?

Tupac: (inaudible) - I like - print it and send it to him.

Tara: Ah:: Ok. We can do that. Why don't you write a letter. If you *want we can send him - um:: (.) you could - you could write it in your voice or you could write it (.) there.

Tupac: Ok.

Tara: You can compose it first of all (.) in the Spriter and then you can write it. Or you can just write it (.) whatever you find easiest.

Tupac: I wanna *say it.

Tupac has no experience with letters. He, like most of the Umoja students I spoke with, had no idea that letters begin with a salutation to the person addressed and end by signing or declaring of one's name. We learn how tenuous Tupac's commitment to the letter is when he immediately begins to find reasons why he couldn't possibly compose one. I can't spell! I don't know where Ruben is! I don't know what to say! When Tupac pauses he has time to consider his own self-doubt. He realizes that he is stepping into a foreign territory with contours and borders he cannot identify. He is lost and scared. Our conversation is extremely important in helping him realize that he does know enough to write a letter to Ruben, is capable of putting words to these ideas, and helping him step through the task while subduing his continuous verbal assaults on himself.

Tara: Do you know how to start a letter? Did you ever write a letter?

Tupac: No -

Tara: Did you -

Tupac: But I don't know how to spell

Tara: You don't have to spell anything right now just write your letter (.) by talking it. So if you were going to talk your letter what would you say. (.) Dear Ruben right? It starts that way

Tupac sprites:

[1081201267139] Dear Ruben w::ha:t wait

Tupac: I don't know what -

Tara: Let's fin-

Tupac: I don't know where he is again!

Tara: Well why don't you ask him that (.) that can be a question

Tupac: I -

I try to help Tupac break the task down into manageable pieces – a bits and pieces approach to letter-writing. Tupac suddenly changes the subject and tests my ability and commitment to guide him through the letter.

Tara: So start with Dear Ruben and press stop - stop record. Start with that.
Tupac: (inaudible) I can't stop thinking about Alaska!
Tara: Alaska!
Tupac: I keep on thinking about Alaska
Tara: Why (.) did Ruben go to Alaska?
Tupac: No::
Tara: Then what's Alaska {VOC short laugh}
Tupac: Alaska is a state.
Tara: Yes.
Tupac: And its cold there
Tara: Yes.
Tupac: And its (inaudible) My Daddy went there and died.
Tara: Really!
Tupac: He didn't eat for forty days. Or forty - or fifty - well he didn't eat for fifty nights
Tara: Wow. (5.0) It's a far away place isn't it.
Tupac: Yeah. (.) I don't know what to say.
Tara: Ruben was your friend right. Why don't you just tell him about your life
Tupac: Cause - my life he already knows what my life is
Tara: But he knows - knows
Tupac: {QUAL loudly} My life is - is a disaster!
Tara: No::! {QUAL imitating the dramatic prosody of his statement} A disaster.
Tupac: It is.

This was not the first time at Umoja that a child of very tender years used such despairing ideas to describe their state of being. I do not know if what Tupac says about his father dying in Alaska is true or not. The situation he paints is oddly reminiscent of the forty day and forty night fasting ordeals referred to so frequently in the Bible. It is plausible that Tupac is drawing upon significant church experience to flesh out a fictitious story of his father. Our conversation switches just as quickly from this diversion to Alaska back to Tupac's letter to Ruben. He still does not know what to write. When I suggest he tell Ruben about the daily, mundane and familiar rituals of a school he no longer attends, Tupac rails at telling Ruben something he already experienced—as though composing is only ever about the phenomenal, the outliers, the strange and unknown. Perhaps this is why Tupac radicalizes his life experience for me (his father's death in Alaska and the disaster his says his life is) in order to portray a crisis he believes is necessary for anyone else to be willing to read/aude his composition.

Tupac: I don't know what to do (.) I don't know what to say (.) I don't wanna - I don't wanna do another thing.

...

Tara: So its ok if you build this thing little bit by little bit. You don't have to know everything you wanna say right away. Often //you can figure it out as you go.

Tupac: //Why -

Tara: So why don't you start

Tupac: I don't know what to say

Tara: You know how to start right?

Tupac: Yes but I still don't know what to say.

Tara: Well (.) do you miss //him

Tupac: //kinda. Yes.

Tara: Why don't you tell him that.

Tupac: Yes but -

Tara: What did you do today. Was school exactly the same as he would remember it. Cuz you know he's somewhere else now. He might wanna hear about what you're doing. You can ask him some questions that you wanna know about.

Tupac: Like -

Tara: Cuz you don't know where he is why don't you ask where he is

Tupac: I wish he was here now.

Tara: You can tell him that too I bet he would like that. So you just thought of a whole bunch of things Tupac. Now you just have to put them down.

He makes another attempt at beginning, this time without pressing record, and immediately rejects his practice attempt. I again encourage him to use pauses in spriting with conscious intention.

Tupac: Dear Ruben (.) what are you doing. Na- ah!

Tara: What's wrong with that!

Tupac: {QUAL mumbles} (inaudible)

Tara: What's wrong with that.

Tupac: I don't know what to say.

Tara: Just start Tupac. Just start. Just do the Dear Ruben part and start recording. Then put another paragraph in and think of what you want to say next. You don't have to say everything all in one go.

He tries again to begin, using words and phrases that he does eventually incorporate into the completed letter, as shown in Table 11. But when he first records these thoughts he erases them believing they "didn't sound right." He tries getting out of spriting the letter to Ruben by switching to another activity. The teacher reinforces the spriting activity and

Tupac's own flagging motivation by giving him permission to do the LEGO activity only upon completion of the letter.

Tupac sprites:

[1081201593623.wav] Dear Ruben

Tara: Yeah. Press - How's it sound. Now what do you wanna say next.

Tupac sprites:

[1081201618201.wav] Is it fun where ever you are? And I miss you a lot.

Tupac clicks and listens to everything he's spritten and then deletes everything. He then records what seems to be a self-critique ("that's so stupid").

Tupac sprites:

[1081201634123.wav] O:k that's s:o stoop-

Tupac: This is confusing!

Tara: But Tupac why did you erase those. They were fine.

Tupac: No.

Tara: What was wrong with them.

Tupac: This is confusing. I wanna do a (inaudible) project

Tara: A what what what what?

Tupac: A Lego project

He elicits permission to do a LEGO project from his teacher when he has finished the letter. I ask him again about why he deleted the recordings.

Tara: What was wrong with it (.) why did you delete it

Tupac: Because it didn't sound right

Tara: Hm?

Tupac: It didn't sound right!

At this point I tell Tupac that I have a special machine that can translate his letter to text.⁵⁷

Tara: Once you make this letter to //Ruben

Tupac: It says //(inaudible)

Tara: Tupac listen to me //I have

Tupac: //It says (inaudible)!

⁵⁷ I told students that a machine is responsible for the transcription (even though I transcribe it by hand) because I do not want them to expect I will exercise human discretion and write what they intended to say rather than what they really did say.

Tara: a piece of magic software at home. And if you write this letter to Ruben I can take it home and put it in the machine and it will *spit out a text letter that we can print and send to him.

Tupac: Um hm

Tara: Um hm

Tupac: But if that's so (inaudible) {QUAL screams words} But its *not *right!

Tara: You keep erasing everything! My machine won't work when its deleted! You have to actually make your letter. You have to tell the machine what you want it to say

Tupac: Ok.

Tupac sprites four recordings in rapid succession and completes a short letter to Ruben. How did he manage? Knowing that he would not need to be involved in spelling and writing might have helped. Or he might have garnered enough ideas through our conversation to make sense of what is conventionally included in a letter. Or he might have recognized he had to finish this in order to do something else he wanted to do. While composing this letter, he does not aude the recording before making a new one, but plunges ahead in to the next one. This behavior is similar to an adult student who was also destructively self-critical of his composition efforts. Tupac sprites in the following order:

[1081201791561.wav] Dear Ruben

[1081201797592.wav] What are you doing (.) in where ever you are (.) Is it fun over there? Did you do any fun stuff yet because I miss you a: lot.

Tupac moves some sprittings ("Dear Ruben"), now at the end of the composition to the beginning, compensating for not deselecting "Dear Ruben."

[1081201820139.wav] An: Dar- I don't think Darrin's going to come back yet but I s::aw her I saw him, {PRN em} yesterday at:: at the park and he was doing, he was feeling {VOC inhale} (.) better.

[1081201839482.wav] And De:rrick: miss you too Ali and whoever's here, but except {PRN cept} Mikayla (.) and Mikayla and Niesha don't miss you.

Tupac: I'm done

Tara: How do you sign off on a letter and did you listen to it yet?

Tupac: Ok?

Tara: That was (inaudible) But how do you end a letter.

Tupac: With a period?

Tara: With a period? That's a sentence. How do you end a letter.

After he made this initial draft, we manage to work through a number of editing issues. Tupac decides that Ruben might feel badly about hearing that the girls do not miss him. He deletes that recording and adds another one about the boys.

[1081202426748.wav] Derrick:: an Derrick an Ali (.) miss you a lot: (inaudible)

He also was persuaded to sign his name, though he was sure this was a ridiculous measure as Ruben would know who it was. He recorded:

[1081202521951.wav] It's your friend Ruben you know who it is Tupac

I was enormously proud of his effort when he finished. The emotional effort Tupac expended to complete the letter inhered in the spriting, some of which is evident in the transcript (e.g. frequent false starts, wrong gender anaphora), and some of which is not (e.g. the sigh he heaves as he forces out the word "better," the tiny voice he uses on occasion, the overly measured way he marches through the words, et cetera). This was an effort of Herculean proportions for Tupac, but he saw it through to the end.

Dear Ruben. What are you doing (.) in where ever you are? Is it fun over there? Did you do any fun stuff yet because I miss you a lot. An:d {PRN an} Dar- I don't think Darrin's going to come back yet but I s::aw her - I saw him {PRN em}, yesterday a- at:: at the park and he was doing, he was feeling (.) better. Derrick:: and {PRN an} - Derrick and {PRN an} Ali (.) miss you a lot: (inaudible) It's your friend Ruben you know who it is Tupac

[Sound clip not included because of prevalence of actual names mentioned.]

Table 11 Transcription of Tupac's final talkument 'Letter to Ruben'

For Tupac, the pausing time required in spriting was too much time left alone with his own self-doubts. It allowed him to reflect upon the fact that he has never composed a letter before – how would he know how to do it right? Would other children laugh at his efforts? What if it wasn't good enough? It gave him time enough to realize his fears of inadequacy, which eat at him and threaten to derail him from his stated purposes. For students like Tupac, the pausing required in spriting composition are so personally unsettling that without the presence of another to scaffold or collaborate,⁵⁸ they simply cannot begin, or if they begin they cannot finish.

Spriting pauses are thought to be simply time to reflect inwardly to produce language for the purpose of some composition. But when the scratching of a pencil and the spelling of words is not there to distract, a child is left with his or her own emotional state of mind. If that is unsettled, unhappy, or desperately insecure, pausing is much more difficult than simply figuring out what words to say next.

⁵⁸ One boy at Molière had a similar sense of self-doubt and was very unproductive with spriting until he worked collaboratively with peers.

5.4.2 Building a Conversation with Oneself

Composition is likened to having a conversation with oneself. Vygotsky argues that thought itself is internalized social interactions (Vygotsky 1986); thus, learning to compose might begin as externally posing questions that eventually become part of an inner 'conversational' process. We learn to ask questions of ourselves and answer them.

At Molière, I often led the children in short discussions after I introduced an 'idea seed' for their compositions that day. One afternoon we were discussing the theme "sounds that you have heard." We developed questions in preparation for spriting about the subject. The children contributed, "Where are you when you hear them?" "Are you somewhere special when you hear them?" "Where is it coming from?" I added, "How do they make you feel?" and "What other things make similar sounds?"

Madeline asked, "You mean, we're supposed to ask these questions in our heads?" Yes, I responded, ask them in your head and sprite your answer.

At Umoja Elementary the connection between asking questions and answering them emerged as an explicit conversation a student had with herself through spriting. I was working with Mikayla, age 7, on a book report of Esmeralda's Missing Scarf, a Disney production with pop-out dolls and costumes in the back of the book. Mikayla owned this book and enjoyed playing with the dolls and dressing them up in different costumes. I introduced her to three questions that many book reports would answer:

Tara: What is the book. What is the book about. and then what do I think about the book. You can record each of those questions (.) and then you can answer them.

Mikayla: (.) Ok wait you mean like a ma:n (.) asking me that?

When Mikayla does record her questions, she uses a very funny grown-up voice, stuffed up and staid. When she responds, she uses her 'own' voice. In this way, she puts distance between herself and the questions (which after all came from me—a stuffy grown-up—and her answers). But also by voicing these questions, even in her funny grown-up voice, she makes them a part of her own thinking. Mikayla sprites the following recordings:

[1083102632624.wav] {QUAL grown up stuffy voice} Hi:: What do you think about the book:

[1083102648343.wav] I think {VOC inhale} that I like the book and I think that it's nice book, and I:: think (.) that's (.) it's:: (.) a good book because people can just sit do:wn, and rea:d and {VOC inhale} they can (2.0) make up a story from it. (5.2)

[1083102684859.wav] {VOC inhale} {QUAL teacher voice} So: you like reading books? *Don't you. {QUAL child voice} Yes, I do. {QUAL teacher voice} But! Do you know *why you like reading books? {QUAL child voice} Yes, I like reading books because (.) books give you a lot of energy, that help you read, and sometimes if you're bored you can read a nice book.

When Mikayla finishes recording this question-and-answer conversation with herself, she surprises me by suggesting that she delete the questions. I had not suggested that she ever delete the questions.

Mikayla: I wanna erase this one.

Tara: You wanna erase the question?

Mikayla: Yeah.

The story is about a girl who, (.) was consumed of finding her scarf, and, she: (3.0) danced at the end with her scarf, but before, (.) a unusual man fell into her tent, because he was unusual because she didn't know that he was coming. And she: danced around with her dress. And then after that, she started {VOC inhale} to: um in this story there was a (.) story about a young woman, named Esmeralda. She lived in the town and she woke up but she lost her scarf. In *this book, it has (3.6) {VOC inhale} s- it has a big (.) two: - one page in the front, and on the - inside of the book on - on the first page, there is, a big (.) purple (.) square and it has moons, cups, stars, and suns. {VOC mouth click} And, on the front cover, it has (.) uh (.) Black African American (.) {VOC inhale} woman and she has on a {VOC inhale} red dress, with purple (5.0) cloth, and, a waist cloth {VOC mouth click} and she has a little (2.5) crown and {PRN an} gold earrings, and, she has a little donkey, and, she has {VOC inhale} a purple scarf with stars and suns, (.) and moons. And its {VOC inhale} made by Disney. {VOC mouth click} The name of the book is Esmeralda's Missing Scarf. A Dazzling Jewels (.) book. {VOC inhale} {QUAL teacher voice} So: you like reading books? *Don't you. {QUAL child voice} Yes, I do. {QUAL teacher voice} But! Do you know *why you like reading books? {QUAL child voice} Yes, I like reading books because (.) books give you a lot of energy, that help you read, and, sometimes if you're bored you can read a nice book. I think {VOC inhale} that I like the book and I think that it's nice book, and I: think (.) that's (.) it's: (.) a good book because people can just sit down, and read and {VOC inhale} they can (2.0) make up a story from it. (5.2)

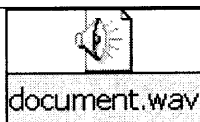


Table 12 A transcription of Mikayla's book report on Esmeralda's Missing Scarf. The original sound file is available in RIFF Wave format.

Mikayla realized on her own that the questions were there only to enable a process that could now be submerged. The answers could stand on their own. She deleted the first question she posed ("Hi:.. What do you think about the book:") but not all of them. She left the questions that she asked and answered within a single recording intact. If the editing

tools for making splits and deletions within recordings were simplified, she might have removed those questions too.

When Mikayla ceased working on her book report, the final product was over three minutes in length and contained more than three hundred words. The text of her questions and answers are highlighted in bold text in Table 12.


5.5 Learning about Literacy through Spriting

Working with text is believed to make salient the difference between surface structure (what a composition says) and its interpretation (what a composition means) (Olson 1977; Olson and Torrance 1985; Torrance and Olson 1982). One six-year-old girl encountered this difference through spriting.

Reading and writing is also thought to introduce how texts can enact things in the world, and its converse, how the world can enact certain changes in texts. This latter form is sometimes called censorship. As spritten talkuments were shared amongst children easily, they began to wield considerable influence within the school environment; thus, teachers exerted pressure on the talkuments to not mention certain kinds of things.

5.5.1 The Say-Mean Distinction

Mariah was six years old and already in the junior group at Umoja Elementary when I arrived. She was a precocious and engaging child, learning how to decode and write words, and a very able conversationalist and singer. Perhaps it was because she was just learning to read and write that Mariah didn't feel comfortable approaching spriting alone. She often worked collaboratively with Mikayla, one year her senior. Their collaborations were riddled with conflict, an outcome often beneficial from a literacy learning perspective (Pellegrini and Galda 1996; Pellegrini and Blatchford 2000). After a typical disagreement, this time about what was Stich's girlfriend's name was, Mikayla departed in a huff. Mariah was left on her own with a strong motivation to prove Mikayla wrong. She wanted to write a letter to Ruben, who had left the school a couple of weeks earlier and was a huge fun of the television show, Stich and Lilo, to settle the question. Motivated by indignant anger, she sprite her very first solo talkument as a letter to Ruben, as shown in Table 13 below.

<p>Ruben. Hi Ruben, is Stich girlfriend's name - um darn I forgot the name, um is Stich girlfriend's name Angel? Yes or No? Bye Bye. I see you whenever you come back.</p>	
	
<p>document.wav</p>	
<p>Table 13 A transcription of Mariah's letter to Ruben and the final talkument in RIFF Wave format.</p>	

I promised Mariah I would transcribe it to text. After I had done so, we went through it together. Since Mariah couldn't yet read, we worked through the letter word-by-word, I

pointed at each word and read it out loud for her. When we were done I turned to Mariah to ask if she wanted to make any changes. Her face was smoldering.

Tara: So what should we do

Mariah: Nothing.

Tara: Why are you angry

Mariah: I'm not angry. If I was angry I would look like this.

Tara: {VOC laughs} So what does your face say. What are you.

Mariah: I'm just that I did not say the one on the *top. I did not say - I did not say -

Tara: Listen. Tell me what you said then

Mariah: I said Ruben hi Ruben (.) is Stich girlfriend's name Angel yes or no::

Tara: Its not what it says

Mariah: Well *you did it wrong

Tara: *I did it wrong! I only did exactly what you said. If you doubt me (.) you listen to it yourself

Mariah: You write too much lines!

Mariah was furious that I had written everything she had said, including the meta-commentary "um darn I forgot the name." Her classmate, Derrick, listened to her talkument letter and verified that Mariah did indeed sprite, "um darn I forgot the name." But Mariah was still angry. Clearly she had not *meant* for the meta-commentary to be a part of the letter—and indeed, a conversant would overlook that as a meta-commentary upon her processes of memory recall. But she was spriting, not talking; she had recorded it and left it on the record. I reinforced the 'say-mean' distinction by transcribing each word, and her peer reinforced it by referring back to the spriting record to verify what Mariah had said in the 'permanent record.' Children can learn about certain features of literate composition that have to do with permanence and invariability of record, such as the say-mean distinction, through spriting.

5.5.2 Censorship and audience

Niesha, eight years old, was an avid spriter from the first day I arrived at Umoja. She enjoyed singing, talking and making beats in a kind of diary form. Very early in the research, she made an exceptionally long talkument that began with a favorite advertisement from McDonalds. In Table 14 I provide a transcription of a single recording Niesha srote for this talkument. In this recording she moves through subjects as vast and diverse as food she likes to a teacher she doesn't like.

Even though I was not planning to inform her teacher of her indiscretion, I was worried about her berating one of her teachers in her talkument. When language is permanent and available to be heard and communicated by many people, it can receive not only accolades but also ignominy from corners farther and wider than the author would have anticipated. I was worried that Niesha's musings would offend the teacher and principal. But I also desired that Niesha learn to be rhetorically aware of her intended, and also potential, audience.

When she was finished with the talkument I asked her what she liked best about the talkument and whether she would want to write down anything. She liked the part where she criticizes her teacher and would want to write it down. I asked her if she thought her teacher would be hurt if she played this for him. She thought yes, he would be hurt. We spoke more about these issues from a philosophical standpoint, but I took no action or made any recommendations to her about what she should do about the talkument.

When I returned one week later, Niesha earnestly —urgently— wanted to sprite. She said she needed to “fix” her piece from the previous week. When she sat down at the computer, she opened her “McDonald’s” piece and began listening. She did not make light conversation as usual. Something heavy seemed to weigh on her mind. She made three careful splits in the recording and deleted a sizable portion of her spriting. In Table 14 below, the portion Niesha excised is shown in **bold text**. This was the part where she spoke ill of her teacher.

{BEAT Welcome to McDonalds may I take your order (.) Big Mac a T_N_T (.) four quarter french fries milk shake can I get an apple pie (.) Welcome to McDonalds may I take your order (.) Big Mac a T_N_T (.) four quarter french fries milk shake can I get an apple pie (.) Welcome to McDonalds may I take your order? Big Mac an T_N_T (.) four quarter french fries milk shake can I get an apple pie (.) Welcome to McDonalds may I take your order (.) Big Mac a T_N_T } I like their chicken nuggets, their french fries their burgers, their drinks, their (.) whatever they got, I like their toys that they give out}, let's see (.) Chicken McNuggets! An let's see what else oh yeah I like tacos, not from Taco Bell cuz it'll make me throw up. I like (.) hmm {VOC mouth sounds} (7.4) I like spaghetti, {VOC mouth sounds} I like chicken {VOC mouth sounds} spicy chicken {VOC mouth sounds} I like Chinese food, the rice the Chinese rice and the (.) red - no the orange chicken (inaudible) they are so good if you eat em your mouth bam! if you eat the orange chickens. {VOC mouth sounds} Ho Ho Ho Ho Merry Christmas. I love Christmas, cuz I get everythin- every present that I want want want but I know sometimes I think I think Santa is not real but sometimes I think my mommy just buys the - my toys everything that I don't want, and some things that I do want, but that's ok cuz I got me a chain, I got me a bracelet, and I got me a five rings, and I got me (.) an (.) sixteen bracelets an I'm off the chain oh yeah! And I got one of those um little skirt - I mean yeah skirt (.) shorts and I have a great school only if **Brother Gene was out of here. And wait - Sister um Sister (inaudible) back in here then there would be real for always making plan a field trips but Gene just does {PRN doos} nothing and tell us that we can't have recess. Don't be bad. Do this. Go get me some water. Do this. Do that. Ain't anybody ever going to get me some water? Uh I'm tired of hearing all of that. He gets on my nerves sometimes.** Sometimes I don't like my cousin Precious but she's a pain like my grandmother always says I'm a pain in the butt. {VOC laughs} I like McDonalds. My family likes McDonalds. Ya pa ta pa ta pa ta {VOC mouth sounds} {NVC mic noise} {BEAT (inaudible)} I got the Cat in the Hat. I got me a Playstation2 I got me an XBox, and aft- the only game I need I just needs some games for my Playstation2,

I need some games for my GameBoy, I need some games for my GameCube and all I need is my (.) Xbox some games for my Xbox I don't getting that Scooby Doo one, yeah yeah yeah yeah yeah yeah except for the except for the (.) um Xbox one, I'm getting everything else but not that one I said I love my - I love my computer love my house. I love my computer screen the big flat ones (inaudible) but everybody else like the white ones I like the black ones black ones are screen are screen TV in the PC room I love it I don't like the other room because it only has one flat screen in it. Now in the PC room has a whole *bunch of em. Well thank you. That's all. Goodbye {QUAL in the background some said that's a short story}

Table 14 Transcription of one continuous recording in Niesha's talkument srote on March 28

I do not know what motivated Niesha to excise that portion from her talkument. It is entirely possible that word of what she had said got around to her teacher and he was angry with her. Spriting was shared between children even when I was not there. Perhaps also the fact that I was monitoring her work and my cultural capital as a researcher from MIT lent her spriting a value greater than even what her writing might command within the school community. Regardless of what or how, Niesha experienced the power of composing and the very real repercussions of using that power when one is in a position of subordination. This in itself is not a bad lesson to learn, as sensitivity to real and potential audience is a good thing. The flip side of this is the dampening effect it has on children's approach to composition. In Niesha's case, as soon as she was finished editing out the offending portion of her talkument, she retreated to reading someone else's words to the Spriter, an inane and ridiculous reading primer ("Al is big. Al ran and ran. Dot has a hot dog. Al hid. Al ran to Dot."). I cringed to hear her relinquish her own bold voice for such drivel.

We must be concerned that the effects of our censorship of children's own words, albeit inappropriate and sometimes mean, do not cause them to appropriate language far beneath them—language simplified, stilted and lacking in creativity—but nevertheless sanctioned by School as appropriate for children.

6 Children's Talkuments Approximate or Exceed Texts: An Exploration of Literacy Correlates

How are talkuments and texts similar and different? Research on differences between talk and writing, and also dictation and writing, inform our expectations about what differences to expect between spriting and writing products. For example, increases in textual word counts are often used as positive correlates to writing improvement. Likewise, increases in sophisticated vocabulary in writing are positive correlates to improvement in composition skill. Can these correlates to literate development inform about important differences between talkuments and texts? Do they suggest how spriting might be best incorporated in to children's education?

Previous research predicts that talkuments will be longer than texts. Speaking is much faster than writing. Spoken compositions made by skilled adult composers with IBM Dictaphone technology are nearly twice as long as their written texts (Gould 1982), while the time spent planning remains a stable 2/3 proportion of total composition times regardless of mode, and product quality and effectiveness are judged to be similar if not biased towards spoken compositions (Gould and Boies 1978). But spoken letters can exhibit more poor word choices even while overall coherence is maintained (Gould 1982) presumably because faster and less flexible production requirements limits the points at which one can plan, and editing tools are not well-developed enough to permit lexical substitutions in spoken letters.

Other studies assert that writing produces superior quality results to speaking or dictating, even though the word counts of speaking and dictating are higher. Because production requirements of writing are so slow, some argue that this provides time to synthesize the production of ideas, making writing more complex, coherent, and integrated (Chafe 1982; Scardamalia, Bereiter, and Goelman 1982). Scardamalia, Bereiter, and Goelman found when comparing 4th and 6th grade children's writing versus dictating performance that it is only when the experimenter prompts the child in a conversational manner (backchannel cues) to continue composing, word counts increase across all modes such that texts can then be judged to be of higher quality (1982). Therefore, to be judged superior to spoken constructions, writing activities must be merged with conversational contexts and cues.

Previous research on vocabulary in talking and writing leads to similarly inconclusive expectations of differences between talkuments and texts. On the one hand, talking is most often used interactionally and characterized by a more casual register, high frequency, and shorter words, leading to a prediction that spriting would exhibit a less rich vocabulary than writing. For example, the 3,000 most frequently spoken words account for 99% of mother-to-child directed speech (Weizman and Snow 2001). And for adults, written and spoken vocabularies rarely overlap, and written words are longer and have more syllables (Phillips 1968). But there is also reason to predict that children's spriting will contain more unusual words than writing. Differences observed between writing and talking

can be seen as 'styles' with features (e.g. register, complexity, interactivity with audience) that can vary in response to social context (Tannen 1982). Western contexts for writing simply have had more occasion for formality than talking contexts, but this should not be seen as deterministic of writing and speaking content. Furthermore, children can be hesitant to use new, less familiar words in their writing because they do not know how to spell them. From this perspective, we might predict spriting to exceed writing in vocabulary sophistication.

A powerful model for children's early writing is their conversational experience. This might impact the use of particular word types. An early developmental feature of young children's writing is the prevalence of "and" (Committee 1999). For example, children might write "I got up and then I brushed my teeth and then I got dressed and then I ate breakfast and then I went to school..." basing their narrative less on the as-yet-unfamiliar structure of sentences than the limits of their breathe—a limitation missing when they write. In conversation, they might also use "and" as a discourse marker to hold their turn at talk while they think of what they want to say ("and...and...and"), indicating a desire to say something more (Schiffrin 1987).

Counting "then" mentions might serve to triangulate how the use of "and" is functioning in the children's compositions. The use of these two words together might differentiate a narrative genre, in which establishing temporal relationships is important, from a poetic one, in which temporal sequence is less important. If there are both "and" and "then", I might theorize that the children are engaging in early forms of sequential narrations. If there are more "then" but few "and," they have learned more sophisticated ways to transition their narration. If there are many "and" but few "then," children might be using "and" in other more conversational ways. Can the relative presence of these words in talkuments and texts inform about whether children take a more conversational approach in spriting as compared to writing?

Using texts and talkuments written and spritten by children, ages five to ten, at two culturally and socio-economically different schools, I present quantitative cumulative data and two comparative case studies to build theory about spriting and writing. This chapter uses correlates common to writing research: composition length, word counts, aspects of word choice, vocabulary richness and other quantitative measures.⁵⁹ Some indirect measures used in literacy evaluations, such as the measure of grammatical complexity based upon sentence units (Hunt 1965), are not directly applicable to a talkument context in which prosody serves in place of punctuation. At this nascent point in spriting development, the mapping relationship from one to the other is not well-specified enough.

⁵⁹ Standardized testing is increasingly requiring students to demonstrate ability with extended composition by adding an essay component; those essays are being graded by computer programs that use indirect measures to evaluate them. These programs do not understand what a student writes. In order to maintain some shred of justification in the writing process as it is realized in school, we need to remember constantly that composition is judged in the world for everything from its effectiveness to the self-satisfaction it gives its author, of which word count, vocabulary, and sentence length might contribute, but do not themselves constitute. Until we develop better ways of assessing and responding to a student's words with integrity and respect, it is important to also stay "close to the data" while employing indirect measures.

Differences between children at the two different schools lead to strong predictions. The children differ in average age; older children would be expected to know more vocabulary and compose better. Secondly, the children differ in socioeconomic status (SES). One of the most confirmed results from educational testing is: children from higher socioeconomic (SES) backgrounds have larger vocabularies than children from lower socioeconomic backgrounds (Chall and Jacobs 2003; Chall, Jacobs, and Baldwin 1990; Snow, Burns, and Griffin 1998; Moore and Goldstein 1986; Biemiller 1999), presumably because of environmental differences and varying opportunities (Hart and Risley 1995), which are particularly salient up to grade three (Biemiller 1999). Given instruction, however, all children are capable of adding new vocabulary at a normal rate (2-3 words/day, 750/year on average) (Biemiller and Slonim 2001), regardless of their environmental differences, meaning that 'catching up' from early disparities is difficult without intense remediation. Early differences tend to persist (Chall and Jacobs 2003). Therefore, I would predict high socioeconomic status (SES) students at Molière Elementary to have larger vocabularies than the low SES students at Umoja Elementary not only because of differences in SES but also because the children at Molière are slightly older on average.

But differences between children might also allow us to see things we have not been able to see clearly before. Does spriting allow us to appreciate children's knowledge who might not appropriate writing quickly or as deeply? I compare vocabulary use within schools, but across modes, to discuss what these children can do now in one mode and not the other. As such, this study affords an unusual perspective on the vocabulary usage of preschool to children in grade four. In particular, it provides a different portrait of low SES children who are often portrayed in literacy research as 'deficient' because of their performance in writing. Interestingly, problems with tools and methods for literacy research emerge from these comparisons too. Vocabulary richness is often assessed by testing a child's knowledge against a standard list of words, catalogued and matched to grade level.⁶⁰ But these standard lists are so antiquated and biased by particular perspectives, they do not well identify 'sophisticated' vocabulary in any child's spriting and writing.

Factors related to the design research methodology make some comparisons difficult if not impossible. The children produced talkuments that vary enormously in genre and intended function. Therefore, it would be difficult to make a global evaluation such as 'quality' or 'effectiveness' that would serve to compare reliably across compositions. Indeed, even comparisons across spoken and written modes of effectiveness within homogenous genres (letters and memos) had high individual variation amongst judges (Gould 1982). There are potential issues with validity too. For example, do the material qualities of the talkument receive more consideration than the textual material qualities due to a novelty effect? For these reasons, I first present two case studies of one student from Umoja Elementary and one student from Molière Elementary to demonstrate differences between

⁶⁰ The Living Word Vocabulary list (Dale and O'Rourke 1976) that I use in this article as a benchmark of vocabulary richness was published in 1976. I note it has a White cultural bias and rural perspective on the words assessed. As well, it does not consider the many new technologies and forms of entertainment that children engage with on an everyday basis in the twenty-first century. See also Biemiller's critique of the current poor state of tools for vocabulary learning, teaching and assessment (2001).

writing and spriting products from a global and holistic perspective. By looking first at specific examples of students' work, I hope to convey a 'feel for the data' before presenting quantitative comparative data. Secondly I present quantitative cumulative results across variables commonly used as correlates to literacy. Thirdly, I look at specific uses of vocabulary across modes at both schools. Lastly I provide a discussion of the kinds of questions this chapter raises about spriting and writing.

6.1 Methodology

The talkuments referred to in the study were created during a three month design research study at two different private elementary schools, Molière Elementary, French-English bilingual private school in a large urban area serving primarily high SES students, and Umoja Elementary, an African-centric, small private school in a large urban area serving low to middle SES students.

Eleven students in grades 3 and 4 at Molière, aged eight (N=7) to nine (N=4), volunteered to participate in a thirteen-week after-school club I offered on spriting in the school's computer lab.⁶¹ These eleven children were a self-selected sample of the third and fourth grades at Molière, biased towards high performance in both French and English writing skills and having parents with post-graduate degrees, as those parents tended to encourage their children to participate in the study.

Twelve children from Umoja Elementary participated in the study, constituting all of the children currently enrolled in the elementary curriculum. There were two different age cohorts in Umoja that I consider separately in this chapter. The group I call 'older' had the opportunity to work with me each Tuesday and Wednesday afternoons during school hours for a full thirteen weeks. These children represented a wide age range, one six-year-old, two seven-year-olds, two eight-year-olds, and one ten-year-old. They were taught in both group formats and small lessons in which questions and projects were tailored to a student's age and ability, similar to a one-room schoolhouse. The group I call 'younger' moved up into this older group with only five weeks remaining. This group, primarily five and six year olds, was anticipating kindergarten in the Fall. All children in the younger group were just learning to write their letters, spell and read simple words. The six-year-old in the older group was familiar with letter formation but, like the younger group, learning to read and spell simple words as well.

I selected two to four talkuments by each student that represent their better efforts. All talkuments used as data in this chapter were individual (not collaborative) efforts, as presumably the texts are. The spriting examples from Molière Elementary were started and 'finished' in the after school club I taught. The children were there to have fun and were not expecting any grades. They worked on their spriting compositions so long as they were

⁶¹ I do not consider two fourth grade students' work because they were ESL students and wrote in French exclusively. By eliminating their talkuments and texts from consideration, the Molière text data set becomes biased towards personal narratives, a genre typically long and less dense than poetry or reports. As a result, some of the Molière writing averages change from a negative to a positive relationship to spriting.

interested. The Umoja students had even more personal freedom with respect to spriting: they were never forced to sprite; therefore, the sheer numbers and length of their talkument data is highly representative of their motivation to sprite.

I also collected examples of the children's writing that they made for their classroom teachers during regular classroom hours rather than try to elicit good writing performance during the short spriting time when they did not want or expect to write. Molière teachers provided me with one writing selection per student they judged to be a good example of the student's writing ability in English. Most of these examples had gone through at least one drafting cycle with feedback from the teacher and are as polished as the child is able to make them at this point. Umoja Elementary provided me with several writing samples of each child's ability across the school year, constituting a much richer and more diverse writing sample.⁶²

All written texts were also transcribed to digital text using the transcription standards (e.g. including spelling errors), as presented in Appendix F, to prepare it for automatic computer processing and eventual comparison to talkument data. Talkuments were transcribed by hand and double-checked, using the transcription standards contained in Appendix E. I wrote a computer program to count occurrences of certain features across the writing and spriting transcriptions:

Total word tokens: A count of each token contained in the final text or talkument. Numbers, times, dates and names (including signatures) are included in this count. In *talkument* total word token count, words begun but left incomplete (e.g. bu-) are not counted; phrases begun but left incomplete (the – the boys) are included in the token count. In *text* total word count, words identifiable but incomplete, as well as misspelled words, are expanded to correct form and counted.

Different words count: Word tokens are matched to like word tokens, each word type counting as one *different word*. No attempt is made to transform tokens to morphemic form (e.g. tokens are not lemmatized before matching; pre/postfixes and tense are not removed). Since conjugating verbs, nominalization, adding pre- and postfixes and more are developmental achievements, I did not want to lose the ability to see those forms.

Rare word token count: The lists of *different words* found in writing and spriting compositions are filtered through a subset of The Living Word Vocabulary (Dale and O'Rourke 1976) to produce a *rare word token count*. Note that this is a token count and almost certainly includes repetitions of the same word. The subset of the Living Word Vocabulary used is deemed known by over 80% of fourth graders, which can be treated as level grade two (Biemiller and Slonim 2001).⁶³ I expanded this subset of The Living Word Vocabulary by

⁶² The difference in writing samples is an artifact of the way in which the two schools participated in my research endeavors rather than an indication of how much time was spent on writing at the respective schools or the diversity of texts produced at Molière, which I know is considerable. Molière students work on writing composition skills in both French and English for several hours daily.

⁶³ Special thanks to World Book International for permitting me the use of the Living Word Vocabulary list and to Andy Biemiller for reducing the vocabulary to root words, grades 2-12.

inflecting basic verb forms, adding plural forms of nouns, names of the students and the schools, a small set of spoken forms (e.g. cuz, wanna, etc.), and words that appeared commonly (e.g. who, what, where, that, this, is, I, me, she, he, etc.). The complete list is available in Appendix H. Words I added to the list are in indented position. After expanding this list, I did not alter it further, regardless of the grade level of students analyzed. One would predict third and fourth graders to demonstrate progressively more rare word use than first and second graders.

'And' percentage: All use of the word 'and' is counted. No distinction is made between discourse, syntactic, and other possible status of the word 'and'. This count is divided by *Total word token count* to produce a percentage.

'Then' percentage: All use of the word 'then' is counted. No distinction is made between discourse, syntactic, and other possible status of the word 'then'. This count is divided by *Total word token count* to produce a percentage.

I used the above measures to produce two additional measures, which provide different ways of looking at vocabulary use.

Rare token percentage is created by dividing the rare token count by total token count. This is a measure of what percentage of the average text or talkument is comprised of rare word tokens.

Word density is used to normalize spriting and writing that vary in length. It measures how much of the text or talkument is comprised of different words (also see Beier and al. 1965). It is the ratio of different words to total words, independent of total word token count:

$$\text{Different word types} / \text{Total word tokens} = \text{word density}$$

For example, if a child used the same rare word many times in a very short text, the rare token percentage would be high but word density would be very low, as the same word was used repeatedly.

6.2 Composition Quality Comparisons

Writing and spriting can be remarkably similar, as in the case of the Molière students, or remarkably different, as in the case of the Umoja students.

6.2.1 Francois's Writing and Spriting

Francois, age 8, was a third grader at Molière. His English ability was quite good, but his native language and the one he spoke at home with his parents was French. It is sometimes evident in his writing, shown in Figure 25, that English is his second language. For example, he uses an article before "desserts" in "for the deserts [sic] I had long peices [sic] of cheese," – and he considers cheese a dessert food. Comparatively, many of his classmates wrote English with native and native-like skill. Apart from many spelling errors, his writing is extended, rich with vocabulary, and strongly organized into sentence units making it easy to read. In these respects, Francois's written work is characteristic of the Molière student cohort. We can see evidence of recent instruction in expanding and compressing comma-delimited lists in class, with his sudden inclusion of the awkward description of the log flume ride, "A log is big. It is brown. It was plastic."

Francois's text in Figure 25 is 230 words long, with 121 different words. The word density is 0.53, slightly higher than the Molière average perhaps reflecting the unusual activities described (theme park) and proper nouns used. His vocabulary use registered 17% rare word tokens, one of the higher Molière writing percentages likely due to the modern subject matter (e.g. roller hockey, soccer, and amusement parks) not accounted for on the 1948 Living Vocabulary. Francois's use of "and," subtly placed, is 2% of the text. Even though it is a personal narrative and we might predict higher use of "then", Francois uses "then" only once, demonstrating a grasp of more sophisticated temporal transitions like "Next morning," "when I finished eating," and "When we arrived."

Canobie Lake Park

/* picture of large vehicle with people inside */

My exiting day was when I went to
the Canobie lake park. My mom
went to drop me off at Antoine's
house. We played roller hockey outside.
Roller hockey is a game we inveted. It is
floor hockey but with roller skates on. Then
we played soccer. Antoine's brother was
the goaly and we tried to shoot in the goal.

I scored many goals. When someone went to the bathroom the other one did naltie shoots. After that we went inside and ate salade, meat and tomatos. It was good! For the deserts I had long peices of

/* next page*/

/*picture of log flume with four people*/
cheese. When I was finished eating I brushed my teeth and went to bed. Next morning at ten o'clock we went in the car to go to Canobie lake park. When we arivved we where the first ones because other poeple where comeing with us. There were two of Antoine's friends. First we went to the log. When we went up it came down so fast. A log is big. It is brown. It was plastic. We also went at the Curk House. If I was you I wouldn't go there because

/* next page*/

when you finish, the ride are going to be sick. In the park there were three Roller Coasters. It was great. It was the best park ever! When we left I was sad to not come back.

Figure 25 A written text by Molière student, Francois, age 8

Like his writing, Francois's spriting was long, detailed, full of rich vocabulary choices, and most of all, easy to understand with strong prosodic and syntactic endings. One of Francois's best spriting works, a series of three mini stories, is shown in Figure 26. Keep in mind that he spent less than one hour on this story triptych, while he likely worked for much

longer than that on his writing, possibly producing even more than one draft (judging from the cleanliness of the written pages).

Francois took a 'bits and pieces' approach to spriting, the only other student aside from Charlotte who did so. Because he was one year younger than Charlotte and less capable with editing the bits and pieces development of his story in the SpriterWriter, he composed the story in mixed up order (due to the SpriterWriter's unwieldy interface design in this respect and Francois's nascent knowledge of how it worked). Francois did not return to this piece to correct the order of recordings. To demonstrate Francois's spriting intention and his spriting composition skill, I reassembled the story *in the order Francois wrote it*, eliminating those many pieces he deleted, of course, by cross-checking the final talkument transcription with the log of his composition process. For clarity, each recording in Figure 26 is a new paragraph.

A long time ago there was an old fashioned clock.
There was a bird in it (.) that really wanted to be free:: and fly:: in the tree::s and make
a nest for his little babies.
The man that lived in the house was a very o::ld man.
He was poor and really (.) really lonely.
Once the old man (.) went in town, and forgot to let the door open.
When it was twelve o'clock, the clock opened, and (.) and the strings that hold the bird
broke, because of the wind.
The bird was finally free. He whooshed through the trees and saw the car of the old
man pass by.
Just when he passed, he was so mad that he pooped on his car.

{NEW PARAGRAPH}

One day there was a boy that live- that lived in the desert.
He went outside to fee::d (.) his animals but a sandstorm threw him (.) off.
He la::nded (.) in the dunes.
He - he could see (.) he - he couldn't
He couldn't see his house, i- his house was way way away.
He saw a camel (.) and said to the camel
Can you take me for a ride (.) to my house?
The camel (.) didn't know what he was saying
He just (.) lied (.) down
He went on the camel and the camel (.) was so afraid that
That he ran to his {VOC inhale} master and his master was (.) the boy's dad.
That's how {VOC inhale} he got home
He thanked the camel so:: much that he almost strangled it.
That's the end of the story.
That's the end of the story.

{NEW PARAGRAPH}

{QUAL Western drawl} A- a long time ago in the western days, there was an old cowboy named Johnny.

{QUAL Western drawl} He had a dog. He loves animals (.) that are called dogs cuz he liked the name dogs, his dog was called (.) Johnny Buddy Baby.

He really wanted to learn (.) much language so he asked constructors to build a school for him, the constructions - the constructors argued with him so badly that he gave up. He even told it to the President, the President said hmm (.) ask the constructors (.) but the constructors already said (.) they couldn't.

Then (.) he had to build it himself, he wanted to build a school he *just *wanted. He would be the director of the school since he builded it.

So he started to build a school.

After two years he was so tired, that he (.) well rest for one year long.

Everybody looked at his school. They knew it was him who builded it cuz they saw him do it.

They enjoyed the school. They sent people to be teachers and directors, and one evil cop he said *I go to this school *I need to be the director and he was a director for the whole:: - for his whole entire life.

{QUAL heavy drawl} I'll say (inaudible) cowboy up its a cattle story it's the end.

Figure 26 A transcription of Francois's "my three storys [sic]" talkument

'The three storys [sic]' piece in Figure 26 is double in length to Francois's written text in Figure 25, 460 words compared to 230. Different words count is 184, higher then but not double of the 129 in his writing. Word density is 0.40, lower than his other talkuments as well as most Molière talkuments, and lower than his writing at 0.53.

His third story is especially creative: it combines many things unlikely to be found together. The genre begins as Western and ends as a dystopian story of a man 'against all odds.' The role of evil is portrayed by the policeman. And a slogan, "cowboy up," is drawn from a popular baseball team's attempt at the World Series. Note also that Francois includes direct quotations and reported speech in this third story to advance the narrative whereas these devices are not included in his personal written narrative. Considered as a first draft, these stories hold a lot of promise.

But Francois seems to struggle to find richer vocabulary to situate his fanciful and post-modern mixing of genre. For example, when he sprites "his house was way way away" and "he was poor and really (.) really lonely" he seems to reach for more appropriate words while repeating "way way" and "really really" but doesn't come up with them in time. Given more editing skill, better editing tools, and some pedagogical direction for doing so, Francois could have added more sophisticated vocabulary to his spritten story later.

6.2.2 Niesha's Writing and Spriting

Niesha, age 8, was one of the older students at Umoja Elementary. She was reading *Addy's Surprise* by Connie Porter from the American Girls series during the time I worked with her. Given her on-age, maybe even advanced reading interests, I am surprised that her writing was so brief. Figure 27 contains three different writings (labeled A, B, and C) Niesha made in Fall 2003 and early 2004. Things Niesha loved to write were her name—all four of them—and the date, both in full and abbreviated form, something the children must have been learning in class.

Text A appears to be a personal narrative written shortly after the Christmas/Kwanzaa vacation break. Notice that Text A is dated after Text C, even though Text C is much longer. This indicates to me that Niesha did not want to write a longer text, though she is capable of doing so. Text A is not what most schools would judge a successful personal narrative for an eight-year-old (e.g. extended description of an event or series of events, with evidence of knowledge of sentences and more complex constructions), but I really like it for what it does not say. Niesha's piece is like a haiku in its condensed, poetic explanation of why she did not give presents to her family for Christmas and the face-saving gestures her family showed her, denying their desire for gifts, out of their love for her. Why drag a child through a detailed and possibly humiliating personal narrative chronicling a Christmas with no gift-giving? In my opinion, it is a most beautiful and effective composition, but it would not win any prizes for personal narrative exposition due to its brevity.

Text B is a rhyming poem and Text C is a reflective piece written in anticipation of Thanksgiving that has some features of a letter, though it is not completed in a conventional manner. She opens the text with the greeting "To my family" and signs the text "Love Mom," which I read as signifying Niesha's love for her mother rather than an attempt to forge her mother's signature. None of the children I worked with at Umoja had firm ideas of the conventional forms a letter can take, much less the multiple audiences implicit in genres peculiar to school, like "Reflection upon important events to produce a text ostensibly for our family but actually for out teacher." Text C has a couple of spelling errors (e.g. bot, wold) and an inconsistent, sometimes unconventional indication of sentence boundaries. Like Francois, also age eight, Niesha does not use commas.

January 6 2004 1/6/04

A

Niesha Lee Lanelle Collins

I didn't buy a gift.

Because Nobody wanted a gift And I didn't
have money.

Niesha

B

My name is Niesha

They call me na'e and i like

horse's that eat hay

I like to play i like to dance

But if i had my way

I would Play all day

My brother name is doug

He is in the bed snug

Whun he wakes up i will give

him a hug but i like to

Play with him.

Date November 14, 2003

C

11/14/03

By Niesha Lanelle Collins

to my family

I am Thankful for my

mother I am Thankful for my

Daddy I am Thankful for

my whole family and I am

really Thankful for The

Police's and firmar and women

I am Thankful for my mother

Because she Bot me close and

I am Thankful for the food my

Mother.

Bot Me

She is the Best mother

in the whole

wold.

Love MoM

Figure 27 Three written text selections (example A, B, and C) by Umoja student, Niesha, age 8

Niesha's texts in Figure 27 are 23, 63, and 76 words in length respectively, with 19, 41, and 37 of those words different from each other. Word densities are extremely high at 0.83, 0.65, and 0.49; while rare words are 17%, 6%, and 18% respectively. Mentions of the word 'and' are 4%, 2%, and 5%; there are no mentions of the word 'then' in all three texts, similar to her peers at Umoja.

Niesha wrote several talkuments over the thirteen weeks, producing five talkuments I consider good examples of her composition ability. Two of them in particular were her self-reported first attempts at producing standard school genres like book/movie reports and argumentative compositions that compare and contrast two things.

Niesha chose to write about a movie she had greatly enjoyed watching, Johnson Family Vacation. Although I had suggested a book report and then broadened it to include movies, Niesha felt most inspired by (and perhaps knowledgeable of) a movie. In Figure 28 below, 'Niesha's Johnson family vacation' talkument is featured both as a textual transcription and a talkument (6:59 minutes in length). After looking over the movie credits and discussing with me how to identify and credit the people who directed, produced and acted in the movie, Niesha recorded this report in one single continuous recording.

Niesha's Johnson family vacation

This movie you're about to hear is called Johnson family vacation made on two thousand four directed by Christopher Erskin writing creating W_G_A Todd R Jones writing by an: (.) Earl Ritchie Jones (3.8) and the people who are on it is Bow Wow (5.3) Vanessa Williams Selanes Noelles (.) Cedrick the Entertainer (3.0) now this is the start. I'll start from the beginning. They - they want to go on this field trip, but Bow Wow's father Cedrick, did not want to - he want to get a car and Bow Wow was like there is this new big red car that bounces up and down as people likes cars like that. And {VOC mouth sounds} so he didn't want - Cedrick didn't want that kind of car, but they made Cedrick take that car because (.) they tore his car up and added up with that no car. (2.3) And there is a Jamaican man who told him - his brother got fired so he:: got hired. And then they went home then they drive {PRN drew} somewhere else then they came back home then they drive {PRN drew} back somewhere else then they came back home before they got home there was this o- girl who Bow Wow likes and he was making fun of her because her father only got (.) um a little car but he - his fath- but Bow Wow's father had um a Hummer and it was the coolest Hummer you will ever see so when they went home the little kid she had a pretend doggy they were leaving I pack up the clothes (.) {VOC sneezes} they packed up their clothes and (.) {VOC mouth sounds} they left. The little girl wanted her puppy to come with her (.) so they got on the highway they start driving they wouldn't stop for nothing, but then {VOC mouth sounds} (.) um oh yeah then they - Bow Wow had to use the bathroom, so he took a cup and he: threw the soda out and then he pu- pulled down his zipper and he pulled down his underwears and he peed in a cup. Then he put the top back on it, and then he put it (.) back where it was, his father wanted to drink some so his father drank some, and it tasted like pee, so the father threw the cup in back (.) of the car and it hit the police so

they got locked and the police was eating something and the mother (.) said I know where you can get plenty more of those and she signed a whole lot of papers. And he said what can I do for you? And she said keys (.) {VOC mouth sounds} and then he gave her the keys to unlock her family so they can get going then and {PRN an} then (4.3) and {PRN an} they got out of jail. They started driving again they got stuck at this Indian place and it wasn't really Indian but they made it look like Indian and (.) then they got to the reunion and then (2.4) - so Cedrick's brother always loved to tease him so he teased him and teased him and teased him and when they were saying grace they would be talking about each other and som- an they were telling their momma what their - the momma didn't know about so they both got in trouble and nobody ate. I like the part when the little boy tried to put his hand inside the food (.) and then the grandma slapped his hand like this {NVC hand slap} and heard a big slap like somebody really slapped somebody on the face. And after that they call: uncle, their uncle was going to fix the car, but he didn't the car was still broke when Cedrick went to go get it, then the next day they um the - their uncle was dancing with some girl and the - and {PRN an} then he fixed up the car and then they drove back home (.) um the Johnson family, Cedrick and his kids excuse me and (4.0) and they went back home. When everybody got out the car I left the bag inside the car well I didn't leave the bag inside the car then I took the bags out and (.) so (3.1) they got home - when they got home (.) the car broke down after everybody got out of it the car broke *down (4.1) and that's mostly it. Good -

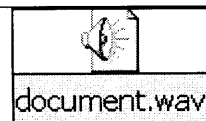



Figure 28 Niesha's talkument titled *Niesha's Johnson family vacation* is transcribed to text and also available as talkuments (RIFF wave file) at 6:59 minutes in length

The Johnson family vacation report talkument is 706 words long, the longest Umoja talkument by the older children, and features 242 different words. The different word density is lower than her classmates' average at 0.34 and rare words are 11% of the talkument. Six percent of the report is "and" and three percent is "then," a strong indication that it is a narrative in which simple temporal transitions are used repeatedly.

The second example, shown in Figure 29, is a talkument in which Niesha chooses to defend Nickelodeon as better than Disney channel. To do so, she makes a series of short recordings, moving towards a 'bits and pieces' style. She struggles to condense her thoughts and feelings into a thesis idea (that Nickelodeon is better) and then to provide evidence for this position. While she composed this talkument, I asked her questions characteristic of the argument genre. In our conversation, we discussed everything from her opinion to words and phrases conducive to making her argument.

Niesha's talkument is typical of young students' first attempts at argumentative compositions, difficult for most elementary students and often much shorter than the personal narratives most emphasized in elementary schools (Kamberelis 1999). Niesha does a lot of important things. She provides detail about what programs she likes on Nickelodeon. She spontaneously adopts new vocabulary and phrases that I use in our conversation to

present her position. For example, the word ‘prefer’ in “I prefer Nickelodeon...” and the prefixed phrase ‘*during the night and day...*’ were words and/or phrases that I uttered and Niesha later appropriated as a resource to build her talkument. And Niesha tries repeatedly to communicate a very subtle argument: she prefers Nickelodeon to Disney channel because most of the time (“day or night”) when she wants to watch television the shows on Nickelodeon are on average superior to those on Disney, even though she likes shows on both channels. This is a sophisticated argument of proportion and nuance. She struggles mightily to represent her opinion, as shown in Figure 29. Each recording is indicated with a paragraph break.

Niesha's book	
<p>Hi peoples! um I just want to say that I like Disney Channel because um (.) hmm my favorite show is called (.) like Sister Sister (.) Raven, um, and lots (.) more other ones - shows. And I like Nickelodeon too (.) because it has my favorite shows on like Rugrats my favoritest, and (.) Fairy Oddparents, Jimmy Neutron, Timmy versus Jimmy, Jimmy Timmy, Power Hour and lots more shows. And that's mostly it. Thank you bye</p> <p>I prefer Nickelodeon (.) more - more than Disney Channel cuz Nickelodeon has more shows that I like and lots more:: different stuff on there, and after Nickelodeon, I watch a show named Nick at Nite and I - and I like those shows too and I really like Nickelodeon (.) and that's all.</p> <p>During day and night I like to watch Nickelodeon because it has more shows on it, and (.) I like it (.) really cuz has it more shows than Disney Channel. um Disney Channel only has three favorite shows that I like, or I think a little bit more and that's it</p>	
	
document.wav	
Figure 29 Niesha's talkument transcribed to text. It is also available as a sound file (RIFF Wave, 2:02 min)	

‘Niesha’s book’ in Figure 29 is 169 words in total, with 71 of those words different from each other, much shorter than her movie report talkument but still longer—more than double—all three texts she wrote. Word density is 0.42, much higher than her movie report, but much less than her short texts, while rare word percentage is high: 25% of the total talkument. The word ‘and’ constitutes a large 8% of the document; the word ‘then’ is not found, in contrast to her very high usage in the movie report, one clue that the talkument is not a narrative genre.

6.3 Text and Talkument Quantitative Results

All charts presented in the next section are drawn from cumulative averages of writing and spriting by Molière students and the Umoja students. The latter are further divided into 'older' and 'younger' groups. The older Umoja students can read and write with differing levels of accomplishment. The younger Umoja students are just beginning to learn to read and write. Note that there is only spriting data for the younger Umoja students, as they had not yet produced any texts with fully formed words (other than first names).

Tables of the individual data used to calculate the averages shown next are available in full in the Appendices. Individual writing data for all Molière students is available in Figure 36; their individual spriting data table is available in Figure 37. Individual writing data for Umoja older students is available in Figure 38; their individual spriting is available in Figure 39. Individual spriting data for Umoja younger students is available in Figure 40.

In the following sections I compare cumulative averages of both writing and spriting variables across the three student groups to begin to develop theories about salient differences between writing and spriting.

6.3.1 Total Words

This research confirms the large difference usually found between low and high SES groups in written word counts. Surprising, then, is the similarity between the three different groups in terms of word count in spriting (Molière 304.56, SD 167.58; Umoja older 227.5, SD 174.8; and Umoja younger 264.4, SD 218.0). Sometimes Umoja students make exceedingly long talkuments and sometimes very brief ones, demonstrating much greater standard deviation in word counts than the Molière students.

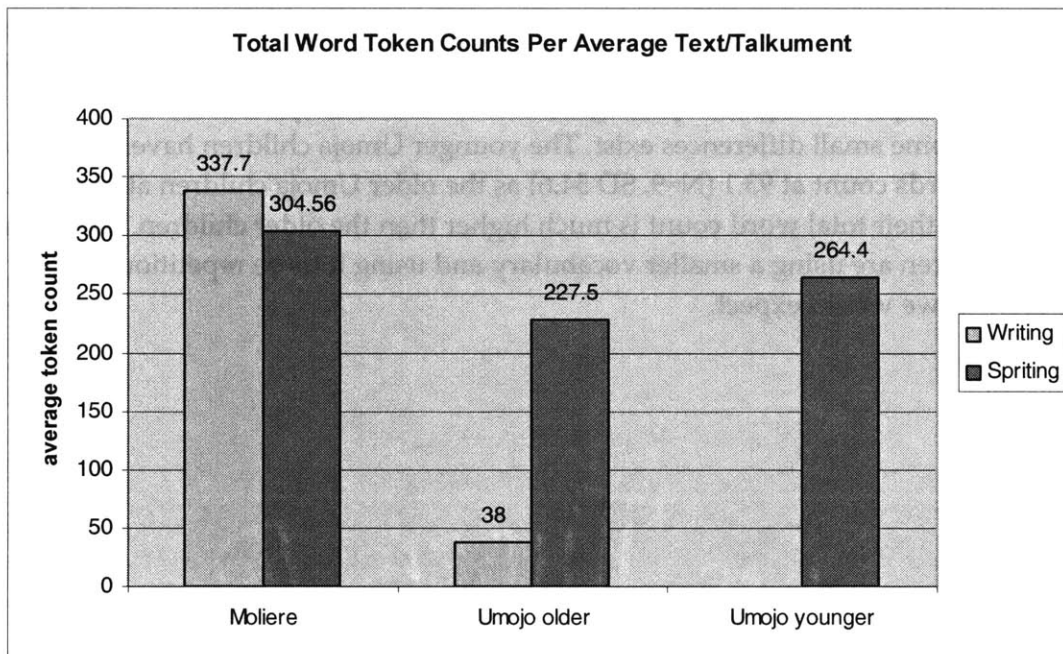


Figure 30 Total word averages across writing and spriting by Molière and Umoja Elementary children

Data shows a large disparity between the older Umoja Elementary children's spriting and writing word counts. They wrote texts that averaged 38.0 words in total (N=21, SD 18.5) while they sprited texts that averaged 227.5 words in total (N=22, SD 174.8). For them, spriting represents an enormous advantage for practicing extended composition and editing strategies.

The younger Umoja Elementary preschool children, aged five and six, sprited on average 264.4 word tokens (N=9, SD 218.0), which exceeds their older and more letterate peers' word token count of 227.5 word tokens (N=22, SD 174.8)! This probably reflects the younger Umoja children's approach of accumulating iterative composing and editing attempts in spriting and not deleting content.

The theorized relationship between spriting and writing is inverted in the Molière data: spriting has slightly fewer words on average than writing (spriting N=25, 304.56, SD 167.58 versus writing N=7, 337.7, SD 108.8). Why might this be? First, it's important to mention that the Molière writing data sample is small (N=7) and representative of a single genre, the personal narrative, while the spriting sample is larger (N=25) and representative of several genres, some of which are not as extended as the personal narrative. Interestingly, the relationship between spriting and writing was reversed, though still close, when the Molière writing data samples included writing they did spontaneously in the spriting class (not personal narratives). If this relationship is so close as to flip-flop by adding or subtracting one or two data points, the relationship between Molière writing and spriting word token counts must be considered at this point as close to parity. Simply put, I believe that the Molière students produce similar word counts in spriting and writing.

6.3.2 Different Words

The different words counts stand in relationship to each other in nearly the same proportions as the total word count, suggesting that the relationship between length and lexical diversity across different groups' writing and spriting tends towards stability.

Even so, some small differences exist. The younger Umoja children have nearly the same different words count at 93.1 (N=9, SD 54.6) as the older Umoja children at 91.9 (N=22, SD 58.3), whereas their total word count is much higher than the older children. This means the younger children are using a smaller vocabulary and using it more repetitiously than the older children, as we would expect.

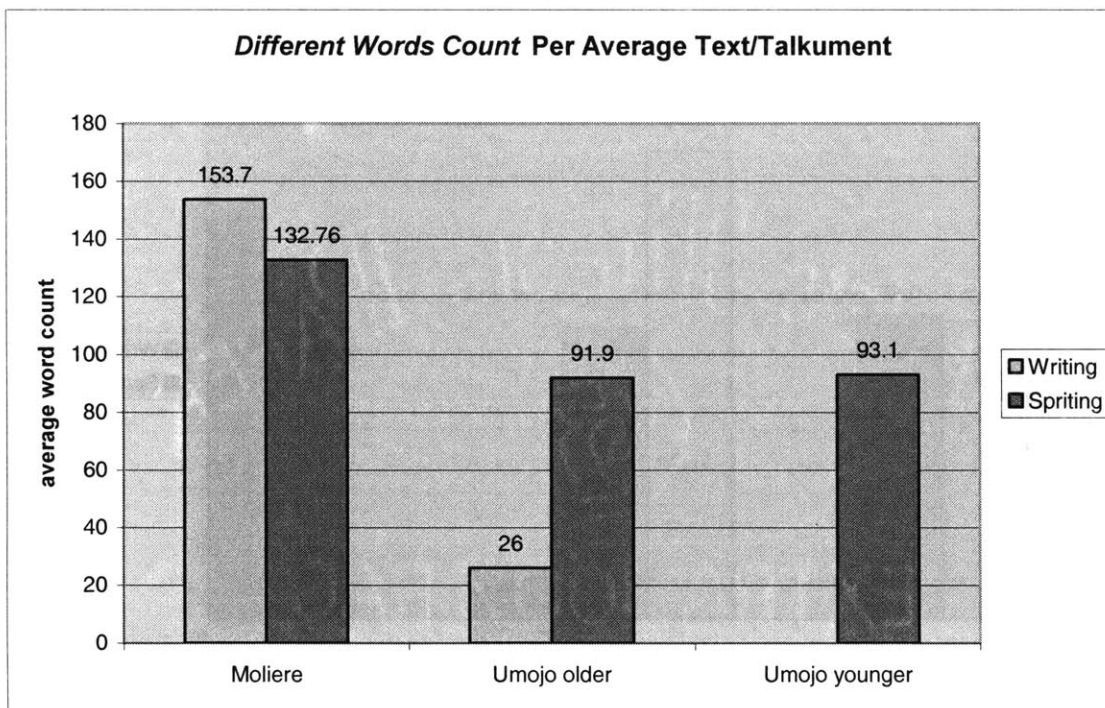


Figure 31 Averages of Different Words used in writing and spriting by Molière and Umoja children

Similar to total word count, the Molière students' different written words count of 153.7 (N=7, SD 32.5) achieves a small edge on their different spritten words count of 132.76 (N=25, SD 54.39). This comparison is rife with the same problems mentioned in the total words count section above (low writing data samples, homogenous genre, contextual differences, etc.). Given these differences, it is surprising that the Molière spriting numbers are so very close to the writing numbers. I wonder what might occur with a larger and more diverse writing sample.

6.3.3 Word Density

The word density measure presents the differences between the modes and the schools in a very intriguing manner. Every measure except the older Umoja children's writing, which is extremely high at 0.74 (N=21, SD 0.15), is within a very similar range (0.46 to 0.48). This suggests that the students distribute their vocabulary usage in similar ratios of repetitiveness while spriting. The Molière students use slightly less repetition (0.01 to 0.02 differential) in both writing and spriting than the Umoja students do in spriting as a whole.

The word density measure provides a different view of the Molière writing and spriting differences. The Molière spritten word density at 0.48 (N=25, SD 0.10) is just slightly greater than the written word density of 0.47 (N=7, SD 0.06), suggesting that those students use the same ratio of different to repeated words in spriting or writing. Rather than spriting being more repetitive than writing, as we might predict, remarkably, it is slightly less so (-0.01).

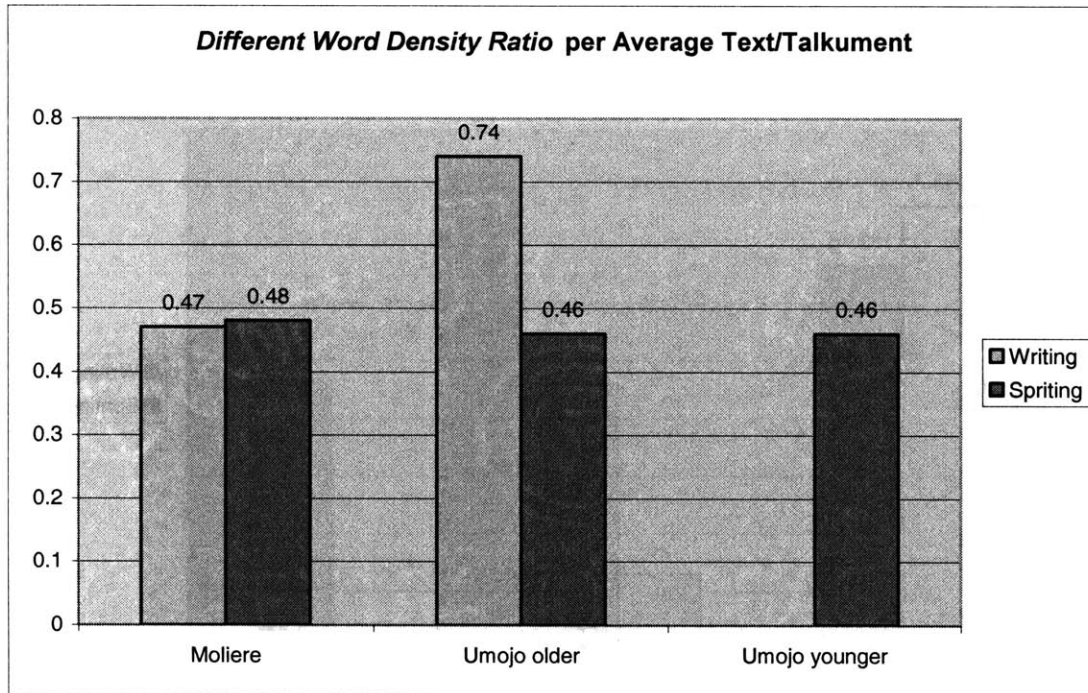


Figure 32 A ratio of different words divided by total word tokens per average text/talkument

Lastly, it is important to note that a score of 1.0 in *different word density* would be similar to choosing words at random. A good composer will choose the best word and continue using it. Where the “break-even” point is, between random and selective processes, is beyond the investigation of this study. However, if we take the range demonstrated by *all* children in spriting, and confirmed by the highly letterate Molière children in writing, then it appears to be close to one-half (0.5). Thus, re-using each word twice on average within a composition might be considered good.

The Umoja older children’s writing is much closer to random than all the children’s spriting and the Molière children’s writing. If the older Umoja children’s writing had been poetry only rather than a mix of genres, this result might be understood to be the product of genre differences. In poetry, the singular use of an unusual word is laudable. Since the older Umoja children’s writing is not all poetry, this density measure suggests that their exposition and word choice appears to be better represented in their spriting than their writing.

6.3.4 Rare Word Use

Rare word tokens, as a percentage of total word tokens across writing and spriting at both schools, must first be characterized as over-whelmingly similar to each other. Molière students’ writing at 13.76% (N=7, SD 4.02) and spriting at 14.78% (N=25, SD 3.17) represent the total range—a difference of only 1.02%.

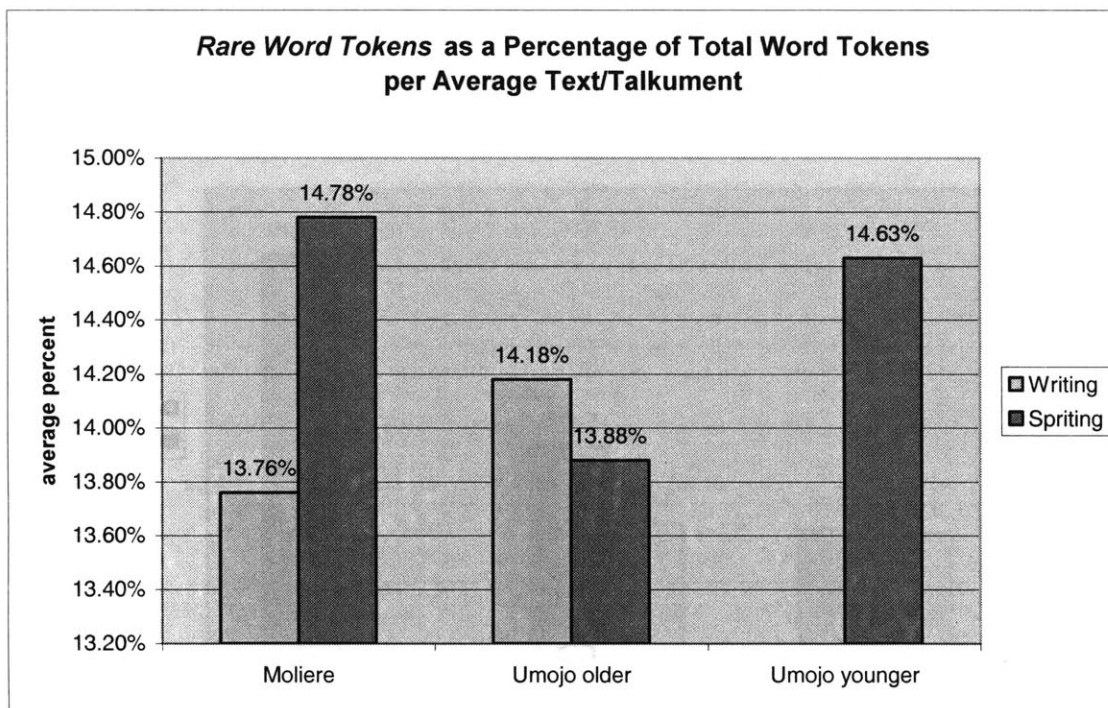


Figure 33 Average percentage of rare word tokens per average text/talkument

Within this small range of difference, however, there are some notable contrasts. The Molière students use more rare words in their spriting than they do in their writing. This might be a result of easier production or the removal of spelling concerns, which in turn frees the use of more advanced vocabulary. Or they might be using different *kinds* of words in their spriting, which are not accounted for in the Living Word Vocabulary list. We will look at this question in more detail in Section 6.4.

In a startling reversal, the Umoja older children use ever so slightly more rare words in their writing than they do in their spriting! But when we consider that the Umoja older students' texts averaged 38 words in length, whereas their spriting talkuments averaged 227.5 total word tokens, it suggests that the difference in rare word usage is due to a kind of unnatural compression in their writing. Their extremely high word density measure confirms this. In their writing, they simply use fewer words, rarely repeat any of them, and situate the more complex or important words with fewer function words.⁶⁴

6.3.5 Use of 'And' and 'Then'

Data trends in both "and" and "then" spriting charts show a clear developmental trend towards using them less often, as we would expect. In Figure 34 below, the word "and" constitutes a full 10.34% (N=9, SD 2.58%) of the Umoja younger children's average talkument, 5.47% (N=22, SD 2.98%) of the Umoja older children's, and only 3.35% (N=25, SD 2.21%) of the (older still) Molière children's.

⁶⁴ It appears those under-appreciated words—the 'most common' ones that receive little treatment in writing literacy research—are necessary in composition to make both reading and auding easier. Reducing or eliminating them is not a clue to good writing.

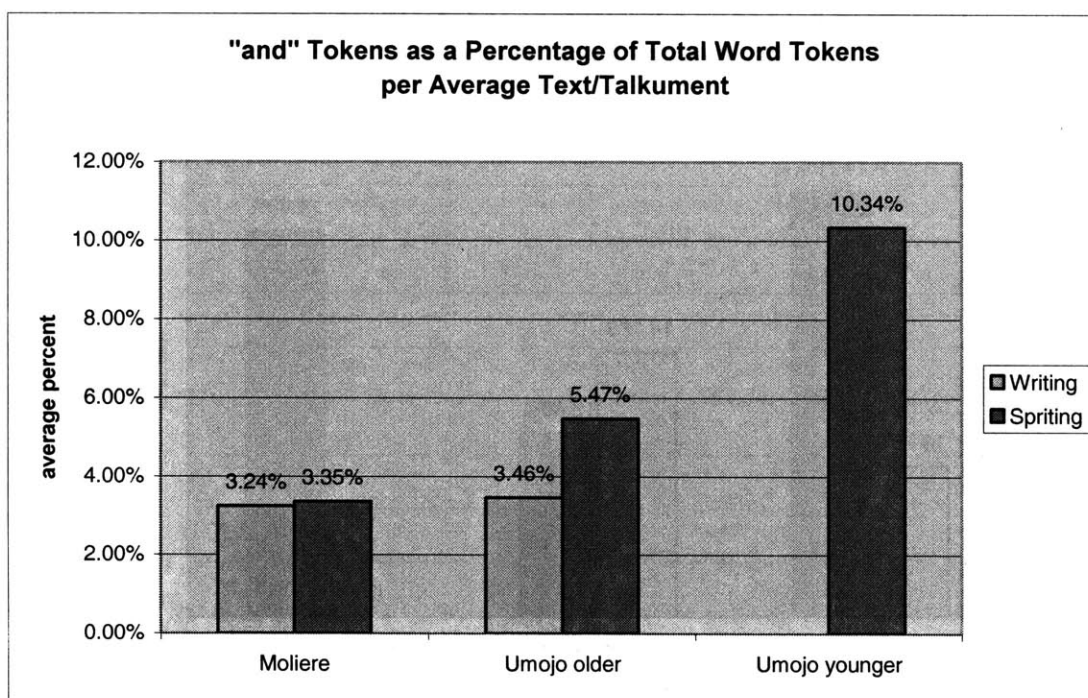


Figure 34 Average percentage of “and” mentions per average text/talkument

The word “and” appears in nearly equal percentages across the Molière texts and talkuments, though they differ in genre representation (texts are exclusively personal narratives). This seems another indication that they are exercising similar composing styles and language skills across writing and spriting.

In Figure 35, there is a similar developmental trend to use the word “then” less often in spriting. Mentions of “then” constitute 2.96% (N=9, SD 2.71) of the Umoja younger children’s average talkument, 1.38% (N=22, SD 2.32) of the Umoja older children’s, and only 0.48% (N=25, SD 0.62) of the Molière children’s. However, standard deviations are much higher than compared to “and” measures; many talkuments within each cohort features no use of “then” at all while others have very high use. I note that the talkuments that do exhibit high use tend to be of some narrative genre. This observation is confirmed by looking at the very high percentage use of “then” in Molière written texts—a sample comprised exclusively of personal narratives, as compared to their more genre-diverse talkuments. I speculate that “then” is used more as a narrative tool to mark temporal transitions in both spriting and writing than as a conversational discourse marker. This is one indication that children treat spriting as a different kind of talking activity than conversation; thus they adapt their language use to styles and structures we would normally expect from writing.

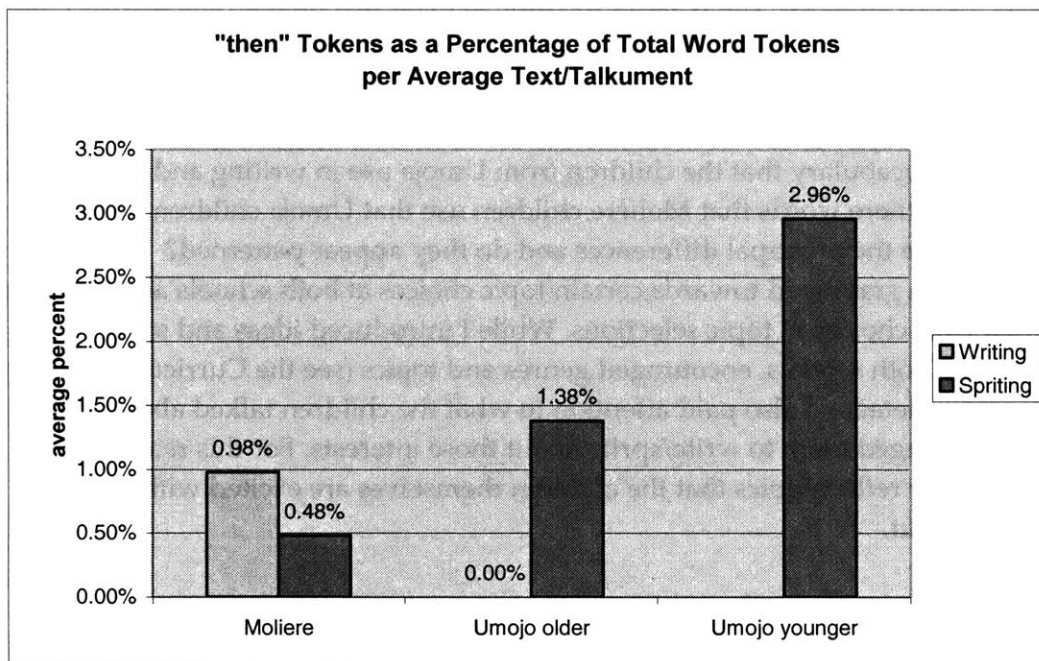


Figure 35 Average percentage of “then” mentions per average text/talkument

Writing can distort some student’s language abilities in ultimately unhelpful ways. For example, the older Umoja students use the word “and” in their writing in a percentage similar to the Molière student’s writing. But this is not because the older Umoja students control as many sophisticated transitions in written language. They do not use even simple transitions, like the word “then,” at all in their writing—not one single mention as shown in Figure 35, even though there were several narratives. While spriting, however, the older Umoja students use “then” frequently, it accounts for a full 1.38% of their talkuments. Is this a result of *inherent* differences between spriting and writing modes? Probably not, since the Molière students seem to exercise their linguistic abilities in measures that tend towards parity across modalities. I speculate that the Umoja children use language more freely and akin to the way they speak in spriting, thus enabling them to make sense of the need for transitions and even learn to adopt more sophisticated ones. At this point, they have not appropriated writing to the extent that they can use it to reflect their ability to use language. Writing presents a sadly diminished picture of their abilities.

6.4 Vocabulary Use Across Text and Talkument

The language of an era is, by and large, a record of the problems which that era had to face; new ideas crop up, inventions are made, styles set in, and each of them calls for some new word or some new turn of phrase for its expression.
(Dwight Bolinger in *Words*, 1937)

In this section I investigate questions that emerging from the cumulative quantitative overview. In particular, why does the lowest use of rare words occur in the *writing* of the

most letterate, oldest students. What could possibly explain this unexpected result? Looking in detail at the actual *rare word tokens* used might help us understand what is happening in the charts better.

Does the vocabulary that the children from Molière use in writing and spriting have similarities to the vocabulary that the children from Umoja use in writing and spriting? On the other hand, are there words that Molière children use that Umoja children do not, and vice versa? What are the principal differences and do they appear patterned?

The children gravitated towards certain topic choices at both schools and strongly exercised their own choices in topic selections. While I introduced ideas and story compositions into both schools, encouraged genres and topics (see the Curriculum Schedules in Appendix C for details), I also paid attention to what the children talked about at both schools and encouraged them to write/sprite about those interests. For this reason, the talkuments strongly reflect topics that the children themselves are excited with and feel knowledgeable about.

6.4.1 Approach

I modified my word counting computer program to produce separate composite word frequency lists for Umoja and Molière Elementary children's writing and for their spriting. I treated the Umoja older and younger children as one cohort for this purpose (obviously only the older Umoja students would contribute to the writing lexicon, while older and younger contribute to the spriting lexicon). I wrote another program to compare two word frequency lists against each other and print out a list of similarities and a list of differences. I processed the spriting lists against each other and the writing lists against each other to produce vocabulary lists that appear on one and not the other, and a vocabulary list that appears in both but at different frequencies of occurrence.

We would expect to see the Molière children use more words, and more different and rare words, because they are older and because of the additional advantages that higher SES confers on vocabulary development. But what can we find out about what these two groups have in common as young children in America today? And what differences do their different cultural backgrounds enact in their vocabulary use?

The complete lists of overlap and difference in written vocabulary are available in full in Appendix I. The complete lists of overlap and difference in spritten vocabulary are available in full in Appendix J.

6.4.2 Cumulative Data

There is a large difference between overlapping and different vocabulary between the schools, and between spriting and writing modes.

With respect to written texts, shown in Table 15, Molière uses 540 words that Umoja elementary students do not use, and uses them a cumulative frequency of 1041 (using every word nearly twice). Umoja Elementary students use 170 words that Molière students do not, at a frequency of 257, using every third word twice.

MOLIÈRE		UMOJA	
Frequency Sum	Word Type Sum	Frequency Sum	Word Type Sum
1041	540	257	170

Table 15 Writing vocabulary differences between Molière and Umoja Elementary schools

In writing, Molière and Umoja students use only 76 words in common, and with very different frequencies of use, as shown in Table 16.

MOLIÈRE	UMOJA	
Frequency Sum	Frequency Sum	Word Type Sum
986	384	76

Table 16 Writing vocabulary overlaps between Molière Elementary students and Umoja Elementary students

The words that characterize the total overlapping written vocabulary are shown in Table 17. As a set, they seem to portray almost timeless aspects of childhood (e.g. ate, clothes, brother, sister, games, get, played, movie, toys, dog, teeth, we...). But in total they seem a rather impoverished reflection of what these children have in common as healthy, enthusiastic, active and similarly-aged young children in America today.

all	an	and	ask	at	ate
because	best	bought	brother	candy	car
clothes	come	didn't	dog	eating	food
for	fun	games	gave	get	going
had	has	him	his	hockey	hours
house	i	light	like	more	movie
nice	park	play	played	sister	teeth
time	to	toys	up	way	we
when	will	would			

Table 17 Total written vocabulary overlap between Umoja and Molière elementary children, in alphabetical order

With respect to spriting, Table 18 presents the sum of differences between Umoja and Molière students' cumulative vocabularies. Molière students use 1013 words that Umoja children do not, at a similar frequency to their writing vocabulary (mentioning each word on average twice). This is nearly twice the number of words not used by Umoja children in

spriting. But Umoja children use 534 words that Molière students do not, mentioning each word on average twice, the same frequency that the Molière students use in both writing and spriting! While spriting as compared to writing, Umoja students almost triple their use of words that are not used by Molière students. It seems that these children simply use many different words from each other, and this is most evident when analyzing talkuments, not their texts!

MOLIÈRE		UMOJA	
Frequency Sum	Word Type Sum	Frequency Sum	Word Type Sum
2068	1013	1114	534

Table 18 Spriting vocabulary difference comparisons between Molière and Umoja Elementary schools

But the overlap between vocabulary use in spriting at both schools also skyrockets. Thus, spriting tends to exacerbate both similarities and differences between children’s vocabularies. In Table 19 we see that the overlap between vocabulary has increased from the paltry 76 words in writing to 561 in spriting, with astonishingly high rates of mention: 7816 by Molière students and 5794 by Umoja students. (These frequency rates are presented as total word token counts and are not normalized by number or length of compositions.)

MOLIÈRE	UMOJA	
Frequency Sum	Frequency Sum	Word Type Sum
7816	5794	561

Table 19 Spriting vocabulary overlaps by Molière and Umoja Elementary students

The first 102 words out of the 561 spritten words in common are printed in Table 20 (the full list is available in Appendix J). This provides a taste of the vocabulary shared by these two groups of children, and presents a much richer view of childhood than the vocabulary overlap in writing. This list contains a great diversity of kinds of words (e.g. verbs, adverbs, adjectives, nouns, etc.), as well as in length (e.g. ‘appreciate,’ ‘beginning,’ ‘beautiful’ as well as ‘also,’ ‘ago’ and ‘as’).

actually	added	afraid	again	ago	also
always	am	and	another	any	anybody
anymore	anything	anyway	appreciate	april	are
around	as	asleep	ate	away	baby
bad	ball	bar	basketball	battle	be
bears	beat	beautiful	become	bed	been
before	beginning	behind	believe	bet	better
big	bigger	birthday	bit	black	blue
book	books	boss	both	bottom	bought
bow	boy	boys	breakfast	bring	broke
brother	brothers	but	buy	bye	call
called	came	can	cannot	can't	car
care	cats	cause	change	choose	class
clothes	club	coach	color	com	comes
coming	computer	computers	cooking	cool	coolest
cost	cousin	cousins	cup	cut	cute
cuz	dad	dance	danced	dancing	days

Table 20 The first 102 words of spritten vocabulary overlap between Umoja and Molière elementary children, in alphabetical order, out of a total of 561 words.

6.4.3 Specific Vocabulary Differences in Spriting

The lists of spriting word differences between Molière and Umoja are enormous, at 1013 and 534 respectively. Befitting their elder status, the Molière students use twice as many words that Umoja students do not mention, in line with theory. Some theorists believe that children learn words in roughly the same order (Biemiller 2001; Biemiller and Slonim 2001). But the Umoja students use a sizeable number of different words from Molière—nearly as many as they use in common. What can we make of the fact that the vocabularies used by these different groups of children are so different? Are there any important themes that emerge from the lists of spriting vocabulary differences?

I read through them several times and began marking words (shown in *italic text* in Table 21) that I thought characterized some activity or interest that one group has that the other one does not. For example, the Molière students absorbed and used the language I invented for the software I provided them (*'spriterwriter,' 'spriting,' 'junk'* referring to error messages) to reflect upon their experience in the afterschool club just as they also frequently composed reflections about their own school (e.g. *'molière,' 'period,' 'grade,' 'classes,' 'report,'*). I speculate that this activity, naming and reporting their own practices at school, stems from their school-validated experience of frequent journaling about their everyday lives. Another dominant theme is classic storybook themes with *'Cinderella,' 'castle'* and *'prince,'* and slightly more modern (but still quite dated) comic book series like *'batman'* and the *'joker.'* Likely these children have been read to frequently from such storybooks.

<i>spriterwriter</i>	changes	<i>research</i>	hair	best	important
<i>joker</i>	<i>moliere</i>	edith	idiot	number	<i>period</i>
<i>moliere</i>	brown	enjoy	helpful	<i>junk</i>	add
alexi	annoying	<i>spriting</i>	yum	<i>cinderella</i>	<i>classes</i>
god	<i>learning</i>	mail	maybe	noticed	question
<i>report</i>	<i>tara</i>	asked	cello	changed	couldn't
kinda	sound	elizabeth	war	ask	build
<i>course</i>	dead	<i>grade</i>	guns	hill	emily
messages	millions	outside	<i>prince</i>	seen	third
twelve	<i>wolf</i>	background	<i>bird</i>	blah	boo
button	<i>castle</i>	check	constructors	dark	describe
director	draw	enjoyed	<i>errors</i>	following	forest
fourteen	free	jack	jackson	maria	panther
passed	pictures	<i>princess</i>	probably	sent	share
sports	<i>sprite</i>	stopped	sweet	teeth	theater
<i>toad</i>	under	until	using	win	yourself
already	animals	apologies	art	arts	<i>batgirl</i>

Table 21 The highest frequency 102 spritten words (out of 1013 total) that Molière children use that Umoja children do not use

In contrast, the Umoja children have a great deal of experience with and knowledge of popular culture like video games, television shows, and movies. They use this knowledge as they foray into less familiar genres they encounter in school. In Table 22, I mark recognizable themes in italic text. Many had just gone to see the new “Scooby Doo and the Cyber Chase” movie (accounting for ‘shaggy’ and ‘monsters’) and the new Shrek movie (accounting for ‘donkey’). They played Yugio cards avidly, before, during and after school, accounting for ‘games,’ ‘round,’ ‘attack mode,’ and ‘card.’ The younger Umoja children adored the Pokemon television show and the cute list of characters, including ‘Charmander’ and ‘Senequel.’ They greatly valued owning a ‘Gamecube’ and Sony ‘Playstation,’ often listing it in talkuments they srote about their birthday parties, or in anticipation of their birthday, as things they would like to receive as presents. Several children srote essays contrasting ‘Nickelodeon’ with ‘Disney’ channel, something I had suggested as a topic after observing their knowledge of it on earlier occasions.

A special mention must be made of the first word, ‘Al,’ who was a character is one of their beginning reading primers (e.g. Al pats a cow. Dot sees a spot. Hot Dot.). Two students actually read the same primer to the SpriterWriter, accounting for Al’s high frequency presence in the rare list.

<i>al</i>	<i>scooby</i>	<i>doo</i>	<i>watch</i>	<i>cards</i>	<i>channel</i>
<i>games</i>	<i>round</i>	<i>shaggy</i>	<i>shrek</i>	<i>yugio</i>	<i>donkey</i>
<i>means</i>	<i>monsters</i>	<i>shows</i>	<i>attack</i>	<i>ones</i>	<i>oba</i>
<i>cedrick</i>	<i>cj</i>	<i>nickelodeon</i>	<i>playstation</i>	<i>ali</i>	<i>screen</i>
<i>tom</i>	<i>toys</i>	<i>uncle</i>	<i>anyone</i>	<i>card</i>	<i>charmander</i>
<i>daddy</i>	<i>darius</i>	<i>kitten</i>	<i>mommy</i>	<i>peoples</i>	<i>senequel</i>
<i>watched</i>	<i>dad's</i>	<i>dominique</i>	<i>ho</i>	<i>jimmy</i>	<i>lady</i>
<i>lost</i>	<i>mode</i>	<i>pizza</i>	<i>theatre</i>	<i>bones</i>	<i>buys</i>
<i>chase</i>	<i>crystal</i>	<i>cyber</i>	<i>exercise</i>	<i>gamecube</i>	<i>grandmother</i>
<i>indian</i>	<i>kitty</i>	<i>laughed</i>	<i>lords</i>	<i>momma</i>	<i>order</i>
<i>p</i>	<i>reading</i>	<i>rude</i>	<i>slapped</i>	<i>stars</i>	<i>stepping</i>
<i>store</i>	<i>tall</i>	<i>toy</i>	<i>alive</i>	<i>alphabetical</i>	<i>angels</i>
<i>bag</i>	<i>balloon</i>	<i>baseball</i>	<i>beauty</i>	<i>behave</i>	<i>cake</i>
<i>cars</i>	<i>cast</i>	<i>chain</i>	<i>characters</i>	<i>chinese</i>	<i>christmas</i>
<i>cj's</i>	<i>cloth</i>	<i>colors</i>	<i>daycare</i>	<i>dear</i>	<i>deck</i>
<i>desiree</i>	<i>directed</i>	<i>dollar</i>	<i>drive</i>	<i>driving</i>	<i>dueling</i>
<i>excuse</i>	<i>finding</i>	<i>flamethrower</i>	<i>flat</i>	<i>freddy</i>	<i>gameboy</i>
<i>grandpa</i>	<i>harlem</i>	<i>hat</i>	<i>hummer</i>	<i>it'll</i>	<i>jlo</i>

Table 22 The first 108 spritten words (out of 534 total) that Umoja children use that Molière do not use

Ann Dyson documents how many young children today appropriate popular media culture and knowledge to create texts that mediate their participation in school culture (2003; 2001; 1999; 1994). These texts, she says, present “complex tensions related to the symbolic, social, and ideological diversity of children’s present resources and pleasures” (Dyson 1999, p. 367). It is important to observe that while the Umoja children were able to appropriate spriting in ways that reflected their resources and pleasures, they were not able to appropriate writing in the same way. While spriting, the Umoja children managed to describe, detail and even enact their rich experiences with Yugio, Scooby Doo and Shrek while their writing rarely makes mention of their rich social and intellectual engagement around such pleasures.

6.5 Discussion

The Molière students appear to be able to realize their literacy in equal measure in spriting or writing. Their talkuments—created in less time and with less pressure for success—are remarkably literate sounding even though they were created and edited entirely in recorded speech. Across the correlates to literacy, their writing and spriting tended towards parity, on word token counts, word density, and rare words. It seems clear from the data presented that Molière students can exercise many correlates to literate abilities in spriting just as well as they can in writing.

The Umoja students present a more complicated picture. Their spriting and writing represents them in completely different lights. Their writing is brief, densely written with few function words to situate the use of more complex words. They simply do not write long enough texts to even experience some of the longer forms, such as personal narratives. But whatever their writing says about them in telescopic, Sapphic fragments, their spriting says

at length, with a phenomenal increase in rare words, and a word density ratio that matched the spriting and writing levels of Molière children.

Spriting allowed me to see the Umoja children's ability to speak their mind, use sophisticated and diverse vocabulary to build arguments and stories. When I received their writing samples, I was literally shocked at the difference between their texts and talkuments. I hardly recognized them through their writing, and I was thankful I had come to know them through their spriting work. It is important to provide children who come to school with less developed writing skills and less experience with textual forms with ways to acquire, exercise and challenge their knowledge and composition ability.

It is equally important for teachers to be able to see the knowledge and abilities that these students bring to the classroom. If the primary medium for feedback from the child to the teacher is the sometimes distorting lens of writing, children (poor children especially) who come to school not having a strong relationship with writing and the other factors that serve to bias school success in favor of some will continue to be placed wrongly in the lowest ability streams and learning disabled groups for no more reason than their abilities are only viewed in the most unfavorable light conditions.

Talkument length has a complicated relationship to text length. It is not necessarily longer than writing. For children ages 8 to 9 who write at length and often, the differences in length between their texts and talkuments are negligible. For children ages 7 to 8 who do less lengthy composition and seem not to have appropriated writing as an important intellectual tool yet, their talkument lengths dwarf their text lengths. For some, then, spriting can be the same as writing; for others, spriting is the dialectical opposite of writing. All children can experience higher-level principles of composition in spriting very early that only some will encounter in writing, and that at only advanced stages.

So much of our writing instruction is focused upon making children write lengthy texts. With spriting, however, when the means of production are so much easier, building a lengthy talkument is easy. In fact, the youngest children are the best at creating lengthy talkuments! Building a short, effective talkument is much more difficult. The superficiality of our concern with length is most evident when listening to the children themselves. Children transfer values they have learned about text production to spriting production. Children at both schools bragged openly about the 'length' of their talkument as opposed to more audience-directed concerns, such as organization, effectiveness, and appropriate register.

Recognition of the superficiality — and ultimately ineffectiveness — of common measures of literacy should have a long-term pedagogical impact. Whereas writing instruction attempts to move children towards longer, more explicative texts; spriting instruction should focus on creating shorter talkuments through editing for high-level goals like authorial purpose and audience effectiveness.

And lastly, I provide some meta-commentary on the current means of measuring vocabulary use and development. Filtering these children's vocabulary through a 'commonly known' word list, a common approach to vocabulary knowledge, did not produce a list of 'rare words' for either school. It simply highlighted the cultural changes that has occurred in the world since the common word list was made (in this case, nearly 30 years ago). The Living Word Vocabulary has "turntable," but not "computer," "television," "movie," or any

of the plethora of videogame devices. It also has 'elm' and 'chestnut' trees, both of which have suffered irreparable blights since the early twentieth century and are all but eliminated from their former prominent positions in the North American landscape. But this focus on the defunct or obsolete is merely a quaint problem in comparison to the racism and cultural bias portrayed in word selection.

All too cognizant of the problems, Andy Biemiller is producing a new (long overdue) version of the Living Word Vocabulary list to be published through World Book International in 2005. But clearly, in the long run, vocabulary lists like this are untenable if not damaging because researchers cannot hope to keep pace "by hand" with the fast pace of language evolution. As well, any small group will inherently have too narrow a view on what general language competence means. This task requires a more distributed approach. It seems imperative that distributed ad-hoc online communities (of the sort that generated Wikipedia) and automated computer programs take over responsibility for generating continuously-current versions of commonly known words to assess vocabulary ability. There is also no reason to limit these efforts to single words. Dictionaries have done so because of page limitation restrictions. Combinations of words are also unique and evolving and receive too little attention from cataloguing and assessment efforts. It is equally imperative to establish clearly whether the vocabulary/phrase lists are descriptive of children's competence or prescriptive of what they should know, as these two can become hopelessly entangled. Once a word list exists, it is often co-opted in ways and for purposes it was not intended to address.

Looking at the overlapping and different sets of words revealed much about cultural knowledge, values, and experiences of the children. Neither so-called 'rare' set seemed to be inherently rare, though they were clearly very different. This points to the inherent problems in using a static predetermined word list to assess children's vocabulary knowledge, especially one that does not change for decades even as children's toys, amusements, and entertainment evolve several times over. Many children nowadays look to the narratives on television and movies, played out again in card and video games, as more compelling than storybooks. A 'commonly known' vocabulary list as they are currently prepared and infrequently updated is a crude measure that over-samples some children's knowledge and vastly underestimates others', very likely the ones most vulnerable and at-risk of school failure.

Student	Title	Total Words Written	Different Words Written	Different Word density	Rare Token % of Total	"and" Tokens % of Total	"then" Tokens % of Total	"then" Tokens	Periods	Commas
Edith	std_Edith.txt	532	213	0.40	11%	2%	2%	13	29	8
Emily	std_Emily.txt	404	172	0.43	12%	5%	1%	3	29	7
Madeline	std_Madeline.txt	286	129	0.45	8%	4%	1%	4	21	6
Andre	std_Andre.txt	311	146	0.47	17%	3%	1%	3	23	15
Sean	std_Sean.txt	375	166	0.44	11%	6%	0%	0	25	7
Francois	std_Francois.txt	230	121	0.53	17%	2%	0%	1	25	2
Charlotte	std_Charlotte.txt	226	129	0.57	19%	1%	1%	2	20	11
	count	7	7	7	7	7	7	7	7	7
	average	337.7	153.7	0.47	13.76%	3.24%	0.98%	3.7	24.6	8.0
	SD	108.8	32.5	0.06	4.02%	1.70%	0.78%	4.3	3.6	4.1
	min	226.0	121.0	0.40	8.39%	1.33%	0.00%	0.0	20.0	2.0
	max	532.0	213.0	0.57	19.47%	5.87%	2.44%	13.0	29.0	15.0

Figure 36 Summary data for Molière writing samples

Student	Title	Total Words Sprited	Different Words Sprited	Different Word density	Rare Token % of Total	"and" Tokens % of Total	"then" Tokens % of Total
Emily	MIT sprite write	525	225	0.43	15%	5%	1%
	bbbbbbbbbbbbbbbbbb	317	133	0.42	14%	10%	2%
	oooooooooooooooooooo	338	160	0.47	15%	4%	0%
Sean	fire ball	602	243	0.40	17%	5%	2%
	pizzas	229	123	0.54	13%	1%	0%
Elizabeth	short storys	460	197	0.43	16%	4%	1%
	retold story	299	135	0.45	13%	2%	0%
	UNTITLED	619	169	0.27	16%	3%	0%
Edith	weird western people	81	53	0.65	17%	6%	1%
	my opinion mineeeeeee	640	222	0.35	15%	3%	1%
Charlotte	Short stories	240	127	0.53	21%	3%	0%
	Boo	305	139	0.46	11%	4%	1%
	sounds	54	39	0.72	15%	4%	0%
	last day	134	92	0.69	14%	1%	0%
Adem	adem	231	131	0.57	16%	2%	0%
	MIT	167	81	0.49	19%	2%	0%
	classes	413	170	0.41	21%	2%	0%
Madeline	MIT record	171	95	0.56	16%	2%	1%
	my storis	195	97	0.50	11%	6%	1%
	dmnvmfchn	223	105	0.47	13%	1%	1%
Andre	rrrrayu	249	108	0.43	17%	7%	0%
	sound	193	84	0.44	14%	3%	0%
	new	349	150	0.43	13%	1%	0%
Francois	My Three Storys	460	184	0.40	12%	3%	0%
	the sounds	120	57	0.48	6%	0%	0%
	count	25	25	25	25	25	25
	average	304.56	132.76	0.48	14.78%	3.35%	0.48%
	SD	167.58	54.39	0.10	3.17%	2.21%	0.62%
	min	54	39	0.27	5.83%	0.00%	0.00%
	max	640	243	0.72	21.25%	9.78%	1.89%

Figure 37 Summary data for spritten talkuments by Molière Elementary children

Student	Title	Total Words Written	Different Words Written	Different Word density	Rare Token % of Total	"and" Tokens % of Total	"then" Tokens % of Total	"then" Tokens	Periods	Commas
Tupac	std_Tupac_09_23_2003.txt	36	28	0.78	17%	6%	0%	1	0	
	std_Tupac_10_6_03.txt	21	17	0.81	14%	10%	0%	1	0	
	std_Tupac1.txt	21	16	0.76	19%	5%	0%	2	0	
	std_Tupac3.txt	32	25	0.78	16%	0%	0%	4	1	
Derrick	std_Derrick_09_08_03.txt	55	36	0.65	5%	9%	0%	3	0	
	std_Derrick_09_09_03.txt	86	41	0.48	14%	3%	0%	14	0	
	std_Derrick_09_10_03.txt	45	31	0.69	11%	2%	0%	5	2	
Niesha	std_Niesha_01_06_04.txt	23	19	0.83	17%	4%	0%	2	0	
	std_Niesha_03_23_04.txt	27	23	0.85	19%	0%	0%	1	0	
	std_Niesha_09_17_03.txt	63	41	0.65	6%	2%	0%	1	0	
	std_Niesha_11_14_03.txt	76	37	0.49	18%	5%	0%	2	1	
	std_Niesha1.txt	34	29	0.85	0%	0%	0%	4	0	
	std_Niesha2.txt	28	27	0.96	21%	4%	0%	2	0	
Mikayla	std_Mikayla_09_26_03.txt	51	34	0.67	12%	6%	0%	2	1	
	std_Mikayla_10_27_03.txt	28	24	0.86	14%	4%	0%	0	1	
	std_Mikayla1.txt	23	19	0.83	9%	4%	0%	3	0	
	std_Mikayla3.txt	21	18	0.86	14%	10%	0%	1	0	
Ali	std_Ali_09_25_03.txt	29	15	0.52	3%	0%	0%	5	0	
	std_Ali2.txt	33	23	0.70	27%	0%	0%	0	1	
	std_Ali3.txt	26	25	0.96	19%	0%	0%	0	0	
	std_Ali4.txt	39	19	0.49	21%	0%	0%	0	0	
	count	21	21	21	21	21	21	0	21	21
average	38.0	26.0	0.74	14.18%	3.46%	0.00%	0.0	2.5	0.3	
SD	18.5	8.1	0.15	6.59%	3.25%	0.00%	0.0	3.1	0.6	
min	21.0	15.0	0.48	0.00%	0.00%	0.00%	0.0	0.0	0.0	
max	86.0	41.0	0.96	27.27%	9.52%	0.00%	0.0	14.0	2.0	

Figure 38 Summary data for older Umoja Elementary writing samples (older student cohort only)

Student	Title	Total Words Sprited	Different Words Sprited	Different Word density	Rare Token % of Total	"and" Tokens % of Total	"then" Tokens % of Total	"then" Tokens
Derrick	the little ginger bread man	199	86	0.43	13%	8%	4%	7
	My Birthday Derrick	219	90	0.41	11%	9%	4%	8
Ruben	my birthday	167	86	0.51	15%	7%	3%	5
	April vaction	290	128	0.44	17%	4%	0%	1
Mikayla	Esmeralda's Missing Scarf	287	119	0.41	11%	8%	0%	1
	The girls	310	114	0.37	9%	9%	2%	5
Ali	ali	153	60	0.39	7%	7%	1%	1
	Yugiho	48	30	0.63	13%	0%	0%	0
	what am I going to do for my birthday	168	64	0.38	13%	5%	0%	0
	not	19	10	0.53	16%	0%	0%	0
	p	61	22	0.36	5%	8%	10%	6
	tf	246	120	0.49	21%	7%	3%	8
	disney channel for kids	36	29	0.81	14%	6%	0%	0
Mariah	letter to Ruben	30	22	0.73	30%	0%	0%	0
	Ninja Turtles	305	108	0.35	11%	7%	0%	1
Niesha	niesha lee lanelle collins	572	179	0.31	17%	2%	0%	0
	niesha the funny girl	259	114	0.44	10%	2%	0%	0
	niesha's johnson family vacation	706	242	0.34	11%	6%	3%	20
	niesha's book	169	71	0.42	25%	8%	0%	0
	niesha	461	187	0.41	10%	4%	0%	0
Tupac	Mark	222	89	0.40	21%	9%	1%	2
	Tupac	79	52	0.66	8%	5%	0%	0
	count	22	22	22	22	22	22	22
	average	227.5	91.9	0.46	13.88%	5.47%	1.38%	3.0
	SD	174.8	58.3	0.13	6.03%	2.98%	2.32%	4.8
	min	19	10	0.31	4.92%	0.00%	0.00%	0
	max	706	242	0.81	30.00%	9.13%	9.84%	20

Student	Title	Total Words Sprited	Different Words Sprited	Different Word density	Rare Token % of Total	"and" Tokens % of Total	"then" Tokens % of Total	"then" Tokens
Cole	Smiley Face	489	155	0.32	10%	12%	3%	17
	cole	220	67	0.30	20%	14%	2%	4
Trey	Meets the SpriterWriter	171	62	0.36	6%	12%	6%	10
	summer	245	102	0.42	10%	9%	6%	15
Zackary	pokemon 2	68	74	1.09	46%	10%	0%	0
	all grown up	43	28	0.65	12%	9%	0%	0
Oba	oba	712	193	0.27	12%	13%	7%	49
	spykids	102	38	0.37	10%	6%	1%	1
Khalil	What I've been doing	330	119	0.36	7%	8%	2%	5
	<i>count</i>	9	9	9	9	9	9	9
	<i>average</i>	264.4	93.1	0.46	14.63%	10.34%	2.96%	11.2
	<i>SD</i>	218.0	54.6	0.26	12.23%	2.58%	2.71%	15.5
	<i>min</i>	43	28	0.27	6.43%	5.88%	0.00%	0
	<i>max</i>	712	193	1.09	45.59%	13.64%	6.88%	49

Figure 40 Summary data for spritten talkuments by younger Umoja Elementary (unletterate) students

7 Children Spriting Together

Children can learn richly from each other in ways that serve to develop their sociocognitive and literacy abilities. Research on peer collaboration provides a different perspective on how children learn as compared to those based on expert-novice models of knowledge and skill transfer.⁶⁵ A primary benefit of peer collaboration is that all children can share their relative expertise of literate knowledge and skills (Rogoff, Matusov, and White 1996; Daiute and Dalton 1993; Yarrow and Topping 2001). Oral language abilities⁶⁶ that predict later literacy and letteracy success are in evidence through peer collaboration (Pellegrini and Galda 1993, 1996) as well as affect the development of a composition in fundamental ways (Daiute and Dalton 1992; Dyson 1987; Nicolopoulou 2002).

Peer collaboration during spriting emerged as a very important factor in children's spritten products, motivation for spriting, and self-reported 'best' spriting work. Spriting thus offers another window onto peer collaborations and how it might benefit literacy development. Making reference to previous work about how peer groups have shaped oral and written literate growth, this chapter will discuss the ways in which spriting supported spritten, literate work.

How to most effectively use peer collaboration in teaching and learning is an area of current research. 'Collaborative learning' and 'peer groups' are concepts too vague to communicate what they actually consist of and the possible outcomes of such interactions. Not all peer collaborations function in the same way or to the same ends. For example, the mutuality of the relationship shared by the collaborating children affects the learning outcome (Pellegrini and Galda 1996; Galda and Pellegrini 1996). 'Mutual friendships', those in which children both report that they consider the other child a friend, are especially useful for literacy development because the emotional cycle of conflicts and resolutions the children experience together serve to transform their epistemic positions and beliefs (Johnson and Johnson 1979). Resolution especially affords children the opportunity and occasion to talk about language and linguistic processes. But peer collaborations not characterized by 'mutual friendships' are also useful for their 'cognitive de-centering' effects, as children must assume and express different perspectives through meta-language, another predictor of literacy skills (Galda and Pellegrini 1996).

Gender differences are found increasingly significant in peer collaboration. Peer collaborations amongst girls (but not boys) who are 'mutual friends' afford them more

⁶⁵ Stemming from Vygotsky's constructivism, research has focused upon how caregivers and teachers provide children with their only opportunities for early literacy learning: parent-child conversational interactions (Ninio and Snow 1996; Snow 1972, 1977, 1983), those conversations that occur around storybook reading (Purcell-Gates 1988, 1991), and also around other media like television programs (Close 2004), have been seen as valuable for literacy success in school. Teachers scaffold children to more mature literate forms and ways of composing (Collins, Brown, and Newman 1989; Donovan and Smolkin 2002; Kamberelis and Bovino 1999).

⁶⁶ Meta-language (e.g. "Do you think we should singing this?"), and language about linguistic (e.g. "I want to change that word") and mental (e.g. "I was feeling awful") states constitute the kind of talk early literacy researchers attribute to literacy preparation (Pellegrini et al. 1998).

opportunity to *express* literate language (Pellegrini and Galda 1996). Gender also has developmental impact. Kindergarten girls tend to develop from collaborative groups towards individual authorship over the course of the kindergarten year, whereas boys tend to develop from individual authorship towards collaboration (Nicolopoulou and Richner 2004).

Lastly, not all talk about language achieves commensurate learning gains. For example, when peers talk about spelling issues for significant amounts of collaboration time, spelling improvements are not evident (Reddy and Daiute 1993).

The tools available for literate work might also have a significant effect on collaboration means and ends. I note anecdotally that most research on peer literacy learning flourishes in the early elementary grades when much literacy education is based in oral activities: sharing time, telling and dictating stories, peer conversations around emergent writing, and more. As children move to higher elementary grades, middle school and beyond, peer collaboration is increasingly sequestered to what I will call end-of-process, or revision-based, writing activities rather than infusing the entire invention, composition, and editing process as it did when children were not yet letterate. In support of this statement, I note that collaborative research at the college level has been weighted heavily towards end-of-process activities like peer review and teacher-student conferences in comparison to fostering dialogic peer inquiry and co-production throughout the process of composition, such as Kenneth Bruffee (1993) and Martin Nystrand (1997) advocate.

Spriting seems to invite close collaborations that can persist through the first stages of composition (e.g. planning, drafting) in a way that our current practices and tools for writing can resist. With the introduction of spriting and supporting technology, the oral activities that comprise much of the literate composition process in the early elementary grades can scale up to the more sophisticated literacy tasks and purposes introduced in the higher elementary grades, potentially revealing new ways in which peer collaborations can function to the benefit of literacy development. As the sophistication of spriting technology increases, collaboration might be realized in stronger, more integrated ways throughout school and across the composition process.⁶⁷

In this chapter I provide two different kinds of data analysis: quantitative descriptions and case studies. Quantitative description provides an overview of two differences between collaborative and individual spriting that emerged as important: time spent on a single spriting task and the number of editing moves. The second method of analysis is a series of three case studies. Each case study describes the peer interactions of three dyadic collaborations in spriting that occurred within a longer three-month study. I use the case studies to speculate about the socio-cognitive function of this activity in each child's literacy learning trajectory.

⁶⁷ Spriting technology might also provide a useful comparison for improving the design of collaborative computer-based writing systems (for example, Pargman 2003).

7.1 Approach

I began this study as an investigation of the potential impact of spriting upon literacy development, not a study of collaboration. I was committed, however, to a design research program that involved introducing variation at all levels of classroom contact (e.g. technology, suggested assignment, length, classroom participation, etc.). The importance of spriting collaboration emerged as a powerful effect while varying the participation formats in the classroom. For example, four weeks into the study at Molière Elementary, I introduced an 'idea seed' (a demonstration and model), which was a conversational talkument my husband and I made that told a story of seeing a wolf trot through our lonely campsite while we were cooking chili. This talkument was a raging success. Not only do children love wolves as characters and subject matter, but also the idea for collaborative talkuments of all kinds (not just stories) became a central way for them to organize their compositions over the ensuing nine weeks. In my mind it was the most successful idea seed and classroom arrangement for generating persistent and self-generating student interest, activity and inventiveness.

I did not assign them partners. The children broke up into pairings extremely easily, often with the person next to them, unless of opposite gender, in which case they sought someone across the room. These partnerships sometimes involved unpredictable pairings from my and the Molière principal's perspective, but developed into friendships that the Molière principal noted were evident during the regular school day even though the partners might not have been in the same classrooms. Further, although the children tended to form close and productive collaborations, they were not selfishly possessive of their partners (although these original partnerships persisted with few exceptions until the end of the class, most developing into 'mutual friendships'). They became adept at establishing temporary collaborations with others more generally and would actively seek out the participation of someone else to compose a different idea. After this initial invitation to sprite collaboratively, the children assumed free license and chose to work together often.

Because I did not attempt in any way to control individual versus collaboration as a variable, my observations are necessarily anecdotal and focused upon specific events that I perceive as having broader importance to composition in education. In particular, I focus these anecdotes on how collaborations take on a different flavor and importance in spriting composition. I develop three ideas that I support with case studies: how collaborations can enable children to achieve success with different styles and forms than they might otherwise; how collaborations can allow children to be more physically active while spriting; and how collaborations can be a way of allowing students unfamiliar with the shape of school literacies to get started.

I draw mainly upon the Molière students for my case study examples because of differences in the participation contexts between Molière and Umoja Elementary schools. At Molière, all eleven students were in the same computer lab for one intensive hour per week; at Umoja the students would often come to work with me one-on-one and had to request directly if they wished to work on something with another child. A single, one-hour class per week fostered more opportunities for peer collaboration. Given this, it is surprising that

there was as much collaboration between children at Umoja as occurred, since they had to secure an additional level of permission and social coordination before it could occur. Furthermore, Molière had more students in the same age-ability range (ages 8-9, grades 3-4) while Umoja had a highly diverse age-ability range (ages 5-10) and did not place students in age-homogenous grades.

7.2 Observational and Data Trends

Children are self-motivated to work much longer on talkuments they author collaboratively with a friend than individually, regardless of whether they or I initiated the composition. Table 23 presents the average number of occasions on which students worked on the same talkument, comparing individually versus collaboratively authored talkuments.⁶⁸ The Molière students worked twice as long on collaborative (2.6, SD 1.1, N=7) talkuments than individually (1.2, SD 0.50, N=25) authored talkuments. The older Umoja students worked slightly longer on collaborative (2.0, SD 1.4, N=1) talkuments than individually authored (1.3, SD 0.6, N=22). Note that data points are scarce for Umoja collaborations, and there is no effect for the younger Umoja students. Although N seems quite low for collaborative talkuments, keep in mind that each N for collaborative talkuments represents two students' time and attention. My field notes and experience in the classrooms confirm that children spent a lot of their time on collaborations with others—their work with others was often the work they took most seriously, worked on the hardest, and were most proud of when finished, as demonstrated by what they chose to demonstrate to their peers during sharing time.

	Individual	Collaborative
Molière	1.2	2.6
Umoja older	1.3	2
Umoja younger	1	1

Table 23 Average number of separate days on which students worked individually or collaboratively on talkuments.

Children want to flow between collaborative and individual composition activities, and they do, given the opportunity. Studies that hold individual and collaborative work as exclusive variables are not in a position to observe this flow. Since the design research methodology I used did not force composition activities into a 'collaborative' versus 'individual' composition pattern, there are examples of children who began talkuments collaboratively and would later edit or annotate them individually. Occasionally collaborators would argue and split up, at which point an individual child might continue working on the talkument. This flow made placing a talkument in an exclusive 'individual' versus 'collaborative' category very difficult. More broadly focused analytic tools, such as case studies, might suggest other valid categories. Due to the fuzziness of the categories themselves, comparing time on task between individual and collaborative talkuments is

⁶⁸ Each talkument represented in this chart was selected from the total data set as representative of the children's better work and transcribed to text for further analysis.

somewhat a fictitious construction (although I treated the numbers very conservatively). Is a talkument begun collaboratively and continued by an individual a ‘whole’ collaborative talkument or ‘half’ collaborative talkument? The fluidity with which children moved through different participation contexts also throws the status of ‘the work’ (e.g. text, talkument) into question. What is the original ‘work’ when it has gone in two different directions? These philosophical questions aside, it was nonetheless very clear that on average the children did not work so hard or long on individually initiated talkuments than they did on talkuments they began collaboratively; the numbers in Table 23 accurately reflect the classroom reality.

7.2.1 Composition and Editing

Individual or collaborative arrangements also affected the composition and editing patterns. This discussion will draw upon average data from both Molière and Umoja Elementary, presented in Table 24 Individual versus collaborative data on composition and editing moves. Though the numbers of collaborative talkuments are much lower than individual ones, each N in the Collaborative column represents the efforts of two children, while each N in the Individual column represents one child. Also, this data does not control for the longer amount of time children spent composing collaboratively; therefore, one would expect the collaborative numbers to be higher than individual. The averages are charted in Figure 41 and Figure 42.

		Individual			Collaborative		
		N	Ave	SD	N	Ave	SD
Record	<i>Molière</i>	24	17.1	14.8	6	24.8	28.2
	<i>Umoja</i>	20	7.7	5.6	3	13	3.5
Play	<i>Molière</i>	24	26.4	14.6	7	46.9	47.1
	<i>Umoja</i>	20	16.2	6	3	27.3	6
Record & Play	<i>Molière</i>	24	8.8	7.3	6	8.3	7.5
	<i>Umoja</i>	20	3.6	3.2	3	11	3.2
Delete	<i>Molière</i>	23	12.5	11.7	7	9.6	8.2
	<i>Umoja</i>	18	7.3	6.5	3	20	9.5
Split	<i>Molière</i>	10	4	3.1	7	12.4	29.8
	<i>Umoja</i>	8	3.8	3.3	3	1.3	0.6
Move	<i>Molière</i>	12	9.8	14.7	7	4.7	5.9
	<i>Umoja</i>	4	4.8	4.9	1	1	N/A

Table 24 Individual versus collaborative data on composition and editing moves

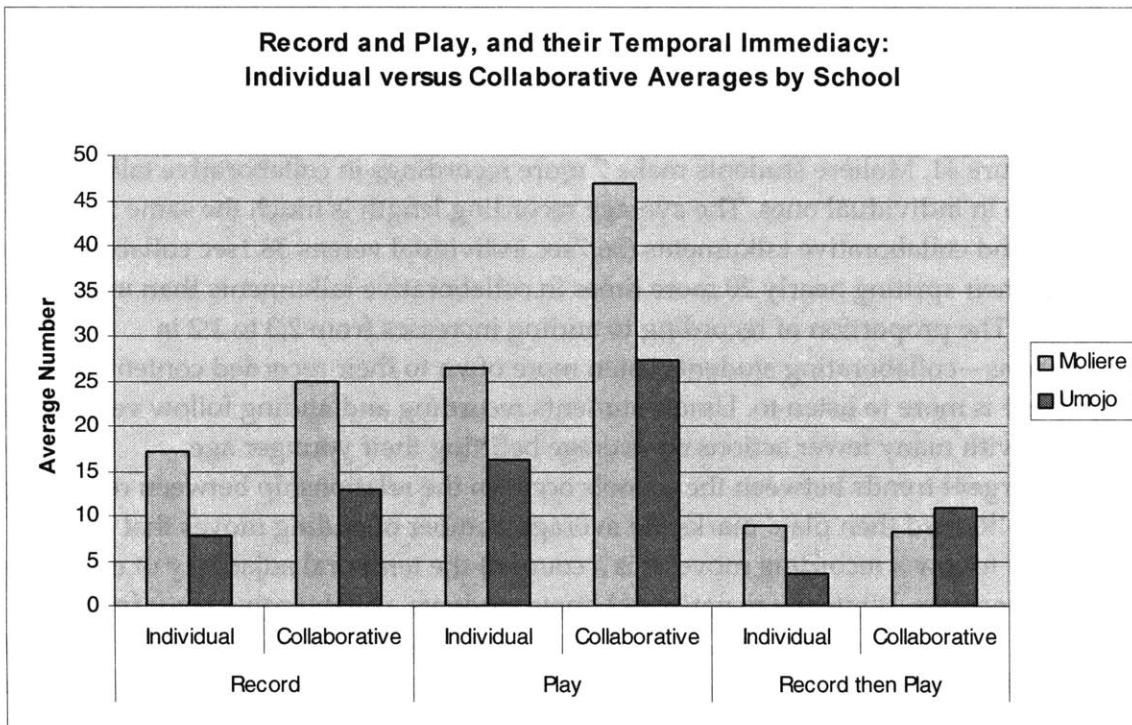


Figure 41 Record and Play, and their temporal immediacy across individual and collaborative composing

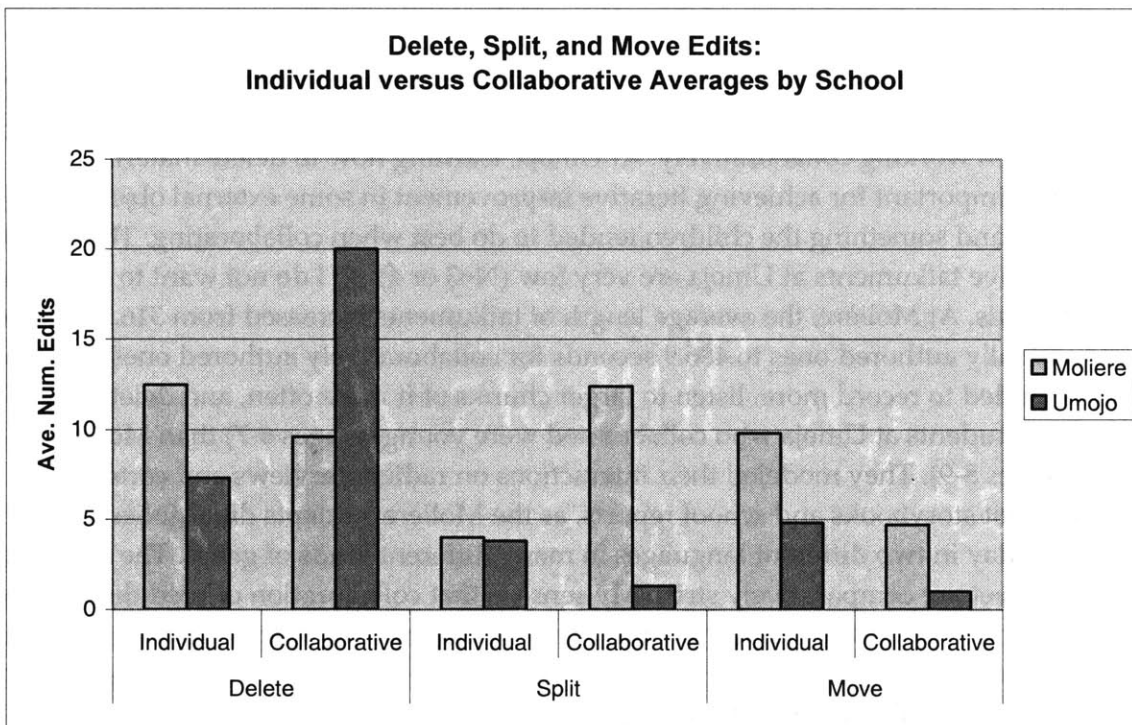


Figure 42 Delete, split, and move edit averages across individual and collaborative composing

There are some strong trends, mostly in recording and playing. Children appear to be more productive in collaborative spriting than they are individually, although this greater productivity might be a result of the longer amount of time they spend on a collaborative piece. In Figure 41, Molière students make 7 more recordings in collaborative talkuments than they do in individual ones. The average recording length is much the same in individual and collaborative talkuments (36.7sec individual versus 38.1sec collaborative). They aude their spriting nearly 20 more times in collaborative talkuments than in individual talkuments. The proportion of recording to auding increases from 2:3 to 1:2 in collaborations—collaborating students listen more often to their recorded content, even though there is more to listen to. Umoja students recording and auding follow very similar trends, but with many fewer actions on average befitting their younger age.

Divergent trends between the schools occur in the relationship between recording and auding. 'Record then play' marks the average number of auding moves that immediately follow a recording move. It is a count of the temporal adjacency of recording and playing actions. While the majority of Umoja students' collaborative recordings are immediately followed by a playing move, Molière students' tendency to do this remains flat even while the number of recordings nearly doubles. This pattern echoes individual editing data, as presented in Chapter 5. Thus, collaborations help Molière students make composition plans that extend well beyond a single recording action through their conversation with a peer. Collaboration also provides a free set of ears to evaluate immediately whether they achieved their spriting goal, alleviating an immediate need to 'relisten'.

Another divergent trend between the schools is deletions: Umoja students are twice as likely to delete spriting material when collaborating while Molière students are less likely to delete when working collaboratively. At Umoja, learning how to delete material is enormously important for achieving iterative improvement in some external object (learning how to edit) and something the children tended to do best when collaborating. The numbers of collaborative talkuments at Umoja are very low (N=3 or 4), so I do not want to read too much in to this. At Molière, the average length of talkuments increased from 316.25 seconds for individually authored ones to 486.9 seconds for collaboratively authored ones: Molière students tended to record more, listen to larger chunks of it more often, and delete less of it.

The students at Umoja who collaborated were younger (ages 6-7) than Molière students (ages 8-9). They modeled their interactions on radio interviews and cartoon narratives, not storybooks and school reports, as the Molière students did. Molière students write every day in two different languages in many different kinds of genre. The standards they must meet are comparatively strict. My sense is that collaboration offered these students different kinds of opportunities for learning. The Umoja students who collaborated seemed to use more critical judgment when doing so, and worked in a more iterative, bricolage fashion; in contrast, the Molière students developed better plans (thus requiring less revision) in the conversations they had before and during composing (though this is not true for all of them), and were more able to play and experiment when working collaboratively.

The data provides only small clues to tremendous differences between what children learned through the knowledge sharing that occurs in collaborations. This diversity is evident in the standard deviations in Table 24, more often larger than the average, as compared to the individual data. The important things learned by one child average out important things learned by another child. For example, two girls at Molière were accustomed to composing individually fabulously long talkuments—five to fifteen minutes of continuous speech. But what they gained by collaborating was the experience of producing a series of short, punchy ‘dialogic’ stories chronicling the adventures of Batman and the Joker. Other children had the reverse experience. Boys, in particular, who did not have the ability to focus by themselves for long enough to compose a lengthy piece and would often delete everything they had done, were able to make very, very long talkuments in collaboration with a friend.

7.2.2 Talkuments and Authorship

Talkuments reveal participation in ways that texts conceal, providing a different kind of conceptual relationship to the concept of ‘authorship’ and ‘the talkument’. On the last day at Molière I held a demonstration time when the children could play three minutes of the talkument they felt represented their best work. More than one-half of the class chose collaboratively produced talkuments to demonstrate as their favorite. Several children also told me that their favorite compositions, and the ones they felt were ‘best’, were ones they did collaboratively.

Adults might have qualms about representing collaboratively produced documents as their own. The children seemed to have none. Why might this be? Talkuments are superior at identifying who made what contribution at which point than are texts. While writing tends to maintain the privacy of authorship, talkuments (at least at this point in spriting technology) demonstrate very clearly which person said what at which point. But I don’t believe the children were conscious of how spriting more clearly attributes intellectual contributions. Rather, they truly felt that they composed their best work—both imaginatively and discursively—while working with a partner. Their own contribution was maximized in a way that it was not when working alone (Daiute 1986). They chose to demonstrate it to the class because they were proud of the fact that they contributed to a fine work.

7.2.3 Cycle of Conflict and Resolution

Lastly, spriting collaborations were complicated social negotiations between children, each with their own ideas of how the composition should proceed, each with his/her own measure of what is ‘good.’ Disputes between children, interestingly, would lead to more composing activities as they would attempt to resolve their disputes by communicating with (sometimes distant) authorities. For example, Mikayla (age 7) and Mariah (age 6) had a serious argument while composing a talkument on Stitch (of Stitch and Lilo cartoon fame). They disagreed on what Stitch’s girlfriend’s name was. Mikayla thought it was Crystal and Mariah thought it was Sweetie Pie and later changed her mind to Angel. Mikayla left the collaboration in a huff to work with someone else when Mariah refused to cave in to her belief. Mariah, a plucky six year old, immediately srote a talkument to a classmate who had

been the local expert on Stitch and Lilo, but had recently left the school. This was not only Mariah's first letter writing experience, motivated by her authentic need for information to resolve a dispute with a classmate, it was also her first individually composed talkument. Through spriting this letter she learned some important lessons about letter genre and the permanence of literacy.

I can't think of a better way to engage with issues of literacy and composition than the ones that emerged while these girls were collaborating around their Stitch composition.⁶⁹ Certainly children encounter problems during individual compositions, but perhaps they reframe their goals and intentions in such a way as to avoid resolution of the problem. In collaboration it is more difficult to steer a course around problems, particularly when they emerge in interactions between people. Collaborative composition might be considered valuable simply because it engenders more highly motivated collaborative *and individual* composing activities.

7.3 Case Studies of Three Spriting Collaborations

Collaboration in spriting does not cause a single, unidimensional effect, save for greater student motivation and time spent than in individual spriting. In the following case studies I describe what it was that the children seemed to share with each other, judging from my observations of them in the spriting class, and the work they did that preceded and followed the interactions described. I highlight affordances available in spriting but not (or less so) in writing, as children were not equally capable with respect to spriting abilities. One girl who tended towards inflation and verbosity discovered important principles of composing a short talkument, especially through the use of sound effects. Children (especially boys) who struggle with the sedentary, finger-twitching occupation of writing are freer to stand, gesture, and move while engaging in a spriting collaborations. It is only during collaboration that one boy was able to focus his over-active body and control his low sense of self-worth in order to finish a very long talkument. And lastly, through experiencing both the intimacy and conflict of collaboration, a nonletterate child is motivated to sprite her first letter that appeals for relevant information from a friend.

7.3.1 More Challenging for Both

Even when children are individually capable and competent composers, collaboration can improve their motivation, broaden their individual repertoire of skills, and overcome difficulties of focus possibly brought on by lack of sufficient challenge. Elizabeth, age 8, and Edith, age 8, were both accomplished, adventurous, and eager compositionists at the

⁶⁹ I did not have Ruben's address to send the letter from Mariah, a terrible pity, since it would have been a valuable learning exercise for all of them. Although children deal with issues that appear trivial from a grown-up perspective, their questions and disputes are nevertheless extremely important to the maintenance of their social relationships and deserve serious scrutiny and attention from researchers. In our dislocative mobile age, I feel that children should have email accounts so that they could send email to each other and receive replies, maintaining a connection even after (especially after) children depart from one school to go to another. These emails could convey spritten messages as easily as written ones to allow children to maintain relationships even when not letterate.

Molière. They happened to be seated next to each other in the spriting class and developed a productive friendship over the course of the class, though they were not in the same class during school hours.

Elizabeth had a strong command of 'standard' American English and was familiar not only with classic English narratives like Cinderella but also many Haitian narratives she learned from her parents. She moved to the United States with her parents at age 4, beginning pre-school at Molière. Her parents, both medical doctors, stated on Elizabeth's school application that they spoke French at home (I do not know if they also speak Creole). On the very rare occasion her English abilities did not extend as far as her French ones, she would lean over and ask Edith for an English equivalent to a French word.⁷⁰ Elizabeth was a top-rated student at the Molière in all subjects and known to enjoy writing very much. I can appreciate why she was thus assessed when I listen to her individual spriting work: her deliberate choice of language, ability to freely adapt traditional stories to make the girl characters more adventurous and interesting, and her superb diction and expressive voice. Elizabeth was a very gifted orator. The only way to express her sensitivity to spoken language without hearing her sprite is to say that she took the time to caress each word and then released it lovingly.

In the after-school spriting class, all the children were more active and flamboyant. Elizabeth was the most physically active girl in the class, had difficulty comporting herself in a classroom fashion, and would often start some gymnastic move in the classroom, risking injury to herself and others in such close quarters. I also noticed that, although she made several stellar spriting compositions on her own in the first few weeks, she seemed to lose interest progressively in doing so. The less engaged she was the more restless and overactive she became. Perhaps I did not present enough of a challenge for her or excite her imagination. Perhaps she was tired of concentrating after a long school day, as many of the children were. Towards the middle and end of the spriting class, it was mostly through her collaborations with Edith that she was able to concentrate. There she was able to invest all her energy, intellectual and physical, into the composition effort, and gained a friend in the process. I believe that the challenges they set for themselves and their interest in the topic were equal to their considerable abilities.

Elizabeth was one of the students in the class least familiar with common computer interfaces and practices, including the difference between 'new' and 'open.' She thus had difficulty initiating and saving her spriting work and lost a composition on at least one occasion. Edith was more familiar with computer interfaces and during their collaborations was often the one wielding the mouse. Elizabeth was also absent for three out of thirteen classes when her family was traveling (the most days any child was absent in the spriting class), while Edith was never absent, adding to the difference between them in familiarity with the spriting technology.

Edith was fluent in English, never needing to resort to French to make her point, even verging on a generative ability and verbosity that could exhaust the listener. Her parents spoke French at home, but one would not guess this meeting Edith only. She was born in

⁷⁰ Elizabeth once broke off in the middle of a spriting recording to ask Edith for a word translation, providing evidence for this assessment.

Paris but moved to the United States to begin kindergarten at Molière. Her written composition given by her teacher was one of the longest I received, and her spriting compositions were also, pushing upwards of ten minutes in length with few moments of silence. She spoke very quickly, gasping for breaths, with a voice quality that sounded like she had been smoking for fifty years. She had an unexpected and virtuosi grasp of vocabulary. All in all, her spriting was sometimes difficult to follow, but edged towards brilliance.

I interviewed Edith about her thoughts on writing and spriting, she said she loves writing, mostly poetry.⁷¹ But she also loves spriting because it's faster. She insinuated at first that she perceived no differences between the two except in mechanical ways, but later contradicted this when she said she likes spriting better because it's more expressive. Her favorite compositions were the ones she did collaboratively with Elizabeth. Edith seemed to show a new side to her personality in the spriting class. She was a member of the student council and, according to the principal of Molière, was known for her pragmatic and level-headed solutions to problems. I found this description of Edith amusing since I had only witnessed her gamboling imagination and her penchant to push storytelling genres past the point where she was currently able to control them—certainly not her tendency towards conservative pragmatism. As I experienced them, both Edith and Elizabeth were adventurers.

7.3.1.1 Collaboration Can be Crushed Even Inadvertently

In total, Edith and Elizabeth sprited four significant pieces together: two in the Batman and Joker series; one called 'songs,' a twelve minute long interview in which each girl reflects upon her friends and likes/dislikes; and their final piece called 'a nic CIVILZED talkk 3ith sssss [sic]' begun and finished on the final day. I believe they would have done more together had their commitment to my research not stood in their way. When I picked the children up from the cafeteria to walk them down to the computer room each Thursday afternoon, Edith and Elizabeth were often close together and talking non-stop, making plans for their series of stories on Batman and the Joker. On one of those days I presented an idea seed, focused upon 'sounds that they hear.' Elizabeth asked me if they could work on something else. I said of course, and really meant it. However, Edith looked at me and said, "my mother told me I'm supposed to do exactly what you tell me to do, so I would prefer to do the sounds composition."⁷² I was stunned. What can I say to this? I thought I was merely making a suggestion and providing examples to broaden the possibilities the children might choose to exercise, but I find that I am determining the children's actions. I can't tell her to not listen to her mother. And though her mother had the best of intentions, she had

⁷¹ Though I discontinued interviewing the children after the first try because I couldn't effectively monitor the class while doing so, Edith insisted on being interviewed. She was so excited about being on camera in a formal situation. Elizabeth did not insist, so I do not have parallel information from her.

⁷² No mention has yet been made in reports of design research about how parents can help (and potentially harm) design research. I make note of these problems because they had significant impact and represent challenges to design research implementation in classrooms. Perhaps we researchers should take time to explain to parents about the goals and tenets of design research and how they can help make it a successful experience for their children and the researcher.

misjudged my research methodology. Meltdown. I asked Elizabeth if she was willing to do a sounds essay—or the story—by herself. She resisted as best she could by saying that she didn't remember any sounds—she spent the whole time in a car and couldn't hear anything—including the car! She was obviously angry and disappointed, which later found expression when she led the third graders as they verbally pummeled two fourth grade girls who were increasingly loud and unpopular. Unsurprisingly, the work Edith did that day turned out to be unremarkable. Even relatively unstructured research methodologies can influence the participation context of the classroom, and push it towards traditional individual composition.

7.3.1.2 “Batman and the Jocker [sic]” Series

Figure 43 below contains a textual transcription of Elizabeth’s and Edith’s first collaborative effort and the beginning of their ‘Batman & the Jocker [sic]’ series. They spent two spriting classes on this short piece, which is in itself a remarkable outcome when compared to their voluminous individual output. Separately they generated talkuments that pushed lengths measured in double digit minutes, yet together they take two days to produce two minutes? This result, like most of spriting’s results, undermines sheer word count length as a reliable measure of literacy achievement. Certainly spriting collaboration is not a simple $1 + 1 = 2$ and deserves close scrutiny about what together they achieve, and what they as individuals gain.

What composition and editing style did they use? They made 35 recordings to create this piece. They deleted 13 times and moved content 9 times. They reviewed their work on 51 separate occasions, of which only 21 immediately following their recording. Their auding pattern implies they had a strong model of what they wanted to say and enacted it, only reviewing several ‘moves’ later to see if they had indeed said it well enough. On the second day they spent working on the story, they changed the ending entirely.

Elizabeth: {VOC evil laugh} {SUNG da da da da:: da da da da:: } {QUAL tune is from the opening of Beethoven’s Fifth

Elizabeth: {VOC siren}

Edith: What did you do Joker. Don’t tell me its one of your new inventions.

Elizabeth: {VOC growls}

Edith: A white wolf. I thought those were extinct. They are. But I’m a ne::w kind. {VOC evil laugh}

Elizabeth: {VOC growls}

Edith: Now I will s- start up my transformer ray (.) to transform into (.) Ray:: Raymond {VOC evil laugh}

Elizabeth: {VOC karate scream}

Edith: {VOC grunt} That creature is *attacking me! Why:: does my sword go *through him.

Elizabeth: {VOC evil laugh} You have not seen the last of my invention. *this is a mixed (.) portion of dust and the skin of a ghost {VOC evil laugh}

Edith: {VOC combative sounds} Th- my gun goes in two (.) what do you - what do - how can I beat him?

Elizabeth: You can't beat somebody that's dead!

Edith: Hi my name is Batgirl I'll come and save you, with my super ghost hyper ray. ha! the Joker says

Elizabeth: {VOC evil laugh} {VOC giggle}

Edith: After the big explosion, Batman, find - Batman does not see Joker - the Joker or Batgirl. he supposes it's probably the Joker that captured Batgirl. when he looks around he finds a remote control. when he presses one of the buttons the monster starts to bark (.) and leap (.) and go everywhere in the room. and this is what he thought.

Edith: A new secret room. Ah! Ah! let me go Joker!

Elizabeth: {VOC evil laugh} I'll *never let you go. and your family will be killed and you (.) off from the face of the earth {VOC evil laugh}

Edith: Police police! we need (.) back up *now. {QUAL low voice} what did you say? {QUAL normal voice} I'm Batman it's Batman (inaudible) Batman we need back up *now! I found the Joker th- at the warehouse (.) ninety three! (.) come here soon!



document.wav

Figure 43 Elizabeth and Edith's first collaborative talkument called "batman & the jocker [sic]" available as a textual transcription and a RIFF wave file (2:47 minutes).

In 'Batman & the Jocker,' Edith and Elizabeth use conversation to achieve different and sophisticated literary effects. They move the voice of narration from first person, where the story begins and provides a hook to pull the listener in to the action, to third person, when Edith sprites, "After the big explosion, Batman...". Later they move back into first person, but in an unusual way. Edith sprites, "And this is what he thought." Instead of moving back into a common first-person dialogic sequence, she moves the narrative perspective to an interior plane, an exploration of Batman's internal state. In early modernist novels this internal state often earns a different typographic treatment, such as italic text, and it earns a low, intense voice quality here. I'm certain that learning how to write dialogue in their regular classroom exercises influenced their ability to control and sustain this complicated story. However, their facile movement from first-, third-, to first-interior person in this talkument is not evident in Edith's writing example or their individual talkuments.⁷³

What can Elizabeth's contributions tell us about collaboration? On the face of it, Elizabeth's spriting contributions are smaller and less linguistically oriented than Edith's.

⁷³ I did not receive a writing example from Elizabeth's teacher.

That is not to say that she did not contribute linguistically. The word images Elizabeth does contribute are succinct and powerful: “this is a mixed portion of dust and the skin of a ghost.” The skin of a ghost? Eyebrow raising. And “You can’t beat somebody that’s dead,” adds a new dimension to the challenges facing Batman. But what I want to consider is the vast number of sound effects Elizabeth contributes. We are accustomed to sound effects in television and movies, but rarely appreciate the complexity of their construction, and how— if they are well chosen—they can immediately situate the action more quickly than any description, draping an emotional fabric around the listener. Elizabeth’s use of violent tearing and gnashing sounds in the beginning seem to be the Joker’s conversational turns in response to Batman. Because Elizabeth chooses not to represent the Joker’s turn in linguistic terms, the threat that the Joker represents to Batman is all the more sinister because its unfathomable. Elizabeth is the invisible (but loud) voice of drama in these pieces.


The Batman sequel is available in Figure 44. Elizabeth and Edith edited their work jointly, often employing splits, moves, and deletions in measures that exceeded their individual work. But nothing can represent the time and energy they spent planning how to proceed—even while recording! In Figure 44 there are numbers in parenthesis, which represent moments of silence in the recording. Edith and Elizabeth developed a curious and idiosyncratic practice of flipping off the switch of their gooseneck microphone in order to conference together in private *while recording!* When I think about the position they preferred to sprite in I can appreciate why they did this. They sprote with their feet tucked up on their chairs, heads close together so they could share the microphone, and reclining back as much as small girls can in unmalleable school chairs. I suppose they resented the disruption involved in leaning forward, putting their feet on the ground, and extending their arm to stop the recorder. The effect of this practice is a 13 second and then a 30 second dead silence in the midst of Batman that they did not edit out. Instead, Edith recommended to me that the SpriterWriter eliminate silences automatically.

In an old rusty wearhouse the jockers hide out the jocker was sick and tired of nice normal people so he thought that if he could make an evil twin for evrybody but not just anybody he would take someone s DNA & would create the exact same person exept that he would make the twin evil & he would also make a males twin a female & a female a twin male .ee

of course you might think that that is completely impossible but nothing is impossible for the jocker . So he locked himself up in his labrotory

and swore that he would not come out before he was done . Days and days past before he came out .When he finally came out he was dancing & prancing he looked horrible . se

Edith: In a rusty warehouse the Joker’s (.) hideout, the Joker was sick and tired of nice normal people. So he thought what he - that if he could make evil twins, for everybody (.) but not just anybody, he would take some DNA, someone’s DNA and would create the exact same person except that he would {VOC inhale} make the twin evil and he would also make (.) males, a twin female, and the females (.) a twin male.

<p><i>Elizabeth:</i> Of course (.) you might think that this is completely impossible because (.) because (.) because what?</p> <p><i>Edith:</i> {VOC laughs} Cu::t!</p> <p><i>Elizabeth:</i> Of course you might think tha- that thi- that this is completely impossible, but nothing is impossible for the Joker so he locked himself (.) up in his laboratory. And swore that he would not come out, before he was done. Days and days passed b- before he came out. When he finally came out he was dancing and pr- prancing. He looked *horrible</p> <p>(13.0)</p> <p><i>Elizabeth:</i> He - he was all blue instead of (.) green. his hair wasn't black anymore (.) it was purple. his beard he- he- he:: had stayed months and days and so his beard was all white and shiny. and his teeth were all yellow and stained because he hadn't brushed his teeth. ah he was horrible (.) all horrible. his - his shirt was all (.) dusty - dusty and gray ah yes he looked horrible as horrible as a dinosaur maybe</p> <p>(30.0)</p> <p><i>Edith:</i> Chapter two. The accident. He was dancing and prancing, but he forgot that he had put all of his stuff (.) a- near him and he hid some of the products with (inaudible) stuff onto the *big place where he conserved all the bodies. They all got knocked down, and the people came out. As outraged {PRN rageous} as if they had been (.) as they - they - if they had been killed but relived again. Then all of a sudden, a product that, the Joker had been working on before, which was - which w- would turn anything wh- into whichever animal fell over all these creatures, of course they didn't turn completely animals. They turned into (.) what you know now (.) as some Greek (.) Egyptian or other (.) folk tale (.) or other (inaudible). And they are also drawn up in the sk- in the stars (.) if you look well. These creatures were *so mad, of course you know that he made twins everybody (.) e:ver:ybody* (.) including Batman himself and (.) um Batman::s friend (.) Batgirl. of course they had been on a vacation thinking that, at the Bahamas, uh thinking that the Joker of *course would be nice this time. But (.) the Joker never does, it does he.</p>	
 <p>document.wav</p>	
<p>Figure 44 Elizabeth's and Edith's "the evil jockers new plan [sic]", available here as the original written text, a transcription of the talkument, and the final talkument itself in RIFF Wave format (4:09 minutes).</p>	

The important thing to note about the sequel to Batman, shown in Figure 44, is that it has the dubious honor of being one of only two compositions at Molière that began as a textual composition in the Writer. But like other compositions children began in writing at both schools, Elizabeth and Edith's final piece was a talkument, not a text. The day on which they began this composition I suggested the children think about how their dialogues from the previous week could be represented in text. Edith and Elizabeth, as eager writers, discarded my idea of revisiting their old work and decided to begin a new piece, but in writing this time to satisfy my 'desire for text', as they saw it! Again, this piece took two days. They formulated the text shown in the top box of Figure 44 on the first day. On the second day they read their writing to the Spriter and then continued to develop it in spriting. The story does not appear to be finished, as Batman and Batgirl's evil twins are yet roaming the Earth as the superheroes fritter away their time in the Bahamas.... Further, there is audible evidence of their conversational process still in the talkument (e.g. "because...because what? CUT!"). They freely adopt the organizing structure of a book when

Edith sprites, “Chapter two. The accident.” It appears from this they are intending a book-length problem and resolution development—a very ambitious narrative project, but do not get farther than Chapter two.

In the sequel we can see evidence that the children experience their own writing anew when they read it out loud, discovering latent narrative directions. Elizabeth seems to stumble headlong onto the possibility that the text could provide an explanation for how one could change the sex of a person through their DNA when cloning them—a far more interesting narrative prospect than the more rhetorical ending in the text she was reading from, “but anything is possible for the Joker.” Unfortunately, they do not follow up on the possibility. Though there are few examples of children reading text to the Spriter, I note that those who did never ad-libbed—they always represented it faithfully and exactly. What does this say about their belief of writing’s editability?

Collaboration has its own dynamic with respect to talkument ‘authorship’. Edith claims the Batman and Joker series as her own and credits Elizabeth with ‘helping her out.’ Indeed, it appears as though Edith has more control over the development of the story thread itself and also speaks more. Before Elizabeth did more than help her out. She made these pieces possible. Before collaborating with Elizabeth, Edith sprouted a piece called ‘weird western people’ in which she begins experimenting with this fast-paced, dialogic narrative form they pursue in the Batman series, but she is not able to make it work (the action and dialogue cut away to the next thing too quickly). Only in her collaboration with Elizabeth is she able to realize this form. Clearly, Elizabeth’s ability to create a place and suggest action through sound, her slower and more deliberate talk rhythm, and her dramatic ideas, allows Edith to be successful in a fast-paced action-adventure genre. Elizabeth also develops the evil Joker into a very formidable foe. Clearly Edith learned something from Elizabeth about how to use sound effects to contextualize dialogic action in powerful ways; she recommended to me that the SpriterWriter technology incorporate sound effects (she was the only one to make such a recommendation).

We need to pioneer ways of recognizing the contributions that children make to each other, and the pieces they can sprite together that they cannot sprite alone, in more sensitive and equitable ways. Although I made it a point to introduce a collaboratively produced talkument as a product of two children’s work even when an individual child chose to demonstrate it as his/her own, it seems that we need to develop better theories for crediting intellectual contribution and work in a medium as strongly oriented towards multiple voices as spriting is.

Elizabeth might also have benefited from Edith. They did two more pieces together after the Batman series, one of which was an extended interview format over 12 minutes in length (1491 words). In this talkument Edith asks Elizabeth open-ended questions about her opinions on school, friends and siblings. Elizabeth gives long meandering responses reminiscent of Edith’s own early, diary-like talkuments. Though Elizabeth does produce some long talkuments on her own, she has stricter notions of narrative and action than Edith seems to, often requiring herself to know where she is going before she goes there. She discontinues several very promising stories because she doesn’t seem to know where to go with them and doesn’t know how to experiment and let herself fail. Though Elizabeth’s

disciplined technique might be necessary for a good oral storyteller, it is not a requirement for spriting as the composer can go back in and edit long rambling sequences later. Does Elizabeth, with Edith as her audience, have the opportunity to generate a meandering and diary-like chronicle of her entire life as she currently sees it? It is possible that by experiencing Edith's less disciplined approach to composition, Elizabeth gives herself permission to ramble on without a clear and present goal to see what she might discover in the process. In this way, she expands her repertoire of possible approaches to composition.

7.3.2 More Physical and Focused

Spriting composition, even at this early stage in technology development, permits more freedom of movement and action while composing than writing does. Especially when boys compose together, this might help them transform the activity into something more like play than like a formal literacy event. And this in turn might impact motivation, engagement, and ultimately the product.

Adem, age 8, and Nicholas, age 8, at the Molière were individuals with very different personalities and interests, so much so that their partnership was at first hard to understand. Adem was a small-boned, bespectacled child with red freckles, a bowl hair cut, and a sense of self-importance that sometimes made the other children roll their eyes. He seemed not to notice and was enthusiastically and seriously consumed with the activities of childhood. His parents were Turkish but Adem had grown up in the United States. His mother was a professor and his father an artist, both with international careers. His mother doted upon him and was there to pick him up and speak with me nearly every week. They spoke both English and French at home. Adem's weakest language at the time was Turkish. His mother told me that Adem wanted to be a scientist and inventor. He was enamored of unique names (e.g. SpriterWriter, spriting) and frequently incorporated mention of the technology (and MIT) into his compositions. He also overtly claimed the intellectual property of his spriting work at the end of every talkument, including ways the listener could contact him (e.g. street and email address, phone number) should they want to use his spriting content. Adem, like Edith, would often create two spriting compositions per class and seemed never to have a problem focusing, as he was extremely capable of making class work personally relevant and interesting to himself. Class work was *his own work*.

While Adem had an abundance of intellectual self-confidence, Nicholas seemed to suffer from a lack of it, though he was a talented composer.⁷⁴ The largest boy in the class, Nicholas had brown hair and velvet brown eyes. He found it very hard to stay still for any length of time. The computer teacher shared with me that he would put tape on the floor to indicate to Nicholas the farthest extent his chair could drift during a single computer class. Nicholas spoke English fluently. His mother was American, a teacher of French, and his father was French. They spoke both languages at home. I was impressed with Nicholas's creativity and juicy titles (e.g. 'pizzas,' 'fireball,' 'clovis,' 'punk,' et cetera). He seemed to have a gift for language and story, a curiosity for the obscure, and used a distinct spriting rhythm to run through his words, barely stopping but for a heaving breath. His topics were

⁷⁴ The principal of Molière offered low self-esteem as an explanation for Nicholas's behavior during the class.

often destructive, sexual, violent or focused upon freaks (e.g. '10,000 pound sumo wrestler'). I got the feeling that he felt others tolerated him only for the shock value he could elicit from them. I recognize that novels, children's stories, and other pieces of imaginative literature do not shrink from violence or the wildly fantastic, so the most disturbing thing for me about Nicholas's compositions was his process of beginning something that held great promise, not giving it a chance, and very soon deleting it. This happened so often that he very seldom finished any compositions. Further, after the class ended and I reviewed his process across the class (including his deleted recordings), I felt he had deleted his best starts and best work.

When Adem and Nicholas began to collaborate, they seemed to lend their best traits to the effort. Adem was able to explore more whimsical ideas while Nicholas was able to follow through on a good idea. Their 'A.N. Dialogue' consisted of an astonishing 78 different recordings, which amounted to a total spritten material length of 614.5 seconds, which they edited down to 519.4 seconds (778 words). Their editing efforts included deleting spritten material 23 times, moving material 16 times, and making 2 splits in the sound to enable finer edits.

In Figure 45 below, the person who spoke the line is listed on the left.⁷⁵ For clarity, each recording is represented by a new paragraph. Notice that the boys built their composition from bits and pieces of spriting, not trying in any way to perform the entire idea straight through. Though Adem was largely the one who controlled the computer, his own individual compositions do not demonstrate the sophistication of this approach, neither did Nicholas's. One of the products of their collaboration seems to be discovering another style of composing and editing.

Adem: I wanna get a pet.

Nicholas: So do I.

Adem: Let's get a dog!

Nicholas: No! *Cats! They're better.

Adem: No Dogs! *They're better.

Nicholas: No *cats are!

Adem: Dogs are (.) smarter and they're more (inaudible) and they need less attention and they're smarter.

Period!

Nicholas: Cats are more elegant. They're - they're s- flexible if they fall on their - if they start falling on their backs they actually fall on their feet! And they sleep fourteen hours a day so I can caress them {PRN em}, fourteen hours a day.

⁷⁵ I played a bit part in their composition because they demanded it of me. They told me what to say and when. I had no input into their topic, development or process.

Adem: {VOC inhale} I like dogs more so do you period! You- No ifs ands butts about it! *Dogs *are *the *best! Period!

Nicholas: But dogs stink! They pee on my shoes and
{VOC ewww::}

Adem: But cats are like (.) so:: not good!

Nicholas: Too late! I'm getting my f- forty dollars to buy (.) a cat! {VOC inhale} (.)

Adem: *I'm giving forty dollars (.) and I have a savings account, so I'll just mail a check and have my dog be sent by mail in a cage, separate, with his own grooming laboratory.
Cats are (.) yucky. Cats are like so:: not good. Cats - I'll never buy a cat. If you buy a cat, I'm - If - If - {VOC Nicholas prompts} If you buy a cat, I'm showing it in the cash or carry it. Period.

Nicholas: But if you buy a dog its just going straight to the dump. I want a cat. Cats are like so elegant.

Adem: Elegancy Schmelagancy! I'll never buy a cat! Period! If it- If you buy a cat I'm bringing i- it to the dump, I'm (.) killing it. I'm doing everything I can for you *not *to *have *a *cat. Pe::ri::od::! Now do you hear that? Period!

Nicholas: Well *I'm getting a (.) cat because I already stand a check {VOC inhale} of fifty thousand dollars. Well you're never going to get a dog. Too late. {VOC snicker} Dogs stink like I always say! Dogs don't exist in this world for me. Never!

Adem: Guess what. Before (.) it gets there, I'm like I'm going to go there, and have my ultra check pair, pay for it in *ten minutes. It will just take ten minutes. And for you, it needs to go through post customs. These days, they have to xray all the postages, and those take twenty four hours. Period.

Nicholas: Fine then I'll tell you truth I didn't do - get a check so I'm going to go to the autopayer, *mine, that gives the money, and its going to pay for me in fif::ty se::conds. Beat th::at

Adem: Guess what. Yesterday I went to the gift shop, I bought a dog its on reserve, today I'm going to get it. And I am finished with this conversation. *I *am going to get it. *!!
Bye!

(4.0)

Nicholas: Well I'm going to get it *first! (5.5) {VOC whispering} {NVC microphone noise} (3.9) {VOC blowing into microphone} (3.1)

Adem: May I please have the dog that I reserved?
Thank you! Bye!

Tara: Sure. {NVC something heavy drops}
Here.

Adem: {VOC Woof woof! Woof woof! Woof! Hahahahaha Woof Woof! }

Nicholas: Can I have my cat please?

Adem: Guess what? I bought my dog right now!

(2.5) Bye! (.) {VOC construction sounds} O_K so I need to get my materials to build a dog home before he gets home {VOC construction sounds drills saws etc} Done! Finally!

Nicholas: Well I'm going to go *first in the house and put a sign saying, no (.) dogs allowed! Ha ha!

Adem: O_K now my dogs set in his house, and will live happily. Now let me just bring it outside, so he can sleep for the day.

Nicholas: Done!

{VOC Ding ding ding ding} {VOC construction noises} {VOC bam! bam! bam! bam!} {SUNG Painting painting painting painting paint paint paint paint Painting painting painting paint}(5.5)

I'm gonna build this now so when I get home I have the dog - the *cat home fit - good and perfect. {VOC construction sounds} Bye!
*Well *here *you *go.

Adem: Your cat {PRN caught} (.) will cost, nineteen - twenty nine dollars.

Nicholas: And never it will be (.) *dog country like you *said. uh. Dogs stink. {VOC spitting sound}

Adem: Welcome to dog country old brother!

Nicholas: Well *brother it's actually *cat country! And n-

(4.5) Wow look at my fantastic cat! I'm going to go right now. {VOC car engine noises}

Adem: Well (.) let your cat not get close to your dog. I'm putting my dog {VOC inhale} in his little garden, that I made all by myself. Period. You're not {VOC inhale} seeing him (.) one more time (.) again.

Nicholas: Now we have another fight! Going again!

Adem: If you want to fight again, go to these addresses (.) and write down these people. Unfortunately

Nicholas: Hey! You're not supposed to say that! I was supposed to say that line! }

Adem: Hey stop fighting!

Nicholas: And it ends up like this.

Adem: Bang! Stop it you - stop it! you're mean you're - you're stop it!

Nicholas:	I'm pulling your hair!
Adem:	Ouch!
Nicholas:	Ouch! You're pulling mine!
Adem:	Hey! (2.1) Dummy!
Nicholas:	Nicholas as the cat (.) (inaudible) {VOC meow}
Adem:	Adem as the dog owner.
Tara:	Tara as the pleasant storekeep. (2.0)
Adem:	This program was created by (.) SpriterWriter, created by Tara, the - pleasant storekeeper who was (.) here earlier.
Nicholas:	s- or {QUAL phone number stated} . }
Adem:	*This is copyright. All rights reserved. U_S - um f- cassette number two hundred and thirty three. All rights reserved. For - uh - m- more information, call {QUAL phone number stated} *or *Or Tara: And my phone number is {QUAL phone number stated}. Thank you and all rights are reserved. Period. For further information, call these following numbers that were just earlier. Thank you! {SUNG da da! bam bam-bam. }
Figure 45 Adem's and Nicholas's collaborative 'A.N. Dialogue' talkument, available here transcribed to text.	

Their storyline is quite complex, featuring conflicts embedded within conflicts, all of which are mediated by language though never resolved. Using the popular expressions used to define oneself as either a 'cat lover' or a 'dog lover,' Adem acts as a 'dog person' and Nicholas as the 'cat person.' Collaborating on choosing a pet, they end up 'fighting like cats and dogs.' Instead of having a simple ending, they continue the recursive nature of the narrative by ending with another fight, this one a pretend physical fight, involving (pretend) hair pulling and name calling. Immediately they cut to the credits, refusing to resolve the cat and dog conflict and instead emphasizing the recursive nature of conflict.

Their story also has an uncanny likeness to the structure of children's arguments. Children often engage in never-ending fights, 'yes you do!' followed by 'no I don't!' and around again. This story imitates this classic child argument structure based not on logic or appeal to ethos, but dogged determination and a single-minded desire to win. That they then use reason and logic to thinly disguise this childish game makes it all the more interesting. These appeals to reason also allow the boys to demonstrate their linguistic prowess (e.g. 'elegant,' 'flexible,' and 'caress'). Adem says, "*Dogs are (.) smarter and they're more (inaudible) and they need less attention and they're smarter.*" Nicholas rebuts, "*Cats are more elegant. They're - they're s- flexible if they fall on their - if they start falling on their backs they actually fall on their feet!*"

And they sleep fourteen hours a day so I can caress them {PRN em}, fourteen hours a day.” The contrast is humorous when they pair a classic disagreement of taste with such virulent and reasoned structures and vocabulary.

Clearly Nicholas has a better grasp of vocabulary (e.g. “cats are more elegant,” “I can caress them fourteen hours a day”) and argument development than Adem, who resorts too often to the emphatic “Period!” to quell any response. Adem appears to have difficulty in representing an authoritative perspective without resorting to autocratic absolutism or violence (e.g. *If you buy a cat I’m bringing i- it to the dump, I’m (.) killing it.*). He might not have had many opportunities to experience cycles of conflict and resolution with his peers, with whom he could address as equals. Parental models can tend to assert authority rather than persuasive reason.

They built such a strong narrative sense of where they wanted to go with the story that they rarely listened to any single recording immediately upon completing it. While they made 78 recordings and relistened to this content 50 times, only 9 of those ‘play’ actions immediately followed a record action. They tended to make several recordings in a row and then review all of them at once. Since their composition is essentially constructed as a dialog, this means they had planned out how each of their turns were going to contribute to the overall story development.

One of the keys to their collaborative success is how they physically arranged their environment. They pushed their chairs back from the computer and table and stood facing each other, free to bend, dance, move and scuff their feet. They would pass the gooseneck microphone back and forth between them. Adem would almost always press Record, Stop and Play, meaning that Nicholas had to verbalize any wishes to delete content. Standing and talking, passing the microphone back and forth, exchanging headphones, and having the freedom to pace back and forth in the room helped Nicholas focus. He especially was able to concentrate enough to lose the paralyzing self-consciousness that plagued his solo works.

Their individual strengths are both challenged and required for success. Adem is put in to a situation where he struggles to formulate witty responses that play lightly with words. He also has the freedom to engage with otherwise mundane topical matter but in a fresh and original way. Nicholas is put in to a situation where someone else not only controls the mechanics of recording and editing, not permitting his destructive moments of self-doubt, but barrels through the task with unquestioning energy.⁷⁶

7.3.3 Mustering Individual Courage

Mikayla, age 7, and Mariah, age 6, were students at Umoja Elementary. Mikayla was writing short personal essays less than 30 words in length. Mariah was learning to spell words and had not yet composed any essays that I was aware of. The only other girl at Umoja in the oldest class was Niesha, age 8. All three girls were friends and often requested working on

⁷⁶ In subsequent weeks, when Adem and Nicholas approached this composition individually to try and ‘translate’ it to text, their composition went in two separate directions. Adem, like the most ‘productive’ children in the class (e.g. Edith, Elizabeth, Charlotte) didn’t bother with translating it to text, ignored my request, and went on to create something new. Nicholas, left to his own devices, deleted the entire composition rather than have to translate it to text.


spriting all at the same time. Mikayla and Mariah would work together on one computer and Niesha worked 'alone' on the other computer. They were always aware of what the other(s) were doing and would direct talk to each other across these so-called 'individual' and 'collaborative' arrangements. As predicted by their close relationship, there were regular disagreements, often begun and perpetuated by Mikayla that torpedoed most of her collaborative efforts with Mariah. It was usually left to Mariah to mend the relationship, as Mikayla was older, more powerful, and pouted better. Mikayla and Mariah collaborated on no less than four talkuments, more than ½ of each girl's total work. It was this collaboration that made it possible for both girls, but especially Mariah, to even consider the idea of authoring individual talkuments.

Mariah was the youngest child in the older group, thin and stretching as tall as her older classmates; her gregarious personality and easy style of interacting with the other children and her teachers made her seem older than her six years. She spoke African American Vernacular English and was becoming more comfortable with other English vernaculars through regular interaction of Umoja's principal and teachers. She was very affectionate and devoted to her friends and teachers at school, and made me feel welcome and loved while I was at Umoja. If you disappointed her in any way, or asked her to do a task she was reluctant to do, she put on a big pout, crossed her arms, and storms clouded over her usually animated face. But happiness and generosity emerged just as quickly. While Mariah was a self-confident child and eager to learn, she did not yet know how to read or write, a fact she tried to hide from me. I assumed she could because she was in the older group, and she used her creativity and prodigious memory to try and keep me from finding this out, presumably because she was embarrassed that her friends, a year or two older, were farther along in their literacy skills.

Her insecurity about reading and writing carried over in to spriting. Though all the Umoja children were accustomed to recounting their weekend activities in a structured form of oral sharing, Mariah did not see the similarity between that and spriting composition. Unfortunately, I was not prescient enough to point it out to her. She was extremely nervous in the first months about the prospect of spriting by herself, and would often claim in a small voice that she wasn't capable, and say "no! no! no!" when I persisted in my invitations.

On my first day with the children at Umoja, I had them build a talkument in a round-robin fashion. This was enormously popular with the children as they drew upon music, television shows and other realms of their rich social lives to create a dramatic composition. Mariah was very comfortable singing for the SpriterWriter when her turn came around. When she was spriting from a standing position, from that first day forward, she would move rhythmically along with her song. None of the other children would sing and dance as easily and spontaneously as Mariah, even though she was the youngest. She could take a theme from a song, add new words and tunes to it, and play with ideas she was composing about (including my name) in a teasing manner through song. Mariah was musically gifted and practiced at expressing herself in dance also. Her performances were guileless and part of her personality, expressed best when in the company of children she cared for and who cared for her in turn.

Mariah was comfortable using the microphone to sing, but not to talk. In Figure 46 below is one of Mariah's first talkuments, called 'Disney Channel for kids.' It begins with a declaration that she likes Disney Channel, which she follows with a pastiche of songs she sprouted in one continuous recording. She was as yet unfamiliar with common methods of developing a composition, including providing examples and describing action in narrative forms (though she might very well have been capable of doing so in an informal oral circumstance or context). It is through her collaborations with Mikayla that she began to gain confidence with these forms as they appropriate familiar popular forms, such as radio interviews, into their spriting activities. This appropriation of popular culture and their own cycle of conflict and resolution led to additional spriting of talkuments more common to school (e.g. personal narrative, letter, et cetera).

{SUNG All this dream} - wait. I like Disney Channel (.) nin- n- Ninja Turtles, and Kids {PRN b_s}, and even I like *when you have fun days, see you later. {SUNG I hate you, ah (inaudible) Come on girl. Clap your hands. Clap your hands. Oh yeah! Clap Clap {NVC hand clapping} Clap Clap} {NVC hand clapping} (inaudible) {SUNG All this dreams come here ah yeah Come here (inaudible) Come On baby can't you see that I can go when you (inaudible) Baby::} Oh yeah yeah, (inaudible) Clap your hands *uh *uh Bump your jam (inaudible) it's true I can say when you (inaudible) and this dream in the - }	
	
document.wav	
Figure 46 Mariah's 'Disney channel for kids' is primarily sung. It is transcribed to text and available as RIFF Wave (1:14 minutes).	

Mikayla, age 7, was a chubby, round-faced girl with thick, wavy brown hair and liquid brown eyes. She was always outfitted in very girlish and stylish attire, as dressing well was an extremely important part of her life. Her mother would often spend time at Umoja in the afternoons when she would come to pick up Mikayla, and would ferry Mikayla to and from karate, dance and other after-school lessons. She dreamed of sending Mikayla to a performing arts school.

Mikayla always knew what she wanted. She was not scared to disagree or deviate from what all the other children were doing or thought, and would just languidly roll her eyes, give an almost imperceptible scowl with the corner of her mouth, and go her own way. Few people were able to convince Mikayla to do something she did not want to do, but as her own agenda was often quite ambitious, she did not require many suggestions. Mikayla was driven to compose and enjoyed expressing herself in forms she invented, appropriated from radio and television, or that were introduced to her (e.g. book report, comparative essay). She often requested to sprite (the Umoja children were never forced to sprite at certain times, they had to *want* to sprite) and usually for a specific reason. She often had an idea for a composition and would pull in Mariah to help her realize it. She was equally quick at expelling Mariah when disagreements emerged between them (e.g. linguistic issues), the kind of talk that predicts later literacy ability. Later on, the powerfully expressed

disagreements would be patched over, mostly because Mariah was motivated to maintain their relationship.

The first talkument Mariah and Mikayla made was an interview-based talkument called 'Best Music.' They spoke of songs and artists they enjoyed listening to with serious prosodic and lexical imitation of the pomp and self-importance displayed when people discuss musical tastes. This first talkument measured 10:44 minutes, allowed them to experiment with posing questions and answers in more formal register and lexicon than they would normally. Mikayla asks, "Mariah, who do you like – whose music do you like *best (.) in all of your singing." Mariah responds, "Gre- gra- great um - ask- great um - great question! I like Hil- Hilary Dove (.) of course." Spriting allowed them to 'try on' the more formal registers they don't often have the opportunity to use, just as they might dress up in their mothers' clothing. Spriting created the more formal occasion—that of producing a repeatable and shareable literate structure—for the display of this language. Interestingly, it is the very 'permanence' and 'shareability' of the talkument that created more cycles of conflict and resolution, because certain linguistic use has moral consequences.

They interspersed their interview with renditions of several songs, something that Mikayla felt free to do only in spriting, and with her girlfriends around her. In fact, they sang lyrics that Mikayla's mother had specifically forbade her to sing. When Mikayla played this interview for her mother later in the day, her mother was shocked and angry. She explained to me that she did not like Mikayla singing or even hearing songs that included imitations of sexual sounds and explicit sexual innuendo, that she is not permitted to do so at home, and wanted me to enforce her policies in school when she was not there. After this incident, I policed the songs they sang carefully, asking them directly, "would your mother let you sing this song?" before they were allowed to sing on the record. The girls were made quite aware of the power of their singing, as the sounds they made—both with linguistic and paralinguistic dimensions—became objects of critical focus.

One week later Mikayla and Mariah again set out to make a collaborative talkument, this time based on the popular cartoon, 'Stitch and Lilo.' With a feel for consonance, they called their talkument, 'Stitch's Silly Story.' Niesha was also present while they created this piece, spriting on the other machine. Mikayla and Mariah rehearsed what they would say before beginning the piece, developing their skills and models for planning. They sprited a first version, listened to it and decided it was not suitable. They erased the entire thing and started over. This spriting, evaluating and rejecting iteration happened several times. In Figure 47 below there are transcriptions of five different spritten recordings that Mikayla and Mariah *deleted* in the process of spriting 'Stitch's Silly Story.' While some recordings are in fact 'edits' intended to improve a prior recording, they also explore three distinct beginnings: 'stop singing that darn music!' drama, a (probably illicit) song adaptation, and a persuasive piece about having pride in one's own body shape. In their individual compositions they rarely deleted content. This exploration of form and content, achieved through a kind of 'bricolage' trial and error process, is by far the most adventurous and critical amongst all their work.

[1081287040530.wav]

Mariah: {SUNG da da-da da da da} *Stop (.) singing that darn {PRN starn} music! I'll show you how to do it!} {QUAL voices in background} (9.0)

[1081287144671.wav]

Mikayla: {SUNG da da da da da da, da da-da da da:

Mariah: *Stop singing that darn thing!

Mikayla: No! {SUNG da da da da da da, da da-da da da:}

Mariah: *I'll show you how you do it! {SUNG Ah! Oooo! Ah! Oo oo! Ah! Oo oo oo! Ah! Take dat thing! Ah! Oo oo oo oo! {VOC screech} Uh uh-uh-uh-uh! Come on baby let's see what you can do! AHHHHHHHH!}

[1081287320436.wav]

Mikayla: You gotta stay in your pants!

Mariah: {QUAL echoing Mikayla's words} Because you got - (.) um (.) {VOC laugh} tartersauce!

[1081287491905.wav]

Mariah: Baby (2.8) Baby, yeah! (2.6) {QUAL whispered} You got to -

[1081287538702.wav]

Mikayla: Are you little? Are you fat? Or are you skinny. *My family talks about finny skinny and fat. My family tells you that fat or skinny, you shouldn't care, you should be happy about your weight. So, the next time you say someone's fat, think about (.) *why you called them (.) fat. Thank you. People's (inaudible).

Figure 47 Five spritten recordings that Mikayla and Mariah deleted in the process of making their 'Stitch's Silly Story' talkument.

Finally they hit upon the approach they wanted to take. They do not position their narrative as first-person interviewer-interviewee like they had done the week before, or as the dramatic first-person perspective they had tried first but rejected (shown in Figure 47). Instead, they begin with first-person plural ("Hello! We're talking about Stich here...") and move between third-person omniscient reporting about Stich, with first-person reflection upon mental and linguistic state, in a dialogic repartee, as shown in Figure 48 below. The talkument they made is available both as transcribed text and as the original sound file. This collaborative talkument is more cohesive and more edited than most of their individual products.


Mikayla:	Hello! We're talking about *Stitch here peoples! Cause you know (.) Stitch is rude (.) and (.) he (.) sometimes licks his nose. And he got a girlfriend that's very very pretty, and I don't know her name but she was very {VOC inhale} very {VOC inhale} so:: (.) {QUAL whispered} evi::!! And I'm going to tell you parents. If you don't stay in school, I'm going to tell.
Mariah:	And her name is:: - (.) I don't- I forgot her name
Mikayla:	I know her name her name is Crystal and she's very very beautiful.
Mariah:	Thank you very much. She's so hot.
Mikayla:	And she's so (.) little and beautiful *but evil.
Mariah:	Actually her name is um: {VOC inhale} Sweetie Pie she's so nice and she doesn't got anything to do with it.
Mikayla:	Oh! Don't listen to my frie::nd, because her name i:s (.) Crystal. Believe me. Go online and find Stitch dot com on Disney Channel. Bye bye.
Mariah:	And you can go
	
document.wav	

Figure 48 Mikayla and Mariah's third person dialogue in 'Stitch's Silly Story.' It is available here transcribed to text and in RIFF wave format (1:07 minutes).

Their dialogic collaboration does not last long, however. In their third-person reporting activities, they disagree about what Stitch's girlfriend's name is. Mikayla says 'her name is Crystal'. Mariah responds 'actually her name is Sweetie Pie' and Mikayla counters 'don't listen to my friend because her name is Crystal.' This eventually derails their collaboration on this talkument. Mikayla moves over to the other computer to join Niesha and leaves Mariah alone on the computer. This argument is not only based upon a linguistic disagreement but it provokes Mariah into exploring another literate genre, this time individually!

Mariah sprites her first solo talkument: a letter to a former classmate intended to resolve the dispute with Mikayla about Stitch's girlfriend's name. But this is only the beginning of Mariah's individual work. One week later, and still disagreeing with Mikayla about Stitch's girlfriend's name, she extends the Stitch composition on her own. Figure 49 shows what Mariah added to the originally collaborative composition. While her individual work involves a considerable amount of singing, some of which is topically relevant to Stitch and Lilo, she also sprites her first spoken descriptive composition about her teddy bear, as shown below in the second paragraph in Figure 49. The collaborative work with Mikayla and the ensuing disagreements they had about content was the precipitating event that allowed Mariah especially, and also Mikayla, to compose individually. That these girls begin composing collaboratively and move to more individual compositions is in line with other work on girls' development (Nicolopoulou and Richner 2004).

{SUNG Oh the streams! (inaudible) down the mountain! (inaudible) I love you. Oh the streams! I love you and the way baby let me see you as (inaudible) Oh *oh oh:: oh:: oh:: Oh oh oh I love you I can see this money in my hands a twenty and a thirty and a forty and a fifty and a one, a two, a forty fifty sixty *seventy eighty ninety a hundred (inaudible) I can see the streams. I can walk through the mountain, baby let me see you can go Oh (inaudible) Oh oh oh bo bo bo oh oh oh {VOC mouth clicks} Sister Tara is a girl! Um. Sister everybody I know! And I can go to the streams (inaudible) oh I can see (inaudible) Oh look at me! I know what you think! I can't go to the mountain oh baby! I can go and I flow I can see you oh the streams ago! oh! oh! (inaudible) money (.) a ten, a twenty, a thirty and a forty and a one, a two, a forty and a fifty and a six, a seven, a eight and a nine. Baby I can see:: you:: oh::}

My bear name is Shanti. She's at home and having fun. My Mommy and Daddy - well my Daddy pick m- well my Daddy pick me up next weekend, I'm gonna have fun. And I'm gonna get a lot of toys if he lets me have some. And I'm gonna love {VOC inhale} my Daddy, all the people who are not here those in my class, and I love them. And I love my Mommy, *tha::t's it.

{SUNG All this Fri::day! I know you! Oh:: Stitch! Lilo and Stitch! Come on baby let me go! I know you can go that fast on our (inaudible) oh::! Her name is (.) Angel. She got a smart (.) head! oh:: uh:: Lilo and Stitch got (.) anything to do with it Come on go down (inaudible) Come on baby oo:: oo oo Come on baby mm mm mm oo oo oo oo oo {NVC microphone noise and clicks}

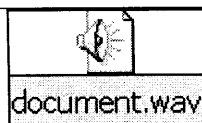


Figure 49 Mariah's individual contribution the next week to 'Stitch's Silly Story' talkument, available here transcribed to text and as RIFF wave file (4:14 minutes).

Mikayla also moved from her early collaborations with Mariah to individual compositions. She wrote a love letter to a boy on whom she had a crush—the only piece of writing in both schools that does not gain any spritten representation. During the final days of my work at Umoja, Mikayla sprrote a talkument that combined talk about 'being popular' with song segments and quotations. Her mother was surprised to hear Mikayla sing. She remarked to Mikayla, "Baby! You sing so nicely!" She also giggled at some of Mikayla's song choices and how they so nicely 'punctuate' her thoughts on 'what the popular girls do.' In this case Mikayla seems to have internalized Mariah's spontaneous method of integrating song with spriting. When this emerged, however, the songs and the topic served Mikayla's thematic purpose well.

7.4 Conclusion

Data and observations of children spriting collaboratively confirm results found in collaborative writing: final products improve when children work together. Umoja girls made their first highly edited, cohesive compositions through critical collaboration and were able to transfer some of these models to their individual compositions that followed. Boys at Molière who had difficulty completing talkuments individually (for reasons of lack of motivation or high self-doubt) were able to do so collaboratively. Additionally, the majority of children at Molière and Umoja Elementary schools found collaborative spriting to be more personally motivating. They worked on collaborative talkuments far more than they worked on individual talkuments and they expressed greater pride in their collaborative work.

Because studies that focus on differences between individual and collaborative work tend to control these variables, this study can observe a fluidity between individual and collaborative composition. Thus, I note that children tend to continue working individually *on that same composition*, as well as new ones, even after their collaboration has run its natural course or fell apart due to conflict.

Similar to collaborative writing results, the children were able to share their relative expertise to address limitations and composition problems they had. Even competent composers were able to explore different styles of composition through collaboration. Only with Elizabeth's help was Edith able to develop an effective, action-packed short story. Conversely, with Edith's help, Elizabeth was able to sprite enormous, meandering thoughts in a diary-like fashion, discovering purpose in an exploratory fashion as she went. Nicholas was able to finish an enormous story with the help of Adem's withering focus and energy; while Adem was able to play with words and ideas in a more light-hearted manner than he was accustomed to, and gain a friend in the process. Lastly, Mikayla learned how to use songs to illustrate and punctuate her spriting points while Mariah learned how to use available resources and appropriate things she knew (e.g. peers, cartoons, teddy bear) to approach a composition task. Further, conflicts between peers provided authentic motivation to compose individually (even for the first time!), and learn new genres in the process. At all levels of composition ability and experience, these children benefited individually from collaborative spriting.

But more must be said about how spriting enabled these successful collaborations. Spriting seems to admit even closer, more integral collaborations than does writing, perhaps because spriting can more easily incorporate conversation as both planning and composition material. Scardamalia, Bereiter and Goelman (1982) found that when they gave children back-channel signals while they write or dictate, children write or dictate twice as much material or more. This effect has been replicated and significantly expanded in recent years with the computer acting as the conversational listener and providing textual or recorded prompts to a child while they are engaged in a story-telling task (Cassell and Ryokai 2001; Bers and Cassell 2000; Cassell 2004). Furthermore, a computer can provide a child prompts during play that elicits more rich narrative language predictive of later literacy accomplishment (Cassell 2004; Ryokai, Vaucelle, and Cassell 2003).

Collaborative writing appears to provide similarly motivating interaction for children, but during more formal literacy events, explicitly intended to result in 'permanent compositions' they can share with their teachers, peers and parents. It holds the promise of continuing the highly interactive oral peer collaborations used successfully in preschool and kindergarten (e.g. oral narratives, sharing time) in progressively more sophisticated ways throughout the elementary grades. This might lead to children having greater fluency and comfort with composition forms at all levels, including iterative editing techniques and different narrative styles.

8 Children Have Much to Sing About

When children are released from the representational strictures of paper and pencil to compose language, they do not just talk their words, they sing their words. And they sing and they sing and they sing. They do not discriminate between shades of vocal and linguistic arts. They sing pure sound and rhythm, words, advertisements, school songs, popular songs and television theme songs with equal abandon. They screech, moan, wail and do battle, pushing even the concept of singing to the limit.

After I recovered from my initial shock, I was struck by the fact that we have survived for so long without well-adapted ways of composing documents about music. While music has such significance in the functioning of our daily lives—we mature, court, marry, mate, fight, rebel, think, celebrate and worship with music, and use it to develop and convey our identity, yet the primary mode for organizing and conveying our thoughts has become writing, a medium ill-suited for imitating, using, and demonstrating music, thereby limiting how we can discuss it in coherent ways. The children, having been pressed into the quiet service of letterate work immediately upon entry to school, released their thoughts into their spriting work with both music and talk playing powerful and significant—yet different—roles. As a group, they produced a diverse collection of what I call ‘singing talkuments.’

Like a document, a talkument can be edited with all the functions available in a typical word processor (e.g. cut, copy, paste, move, delete, insert). I developed a system for composing and editing talkuments called the SpriterWriter. A singing talkument is when children chose to record their words (or voices) in singing instead of, or in addition to, talk. Although my first hypothesis about the activity of spriting was based in talk—that they could compose and edit with recorded speech in ways that parallel composing and editing in writing, the behavior of the children forced me to make finer distinctions between the many different kinds of things that they can do with their voice that doesn’t fall clearly under the definition of talk. Three major kinds observed across numerous children were *talking* spriting, *singing* spriting and *reading* spriting. In this chapter I address singing spriting and speculate about the its worth and function in relation to literacy learning.

The importance of singing in literacy development is not much explored relative to its weighty presence in all cultures. Some important but all-too-singular observations include the appropriation of popular culture which includes song in early literacy learning (Dyson 2003, 1992), cultural differences in children’s approach to literacy as demonstrated through singing (Ball 1991; Noll 1998; Egan-Robertson 1998), and the reciprocal involvement of folk and school meaning-making practices, particularly composing songs and raps to promote critical literacy (Kolb 1996; Smith 2000; Morrell 2002; Morrell and Duncan-Andrade 2002). In most of these investigations, however, there is some written artifact. Either text was generated in the process of composing a song or a ‘singing’ process yielded some final written product. Literacy researchers can still point to these written artifacts as justifying—in the *letterary* sense—what might be seen by many as a ‘diversion’ into song. But what if there

is no written artifact? What if the process and the product is entirely singing? What sense can we then make of this phenomenon from a literacy perspective?

8.1 Songs in Education

We must not forget also that it was not so long ago that school children learned their lessons through song and still do in many parts of the world where standard education is not available or wide-spread. Song aided the memorization process for the rote learning often required in education; it provides structures on which to hang otherwise inert facts. Math teachers have realized this anew. Local news agencies occasionally feature the ‘singing math teacher’ and report the gains in student achievement.⁷⁷ Sung words are also more memorable than spoken words. One claim to account for this is that words in song have longer duration, as when speech is lengthened it is similarly memorable (Kilgour, Jakobson, and Cuddy 2000). Indeed, Elementary English teachers might be well advised to take a lesson from the Math teachers. Vocabulary might be more memorable and distinguishable to elementary school children if the words were sung, as the exaggerated rhythm and prosodic structure might aid in perception and word recall.

Contending with what I will call ‘pure singing’ spriting—the wordless songs—is the most radical departure from conventional literacy. However, singing phenomenon was found throughout the students’ work at both elementary schools, Molière and Umoja Elementary, on a continuum of spriting that moved from greater proportions of singing to greater proportions of talking. But the presence and prevalence of singing in spriting forces us to confront our (my!) deep ambivalence about treating language and composition musically. My textually acculturated mind feels that pure songs and beats somehow weaken thought and render singing spriting composition more trivial. More ‘illiterate.’

But, I argue with myself, this is a reaction, and an ill considered one. Rather than view language as the sophisticated great-grandchild of singing, perhaps we need to recognize that language as but one small, specialized subset of human producible sound. Over the lifetime of an individual, and more broadly, over the ontological development of a culture, all forms of human sounds, including singing, develop into mature, sophisticated forms.

There are emotions and thoughts that only music can convey. In this chapter I can only try to put these into words—always insufficient. And further, these particular examples are bound to my idiosyncratic cultural development, a history that can be laid bare with musical references. But I am thinking of the portrayal of a violinist’s ambition and agony in Schnittke’s ‘A Paganini’: trying to play the Mozartian ornaments with guileless unaffectedness while on another level displaying double-bowed rage. The tremolo and slow-footed fall of

⁷⁷ A ‘math song’ by Dave Gertler of Wilmington Friends School, Wilmington, Delaware. The Quadratic Formula is made more memorable to the tune of “Pop Goes the Weasel”:

x is equal to negative b
plus or minus the squaaaaare root
of b squared minus 4ac
all! over 2a

Billie Holiday's voice. The relentless assault of a Bach cantata that climbs on and on without breathe or pause, voices imitating instruments, instruments imitating voice. The blood curdling scream of Axel in Guns and Roses that lets loose the "Welcome to the Jungle" song. Music refers to social interactions important in one's life and can whisk one to a time and place with awesome and brutal expediency....

8.2 The Singing Homo Sapien?

It is surprising to me that as we engage technology such as speech dictation recognition and speech generation, as well as Talking Books, we do not pause to consider the obvious musical foundations of our communication. Our speech is music, informationally emotive. I refer back to one of the great American thinkers in the field of intonational linguistics, Dwight Bolinger, who argues that even the logical purposes and functions of speaking are emotionally based. He argues against a simple dichotomy between logic and emotion, "In order to persuade, you have to *sound* persuasive [emphasis in original]" (Bolinger 1987).

Brain research is providing some clues to how deeply we are musical animals. Spine tingling music experiences have been shown to share the same 'euphoric' neural pathways as food and sex—necessary for species survival—as well as illicit drug use (Blood and Zatorre 2001). Blood and Zatorre conclude, "The ability of music to induce such intense pleasure and its putative stimulation of endogenous reward systems suggest that, although music may not be imperative for survival of the human species, it may indeed be of significant benefit to our mental and physical well-being" (p. 11823). This is surely too weak a summary for such a powerful result. Simply "of significant benefit" when its importance is equal to that of food, sex and drugs?

A recent hypothesis for the origin of language in homo sapiens challenges the language evolution theory of Steven Pinker (Pinker 1994) and Universal Grammar theory of Noam Chomsky (Chomsky 1957). Vanechoutte and Skoyles argue that due to the unique genetic adaptations of our vocal apparatus and our neural control over vocalizations, it is much more likely that homo sapiens evolved to sing first, which through subsequent memetic evolution (a cultural adaptation, not genetic) permitted our ability to talk as well (Vanechoutte and Skoyles 1998):

"The tonal modulation of song is not only enabled by neural control but also by anatomical specialisation of the vocal tract for producing a wide variety of pitches and timbres. The peculiarity of our vocal tract is usually attributed to enabling speech, although it is sometimes also considered as a mere consequence of postural changes between the head and thorax that accompanied the upright stance and human-style bipedal locomotion.... However, the anatomical characteristics of the vocal tract are more closely linked to our capacity to sing than to our capacity to speak. People cannot sing without fully using all their vocal tract. However, people can speak without using large parts of the vocal tract (for instance in buccal speech, more familiarly known as Donald-Duck speech). Although normal speech contains a range of vowels and consonants that fully exploit the vocal tract, sufficient variety amongst the world's languages exists to suggest that intelligible speech only needs a subset of possibilities, exploiting only part of the vocal tract's pronunciation potential.

Without the neural control that enables song, speech could not exist. But which came first? We argue that we can speak because we can sing, and not that we can sing because we can speak, also for parsimonious reasons: the capacity to speak requires in addition to respiratory control also syntax, phonology and the capacity to use and learn a vocabulary of words...while singing requires none of these (songs can exist without words). Second, in the development of speech by children, melody - in terms of interest in and production of intonation and rhythm - comes before other aspects such as phonology, syntax and vocabulary."

Note that while singing is more parsimonious than speaking, this does not mean it is less complex, and whatever forms of song we might have evolved to use for social bonding have surely developed into highly sophisticated practices in their own right, if Vanechoutte and Skoyles are correct, over the past 80,000 years. Comparisons of neural activity in singing with speaking "indicate that the production of words in song is associated with activation of regions within right hemisphere areas that are not mirror-image homologues of left hemisphere perisylvian language areas, and suggest that multiple neural networks may be involved in different aspects of singing" (Jeffries, Fritz, and Braun 2003). Singing words is not the same as talking words, and in fact, may involve more of our brains than does speaking.

Some narrow areas of research dealing with learning disabilities like dyslexia or aphasia provide powerful, although still atomistic, evidence for the 'singing homo sapien.' For example, research into dyslexia posits a causal connection between phonological skills and the ability to decode text (Richardson et al. 2004; Goswami et al. 2002; Carroll and Snowling 2004; Ramus et al. 2003).⁷⁸ It makes sense that if we cannot perceive speech quickly or accurately enough that we would have trouble with phonographic reading. With a musical cause pinpointed, there can be musical interventions. Since weak abilities with timing and rhythm might be a key factor in the so-called 'phonological deficit' theory of dyslexia, interventions that focus on building rhythmic skills have been shown to improve young dyslexic children's phonological and spelling skills (Overy et al. 2003) and improve the reading performance of other children with reading difficulties (Douglas and Willatts 1994).

A musical treatment called Melodic Intonation Therapy (MIT) has been used for over three decades to rehabilitate severe adult aphasics (Sparks and Holland 1976; Goldfarb and Bader 1979; Belin et al. 1996). MIT involves a practice of intoning short phrases and sentences in a simple, non-distinct melodic pattern, gradually fading the intoned support away over time. Eventually patients are able to produce these key phrases with normal speech prosody. MIT has been used successfully to treat other language disorders too: "In patients with brain lesion, a pre-verbal, emotionally-focused tonal language almost invariably is capable of reaching the still healthy sections of the person. Hence, it is possible for music therapy to

⁷⁸ There remain many questions even in this robust connection about whether the effect extends to speech production (Bertucci et al. 2003), whether the computer-generated speech used in experimentation exacerbates results (Blomert and Mitterer 2004), and which transitory features of speech are the most critical—the onset of amplitude envelope thus affecting the perception of speech rhythm appears likely (Goswami et al. 2002).

both establish contact with the seemingly non-responsive patient and re-stimulate the person's fundamental communication competencies and experience at the emotional, social and cognitive levels" (Jochims 1994). Outside of the 'singing homo sapien' theory, the success of MIT is not easily explained.

Though the 'singing homo sapien' hypothesis has origins in the writings by luminaries no less than Jean Jacques Rousseau (1852/1966), Wilhelm Von Humboldt (1836/1988), and Otto Jespersen (1922), even Vaneechoutte and Skoyles question why the possibility of 'singing homo sapiens' has not been given much credence in 20th century linguistic theories of mind. They too mention that the departure for such studies often considers 'language' in textual terms rather than speech in all of its material repleteness (e.g. intonation, prosody, rhythm and voice quality). It seems that graphocentrism can limit our logical and explanatory powers as well as our expressive ones.

8.3 Raising the Songs

Brain studies don't capture for me the phenomenon of singing. As someone who grew up in a community that bonded socially and spiritually through singing in *a capella* four-part harmony, and later spent fourteen years training my voice in classical techniques, I have always believed that singing was the most difficult, integrated and fulfilling activity I have ever approached. The composer Alice Parker conveys the experience of singing and the totality of engagement in a different way than the brain studies do:

"It seems clear that singing may be the only activity that humans engage in that calls on all of our abilities at once. Breath, body, mind, emotion, imagination, spirit—they are all working together to adorn this moment in time and space, this now, this eternity. When we enter gratefully into the song, we are taking our place in the physics of sound and energy; we are balancing our rational and intuitive minds; we are creating architecture in air, imagining a completeness that we can't find elsewhere in this world. We are most human—and most divine." (Miller 2004).

I found myself at sea amidst a children's culture of raising the song. When given tools to use their speech and voices to compose, the children moved in strong musical directions that had no home in literary studies as currently conceived. But they did not second-guess their behavior—they simply loved the singing and thought it felt right amidst their talking.

The children whose stories I am drawing from in this chapter were a diverse lot. At Umoja Elementary, fifteen children, ages 5 to 10, were primarily American of African heritage, and three children from immigrant families from West Africa. Most families were of modest financial means. Many of them spoke a mixture of English dialect variously called African American Vernacular English (AAVE), Black English Vernacular (BEV), Ebonics, mixed more or less with other English vernaculars. The West African immigrant children knew additional languages, but did not speak (of) them at school.

At Molière, a French-English bilingual school, eleven children were American, Canadian, and French nationals (one of African heritage and the rest of European heritage), and spoke English and French during school hours. Some of them spoke additional languages at home (e.g. Russian). They were from families of large financial means (e.g.

research scientists, professors, etc.) with strong connections to prestigious institutions of higher education. Most of them traveled frequently with their parents.

None of the children I worked with were deaf and/or mute. Considering that some children cannot hear or sing, and other children have difficulty with oral language, the results and thoughts I share here do not have universal application, just as writing and text do not.

Let me be clear: children from both schools sang, and sang of their own volition. Of course, they sang different songs and in different styles and even with different aptitudes for it, but they all sang. Out of 197 talkuments created in total, 85 involved singing in just the process and/or the product, and 15 were comprised solely of singing.

Through close study of the children, their interests and abilities and the talkuments they invented over the course of the thirteen weeks I spent with them, I chose to describe four different ways children used singing in their spriting work. These four examples are not meant to provide a comprehensive picture of singing within spriting. They are exemplars to help us begin to make sense of how singing might fit into literate composition practices. I also hope to convey the children's commitment to singing, because like it or not, as they are given more flexible tools with which to compose, what they choose to do with these tools *will* challenge literate practice as currently conceived.

I intend to err on the side of description than analysis because any attempt to analyze and interpret this singing work, especially within the frames currently available for literate composition, must remain speculative at this early point. I use video recordings, the child's own spritten recordings, and my field notes to contextualize the child's singing in terms of their own composition trajectory and immediate concerns at the time. Whenever possible, I use transcriptions of their own words.

8.3.1 Singing Enriches Children's Composition Process

Two girls at Umoja Elementary, Niesha and Mikayla, spent a lot of time spriting over the three months I spent with them. They both completed talkuments in the final two weeks that integrate singing and talking in very unique ways. It was my impression that these two pieces, one by each girl, was amongst their best and most original work.

8.3.1.1 Singing to Prepare the Mind

Niesha, age 8, was one of the oldest students at Umoja, and the oldest girl. She was pulled out in a small group for math lessons with another 8-year-old boy in the class, but would otherwise hang around with the other two girls, Mariah, age 6, and Mikayla, age 7, when she was feeling social. There were many times when she was not feeling social or was feeling badly about some interaction with a peer or teacher, and stayed by herself, sleeping or reading. One might say that Niesha was accustomed to working on her own in the company of friends.

She enjoyed spriting a lot and was one of the more prolific creators of talkuments. She experimented immediately and often, using her impressive ability to generate nonverbal 'beats' during the period in which most children would fall silent while thinking of what to say next. Niesha, in contrast, seemed verily to think in sound and rhythm. She was usually

open to learning new things and I introduced her to some conventional school genres like book reports and argumentative essays. Adapting these forms to her own experience and purposes, she made a movie report on 'Johnson Family Vacation,' a movie she greatly enjoyed, as well as wrote an essay comparing Nickelodeon and Disney channels, in which she struggled to represent the subtle reasons for her preference.

Niesha was vocal with criticism, a trait that tended to get her in to trouble. She often complained of the school's food, frequently choosing not to eat anything rather than 'suffer' the lunch fare (e.g. chicken and rice with peas). This often put her in conflict with the young male teacher who wanted her both to eat and to not speak disrespectfully to him. Notably, when she began spriting, her first tendency was to use the Spriter as a kind of diary or journal, but somehow the complaints she recorded about this young teacher must have gotten back to him. Not only did she edit that talkument to delete such mentions the very next week, she also did not sprite for quite some weeks afterwards, explaining to me later that she had not been allowed to sprite. This experience did not stop her from continuing to register her critical evaluation in subsequent talkuments, as she does in Figure 50 below: "I don't like none of the cook's food and I'm just - I hope nobody (.) hears this but I don't, O_K?" Talkuments can act upon children's complex social relationships and environments in more powerful ways than texts because children not only understand and compose them easily, they enjoy listening to each other's work.

Niesha made the talkument transcribed in Figure 50 during the last week of my work within Umoja Elementary. She, Mikayla and Mariah requested to work 'together' — they had something they wanted to sprite.⁷⁹ Actually, they wanted to sing.⁸⁰ I negotiated a compromise and required a 1:5 ratio of singing to talking (we also had the opportunity to explore the idea of 'ratios,' as the Umoja children had a very strong mathematics curriculum). This ratio most certainly influenced their spriting work and became the limiting structure around which they needed to work creatively.

Niesha began her process in singing. She sang, "*I'm so am weak in the knees I can hardly speak and I need someone to love me*" six times, each time deleting it. It does not escape notice that this 'favorite song' of hers declares overtly that she is physically unstable and speechless, something very self-sufficient and independent Niesha would never say. Singing seems to give her permission to express about her powerful emotions, which in this talkument, appear to be about isolation and loneliness, and fear of being unlovable. Though

⁷⁹ Niesha only requested to work with her girlfriends in a distant collaborative manner. She worked on one computer while they worked on the other. They exchanged thoughts and listened to each other's pieces during these social work periods. She also freely shared her advice with them on matters pertaining to editing in the SpriterWriter and spelling. Perhaps because Niesha considered herself one of the older children at Umoja, or perhaps because of her independence, she never offered to collaborate in a dialogic fashion with Mikayla or Mariah.

⁸⁰ I struggled, particularly at Umoja, to do two things at once that were often in conflict: (1) introduce them to a variety of genres (e.g. reports, narratives, letters) through spriting, and (2) extend them the freedom and respect to follow their own initiatives with spriting. When a child wanted to sprite, my first question was always, "What would you like to sprite today?" Some of them had very particular ideas. But I was just not expecting the great gulf between what especially the youngest children wanted to do and the kinds of things often generated in and for school. Their singing spriting seemed at first to disrupt the first goal and it was not until much later that I considered its value.

the original song is likely sung by a woman much older than Niesha, probably with more intended sexual innuendos, its meaning changes to a plaintive and innocent cry when sung by this eight-year-old girl. By repeating this song again and again, often in tones so quiet the song is barely audible on the closely-microphoned recording, Niesha croons to herself, perhaps facing her sense of isolation in a way that she can productively deal with it. She sings the same song many more times later on in the talkument, involving it not just in the process but in the product too. When she uses it 'for real,' she situates it in a direct address to her audience, the way a radio deejay talks to 'you':

My favorite song is this. {SUNG I:: *am weak in the knees I can hardly speak and I need someone to love me* } That's why you might keep on hearing this inside this song - inside this (.) talk thing. Because I really love this song and I cannot get it out of my head {VOC inhale} since that day I learned it. *And, when I was starving too but the singing made me feel a::ll better I felt like I was going throw up but {VOC inhale} that singing made me feel a::ll better.

By singing her favorite song again and again, Niesha claims to have wrapped herself with her loneliness, and through it, brought her mind and her body into focus. That she knows she is responsible for healing herself is evident also in her singing, but not in her talking spriting. She sings, "*I need what I dream my knight in shining armour is me so I'm gonna set me free. I don't wanna be like Cinderella sitting in the car all dusty (inaudible) waiting for somebody to come and set me free.*" Niesha is going set herself free.

In fact, Niesha sings "I am weak in the knees..." six times before she is even able to begin speaking in her typical sassy and dramatic style, "Better appreciate it cause if you don't I'll dump you just like (.) that. Yeah, holler back." While she does not permit her talk spriting to show any sign of vulnerability, she allows her singing to carry a greater range of emotions. In her singing she can be defiant and aggressive, distancing and threatening her audience, and also vulnerable and small, asking her audience to stand beside her.

Her talkument is also unique in and of itself. She develops a descriptive essay about what she, her mother and her friends are wearing. She reads the make and models of their (as far as I'm concerned, unlabeled) clothing with incisive judgment. Since the girls had not discussed clothing issues in my presence up until that point, I didn't know how important their wardrobe was to them, nor was I competent in any way to 'read' their clothing the way Niesha did. She uses her favorite song and others to break up moments of what it means to 'dress well' and 'look good.' In this way she develops her talking spriting about the masks that people wear—including stylish clothing—that serve to cover up loneliness and the need to connect with others. In contrast, her singing spriting serves as an emotive choral response to this style guide, singing of what is most important in life: the need for love in the biggest and best sense of the word, and the emotions that run so strongly under the superficial masks.

{SUNG oh:: *so am weak in the knees I can hardly speak and I need someone to love me* } I got this from my cousin, Jada. She not really my cousin, I just say dat. She's my aunt. But, {VOC click} she don't care if I say dis, and I'm - I'm looking cute today some tight capris and a

nice shirt. And my friend Mikayla over here wearing a pink (.) shirt with some pink and {PRN n} white light pink dirt pink a little bit uh pink (.) clo- skirt. {VOC click} And my friend Mariah she has on a red shirt some jeans - a jeans skirt. It is (.) {VOC click} it i- let's see (.) Baby Phat (.) girls, and she has a JLo shirt. Yeah. Ok, you know all my friends look cute all the time except for Ali, Derrick, and (.) that's it. Thank you! Very much.

Ok I'm gonna sing one more time cause my voice is sounding good. {SUNG oh:: so am weak in the knees I can hardly speak and I need someone to love me Boom boom boom boom boom boom oh:: so am weak in the knees I can hardly speak and I need someone to love me baby. Boy, I love you. Yeah uh huh uh huh uh huh. }

{SUNG Pop it (.) pop it (.) pop it (.) yeah! I know you love me woah I don't love you either (inaudible) I didn't tell you that I hate you. Yeah! }

{SUNG I'm:: so am weak in the knees I can hardly speak and I need someone to love me! I':m so am weak in the knees I can hardly speak and I need someone to love me }

My momma went to work today, and she is looking *fine. She got on a:: jeans skirt {VOC click} with a red shirt {VOC click} and her red and white Reeboks. Or I think she got on her white Reeboks or, her white tiny slippers, you know, the cute ones that everybody's wearing {VOC inhale} uh dat's in the (.) Dollar Store. Yeah! I know dat! It is looking cute and I got the white one's too, my Mom got the black one, and I got all the colors. Yeah! {VOC click} You know, I got every single color they got! Yeah! I'll back at you girl. K_P, yeah.

My favorite song is this. {SUNG I:: am weak in the knees I can hardly speak and I need someone to love me } That's why you might keep on hearing this inside this song - inside this (.) talk thing. Because I really love this song and I cannot get it out of my head {VOC inhale} since that day I learned it. *And, when I was starving too but the singing made me feel a::ll better I felt like I was going throw up but {VOC inhale} that singing made me feel a::ll better. My mom and grandma said they'll be right out of the store, right quick, but they took *forever. I was *starving. I didn't have nothing for lunch, nothing for breakfast cause I didn't like my (.) milk and cereal bar. {VOC click} And cause I didn't like n::othing for lunch (.) I don't like none of the cook's food and I'm just - I hope nobody (.) hears this but I don't, O_K? I know. You know how to haul the back at K_P.

{SUNG I:: am weak in the knees I can hardly speak and I need someone to love me. I:: am weak in the knees I can hardly speak and I need someone to love me. I know you love me boy and I can love you too and (inaudible) and baby (inaudible) oo oo oo doo doo doo yeah yeah oo oo oo doo yeah I love you (inaudible) and I need what I dream my knight in shining armour is me so I'm gonna set me free. I don't wanna be like Cinderella sitting in the car all dusty (inaudible) waiting for somebody to come and set me free. I don't wanna be like Cinderella sitting in the car all dusty (inaudible) waiting for somebody to come and set me free. No no no no no no no no no oh oh! I

ain't gonna do nothing for you boy if you don't appreciate it, um um) Better appreciate it cause if you don't I'll dump you just like (.) that. Yeah, holler back.

{SUNG I:: am weak in the knees I can hardly speak and I need someone to love me. I:: am weak in the knees I can hardly speak and I need someone to love me. cause I'm finally without (inaudible) I don't wanna feel no more no more no more (inaudible) and over and over you cry and I don't wanna (inaudible) Oh man! uh huh. Oh man! uh huh! I so - I love some - I:: am weak in the knees I can hardly speak and I need someone to love me. I some - I so - I:: am weak in the knees I can hardly speak and I need someone to love me. Uh huh uh huh yeah yeah yeah yeah yeah yeah yeah I:: am weak in the knees I can hardly speak and I need someone to love me. So deep in the knees I can hardly speak and I need someone to love me. I love some weak in the knees I can hardly speak and I need someone to love me. I love some am weak in the knees I can hardly speak and I need someone to love me. I:: am weak in the knees I can hardly sleep and I need someone to love me. I:: am weak in the knees I can hardly speak and I need someone to love me. uh huh } Hey::, it was supposed to be my turn. (.) Oh!

(52.0)

This is Niesha you should know my voice. And, my friend, Mikayla we gonna talk about her today like we did yesterday. Remember yesterday I told you what she had on. *Today she has on a blue shirt (.) an::d some (.) things. O_K bye bye.

Figure 50 Niesha's singing and talking talkument

The enormous 52 second gap evident in Niesha's talkument is actually a piece of talking spriting that was not recorded because she had not turned on her microphone. She, like every child when the SpriterWriter fails to record their voice for any reason, was very disappointed. But unlike the youngest children, she was able to recognize that what she had composed could be redone. She began again. Unfortunately this 'redoing' was left unfinished because her aunt came to pick her up early.

I speculate whether Niesha's use of song has a structural similarity to the *topic associated* narrative style characteristic of many African American children's narratives. Topic associated narratives are characterized by "a series of implicitly associated anecdotal segments, with no explicit statement of an overall theme or point. Temporal orientation, location, and focus often shifts across segments but the segments themselves are linked implicitly to a topical event or theme....It gives the impression of having no beginning, middle, or end, no obvious structure.... The structure is there, of course, if one is expecting and listening for multiple segments" (Michaels 1984). In Niesha's talkument, the implicit theme seems to be the dialogue between inner and outer states, while she shifts back and forth between describing her friends' clothing and singing different songs that describe her own emotional state.

So little about life and school is in the control of children, even in a liberal, child-centered school like Umoja. If singing soothes frazzled nerves, permits the mind some peace

to focus, then that in and of itself should justify its use in a process of composition. While repetition is what an audience perceives, it allows Niesha to re-introduce her own self and unique identity into the classroom. I suspect it allows her to 'own' the space around her, assuming a sense of control over her relatively powerless status as a child.

Perhaps singing is to spriting also the way doodling is to writing – a way to creatively connect beyond the mundane thoughts and issues that often occupy mental space. But it might be even more than that. Especially through repetition, in the manner of a Phillip Glass composition, founded on the layering effect of different tonalities and instruments joining and leaving a repetitive musical strain, perhaps singing the same piece – always unavoidably voiced differently – establishes an emotional depth to her message.

8.3.1.2 Songs as Dramatic Illustration in Talkuments

Mikayla, age 7, also created a talkument that combined talking with singing spriting. The talkument is available transcribed to text and as a sound file in Figure 51 below. Mikayla seems to use singing in four different ways in her talkument: as illustrations of her explicit theme – what popular girls do; as separations within a talkument much like paragraphs; as the only way she offers first-person and evaluative statements; and as time for planning her next talking spriting part.

Mikayla names her talkument 'The girls,' but it is not about just any girls. Mikayla's subject matter, while perhaps alien amongst normal school themes is extremely important in the lives of girls: what makes a girl popular. Mikayla answers this question by describing what popular girls do. In her talking spriting she describes the popular girls in third-person ("they like Jlo," "they like boys"). It is only in her singing spriting that she assumes first-person perspective and allows herself to be the popular girl ("I like it like that," "I want you to know I love you," "I want you to be like that"). She sings these in a slow, rising-up-to-the-pitch, syncopated hip-hop style.

Mikayla cleverly frames her songs as part of the thread of her narrative, like direct reported speech from a character: "and then they like to go to the singer theatre and this is what they hear." Then she sings songs about love and togetherness. Then she again talks more about what popular girls do (e.g. see movies all day) and introduces the second spate of songs in the same way, "then they went to the movie theatre – the singing theatre again and this is what they heard." And she sings again. Her songs function as performed illustrations of part of the contextual environment that popular girls inhabit.

Her songs also serve to separate and punctuate mini narratives that occur within the talkument. Thus, the story-song structure resembles the strophic verse-chorus structure of a popular song. In the first story-song pairing, she introduces the theme of popular girls broadly and then sings a love song ("I want you to know I love you"). In the next story-song pairing, she develops details of which movies the popular girls like to watch and sings a song that has achieved a kind of iconic status ("I like it, I like it, I like it like that"). The song has a lot of sexual innuendos that little girls observe and imitate in the same way they wear their mother's high-heeled shoes, but do not understand. They are 'putting on' and practicing how they will 'wear' their gender role. In her last story-song pair, she explains

what 'stepping' is and then sings a song about stepping ("step step side to side...").⁸¹ Given that the first two story-song pairs were recorded all in one, the very automaticity of the songs might have permitted Mikayla time to plan what she would say next.

(inaudible) The girls of popular are *popular and they like JLo and, they like boys and the boys of - are cute (.) the boys that *they like an:d they: like to stay, at the movie theatres all day and watch three movies a day {VOC mouth sounds} and then {VOC mouth sounds} they like to go to the park and play and then they like to go to the singer theatre and this is what they hear {SUNG I want you to know I love ya because you and me are together and I want you to know that it is so true that I love you and it's true I want you to know that it is true and you are the boy of my life and I want you to be like that} and then they went to the movie theatres and they saw Sinbad they saw {VOC mouth sounds} Shrek Two and they saw Shrek One and they saw, the love movie with (inaudible) and then they went to the movie theatre - the singing theatre again and this is what they heard {SUNG I like it (.) I like it (.) I like it like that (.) I like it (.) I like it (.) I like it like that uh huh (.) oh yeah (.) baby}

If anybody asks me about the s:ong about s:tepping, it's - you have to think about what you want to do, and then you have to think about what step moves you wanna do, when you dance or you go to the club, or you just dance in your house with music it's just fun to dance, and that's why I go to dancing school and I go to other: exercising schools like tennis and stuff, to exercise my bones and dancing can exercise your bones too, it can make you healthy and: sometimes if you learn how to step, it'll be easy for you to stretch your bones because if you dance you can like (.) touch your toes without bending your knees and, I like dancing and stepping because they're really fun and dancing and stepping {VOC mouth sounds} are fun to do. Bye::

{SUNG Step step side to side round round hit the ground step away bring it back and, let me see you do the love side step step side to side round round hit the ground, step away bring it back, and let me see you do the love side.}

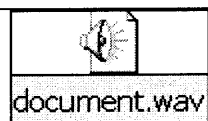


Figure 51 Mikayla's last talkument, available transcribed to text and as a RIFF wave recording (3:08 minutes)

In Figure 52 below, Mikayla's interface for 'The girls' shows that she focused considerable effort on annotating the sausages. I observed her follow a very thorough

⁸¹ Her description of stepping is particularly school-like because it is given in response to a question I asked her. Mikayla had sung the stepping song first. When she was finished I asked her what it meant, and when she began explaining, I asked her to sprite her answer instead. Her explanation was placed before the song automatically, an effect of a particular, poorly-designed SpriterWriter feature.

process to do this. She clicked on the first sausage and listened to it. If no particular word caught her ear, or the sausage was 'empty,' that is, containing no speech or song, she would move on. If, however, a word caught her attention, she would type it in painstakingly. She provided labels equally across talk and song. Interestingly, she chose the more difficult words to spell from the songs (e.g. 'because' and 'together' both came from a song).

Mikayla was aware when she made this talkument how the SpriterWriter could export an animated applet. She intended for this talking-singing talkument to be experienced as an applet, and indeed her labels provide a nice punctuation to both her talk and her song as one listens to the talkument.

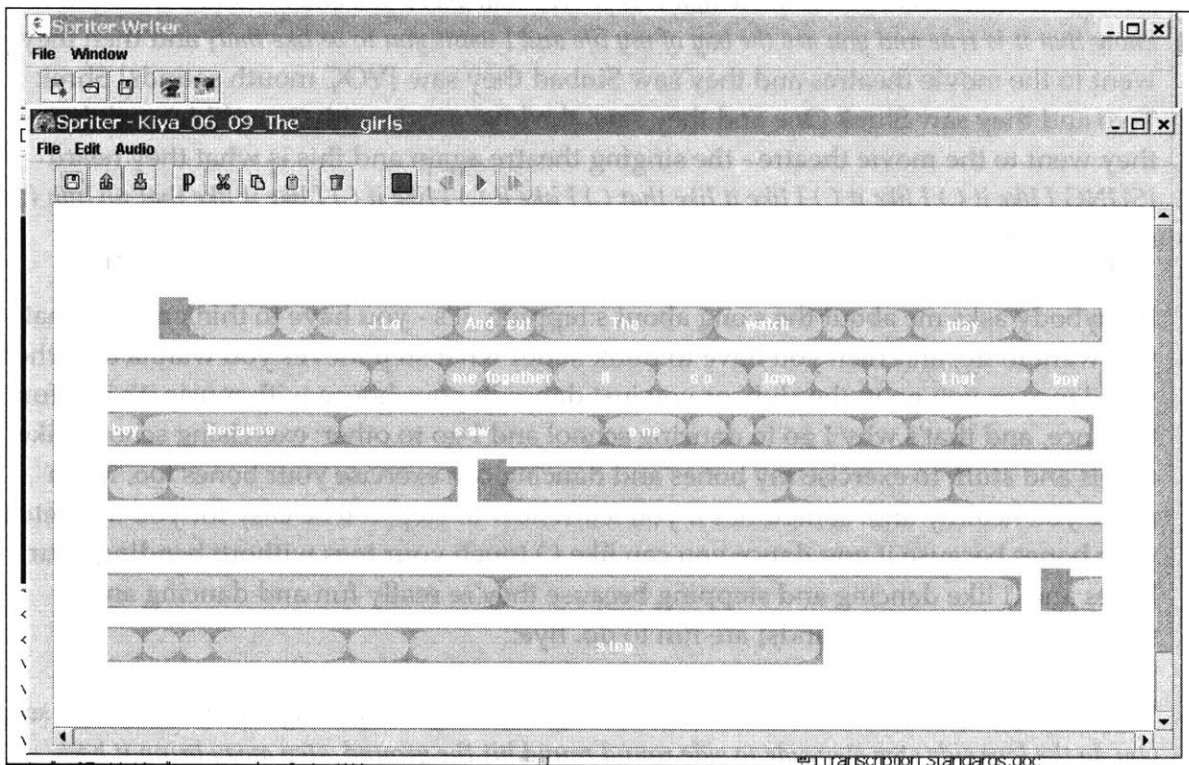


Figure 52 Mikayla's spriting interface for 'The girls'

8.3.2 Reach to the Stars to Buy Candy Bars!

Songs are an integral part of the popular culture that many children enjoy. Theme songs from cartoons, movie songs and popular music that they hear can provide a bridge to literate practice for young children. These are the dialogues and stories that many children have a deep knowledge and love of when they arrive at school.

Two boys at Umoja Elementary, six-year-old Zackary and six-year-old Oba, were anticipating kindergarten in the Fall. They were just learning to form their letters and spell simple words. They were inseparable friends. If one was absent, the other would mope around and sit long-faced without doing much. Their friendship was particularly interesting

because Oba was a recent immigrant from West Africa and was still learning English. Zackary often corrected Oba's pronunciation of English words; Oba helped Zackary with computer tasks such as opening and saving documents, typing and much more.

Zackary and Oba requested to sprite together every day I was available. The second I walked into the school they would run to me, their eyes wide and excited, throw their arms around my legs and literally beg me to 'pick them.' Children begging to compose? Barely able to restrain their excitement, almost in tears if they cannot? Can composing really sustain this kind of response? Wouldn't it be great if it could? Balancing the time with other children who wanted to sprite, I gave them many opportunities. But their spriting behavior was so different from even the other five- and six-year-olds, I found it difficult to know how to respond.

Zackary and Oba sang. They only wanted to sing. Zackary was a huge fan of Pokemon and Oba adored Scooby Doo. They didn't recognize that spriting might require a different kind of discourse from their usual conversation. Rather, they captured their moment-to-moment conversational interactions in somewhat haphazard ways, for example, "Here it comes. Watch this. I wa- (.) You messed my song up Oba!" For them, a talkument was comprised of song and dramatic action. Not conversation. And definitely not this kind of 'individual talk.' They wanted to sing theme songs.

I tried luring them towards talking spriting. I would ask them to talk about what they liked about Pokemon or Scooby Doo and hold singing out as the reward. This was somewhat successful, but I'm not sure it was the right approach. One day Oba sprited a rather lengthy description of the Scooby Doo movie. His nascent knowledge of English was severely tested with this demanding task. He would often cope with the demands of planning and producing English words simultaneously by 'holding' his turn at talk (e.g. repeating 'and,' 'and then,' and 'now,'):

O_K a Scooby Doo um um got squished with Shaggy and Shaggy was um Shaggy was and and then (inaudible) went to find Shaggy and Scooby Doo and those - and two those guy (.) *now and *now now the Scooby Doo is great so so that means that means I mean Daphne does sleep inside that (inaudible) when someone discover her up and then and then and then somebody put her to a um to a (inaudible) and then and then and then the Scooby Doo movie is in the (inaudible) so so then and so so then Shaggy does find the monster and Shaggy and Freddy says Hey! I'm not afraid of monsters! And and then and then he goes like Scooby Doo where are you! And then and then and then the Sooby Doo was great and then and and then and and then the Scooby - and and then Velma said *don't be a scary cat Shaggy or Scooby! And and and and then Scooby Doo say hey ca- hey what else you go- monsters! And that and and then and and and (.) and the monsters wasn't real so (inaudible) so that's I say the monster wasn't real and then and and and then the lady that's find um um to the rescue the lady was not a lady anymore so it has two costumes so that's her was the one so (.) so I think that's all

After he felt he had done his duty, he looked at me with his enormous round eyes and said,

Oba: I need to sing - to sing a song now

Tara: I think you earned a song

Oba: O yay!

He proceeded to sing a sequence of four different songs, each introduced with a compounding of regular English expressions that, spliced together, form a poetic synthesis: "Dad! it's time for me to get a rockstar" or "O_K it O_K a funny song you ever met." Oba wanted to sing whereas he had to be bribed to talk. And in both he was able to explore composing in English. Which is better for his second language development?

Zackary also needed to sing, but was not so patient with the talking requirements I asked of him. Even after singing several songs, when I asked him to do some talking about Pokemon he replied:

Zackary: Yeah but I wanna still sing

Tara: Yeah but I want you to tell a little bit. O_K? So you mix in the singing with telling.

Zackary: I don't wanna do that. I like this. Like this. Just one more song. Please. Just one more song. Please.

Zackary very rarely engaged in talking spriting. The one kind of talking spriting that Zackary was able to enjoy was what he called 'telling a battle'. He proposes to Oba at one point:

Zackary: I wan- this is so great how about me and you tell a battle?

Oba never did agree to tell a battle with Zackary during the five weeks or so I was working with them. Prior research might suggest that they were not ready for that yet. In contrast to girls, boys move from contexts of individual telling towards contexts of collaboration (Nicolopoulou and Richner 2004).

When Zackary told battles of his own they went like this:

Go Senequel! I choose you! Senequel! Senequel! I choose Charmander! Charmander! Charmander, flamethrower! {VOC scream} Senequel, flamethrower! {VOC combative sounds} Senequel is unable to battle. Charmander wins the round! Go:: (.) Notowel! Notowel use - use - use your attack (inaudible) {VOC combative sounds} Charmander return! Go (inaudible) {VOC combative sounds} Return now! Return! Now, Notowel. The winner is (inaudible).

It should not escape observation that this story is also based upon his favorite cartoon, Pokemon. His language when telling a battle about Pokemon is telescopic and difficult to follow, but impassioned. The kind of talk he produces about Pokemon that he

believes is appropriate for school (and indeed, this is the kind of personal reflection I was trying to move him towards) is perfunctory and dry:

I like Pokemon two and I saw Pokemon three, it was so:: cool, and I liked it a lot and, I like the (inaudible) part and I like - I watched that at my dad's house, and I watched that my - um (.) my grandpa and grandma house, but my - my grandma didn't let me um see the ending and that's it.

In comparison to doing battles and singing, Zackary finds this reporting genre quite dull. And indeed, since he finds it dull to produce, it is dull to aude and read.

In an extensive study of the gendered storytelling preferences of pre-school boys, Nicolopoulou finds that boys tend to tell stories belonging to what she calls a 'heroic-agonistic' genre (2004; 1997). These stories are characterized by "powerful and aggressive characters...who were brought into contact primarily through conflict." The plot of such stories is fundamentally about "fighting, destruction, and disorder" with "disconnected characters...introduced sequentially into the story to keep the action going and to generate heightened excitement" (2004, p. 360). Zackary's Pokemon 'battle' above is surely an example of the agonistic-heroic genre. Many characters walk in the story for the purpose of extending the battle scene. Character development is ignored except for the occasional mention of a weapon they might have in their possession. Zackary uses liberal and explosive sound effects to punctuate these battle scenes, involving himself in the battle in a first-person account rather than a cooler third-person account of battle. Zackary seeks total immersion in the heroic-agonistic genre.

In marked contrast to the death, destruction and chaos that characterizes 'doing battle,' Zackary's singing does not describe a battle. Rather, candy bars, 'invention' (though the word is 'adventure' in the original song he imitates), 'rescuing', 'get an education', 'all grown up' are very different kinds of themes than the 'doing battle' themes. Certainly, there is no disadvantage in singing rather than doing battle from a structural and coherence perspective. The lyrics Zackary imitates are more or less as coherent to a listener than his battle scenes, and the tune of the song smoothes over the sometimes-disjointed textual songs lyrics. Here are three examples of songs Zackary sang:

{a three three a two two a one one got to reach to the stars to buy candybars (inaudible)}

{three three two two one got to blast reach to the stars to buy candybars (.) I'm on a when when a when for invention (.) Help (.) The superpower mind (inaudible) {VOC bark} Rescue the (inaudible) on Jimmy Neu::tron }

{{(inaudible) still go to school to get an education each and every day (inaudible) all grown up (inaudible) all grown up (inaudible) all grown with you all grown up with you}}

Zackary's renditions of All Grown Up, Pokemon, and more are executed with the same total commitment, robust energy, and mental involvement that characterize his

agonistic-heroic displays. But the lyrics and exciting tune allow him to express a different set of emotions and language than 'doing battle' does. When a child like Zackary has only two compositional genres that interest him and with which he has much facility, it would be a terrible shame to limit him to only one, and (in my biased opinion) the flattest one at that. When the gender space of a boy is most often constrained to spoken narratives of fighting and death, it seems refreshing that singing cartoon and movie songs is also admissible. It would be worth following how boys like Zackary develop this singing spriting genre for a year or two to see whether it leads to different kinds of story possibilities than the heroic agonistic or serves as a foil within that genre to express different gendered possibilities.

Singing spriting might provide more ways in which boys can act as boys in literate ways. If singing cartoon songs can provide greater depth of expression to young boys as they negotiate the kinds of composition activities school asks of them, then we should seriously consider what they are doing as legitimate.

8.3.3 Wordless Talkuments

There were some singing talkuments that consisted only of singing—no talk whatsoever. Often these functioned like a 'collection' talkument: all of a child's favorite songs by a favorite singer, or theme songs from a child's favorite television shows. But there were some singing talkuments that were more abstract. I would say that these were experiments with composing in sound-qua-sound. They were wordless. Or pre-verbal. Or perhaps they were wordless in the same way that Henri Chopin, an electro-acoustic sound artist, placed microphones inside his mouth and recorded the sound of talking from that internal acoustic space (McCaffery and bpNichol 1978; Hultberg 1993). They were words, but from a different perspective.

I describe the most extreme example of this phenomenon to make the questions and the issues as clear as possible. Although this kind of wordless sound can be found in many talkuments, some of which were also linguistically explicit, there was only a single example of a very long, completely wordless and 'well-developed' talkument.

Andre was a fourth grade boy at Molière. At home he spoke French with his parents who were both French. They had been in the United States for many years. Very occasionally he had difficulty expressing himself in English, which he spoke mostly at school. Both his writing and spriting in English could be quite linguistically explicit when he chose to make them so. He just often had other interests.

Andre preferred direct physical action and visual representation to expressing himself in words. I believe this is more a reflection of his personality than a symptom of his greater difficulty with English. It seems right at this point to say that one of his parents was an architect.

Andre was a budding visual artist himself and spent a lot of time in class drawing in the Microsoft Paint program, a popular alternative to spriting. His drawings—as many of the children's were—were often abstract, demonstrating a startling grasp of visual rhythm and color. He even applied visual principals of composition to spriting. One day while creating a 'character description,' Andre interpreted the assignment in a surprising visual manner. He made finer and finer splits in a very long spriting sound and created the spriting interface

shown in Figure 53. He showed it to me with great pride. I was impressed as much with his ingenuity and perseverance in making such fine splits in time as I was with watching the staccato visual effect under the strains of seamless sound emanating from the SpriterWriter. It was beautiful, and uniquely Andre.

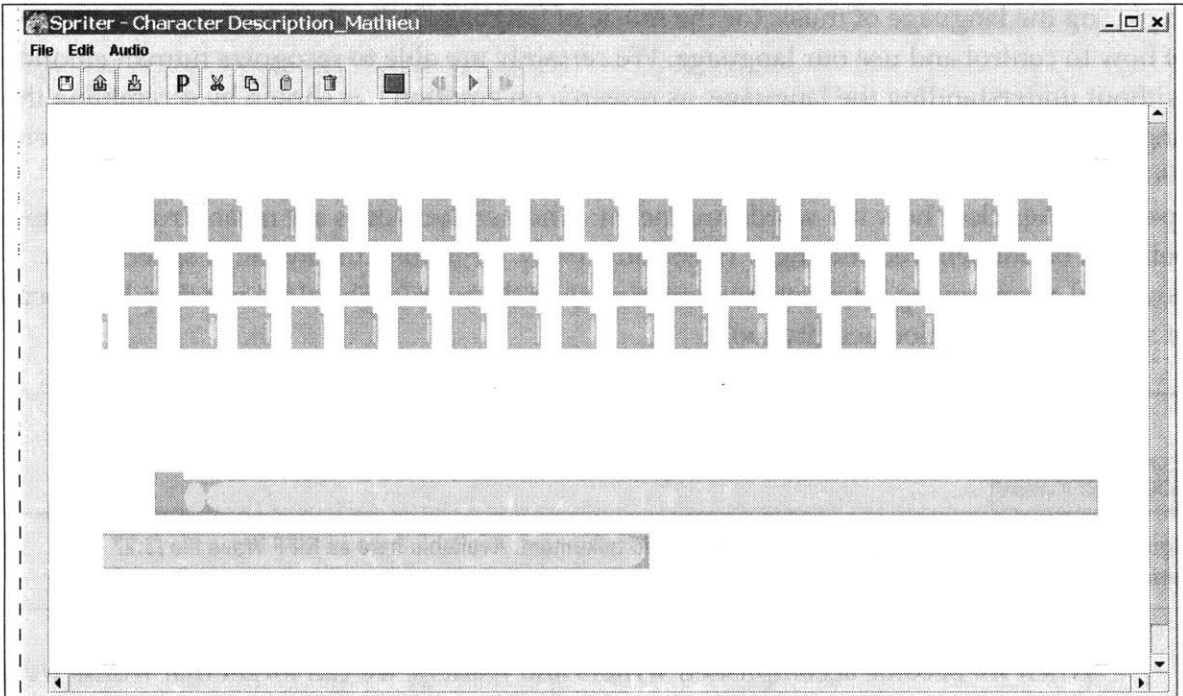


Figure 53 Andre's visual staccato of a single recording

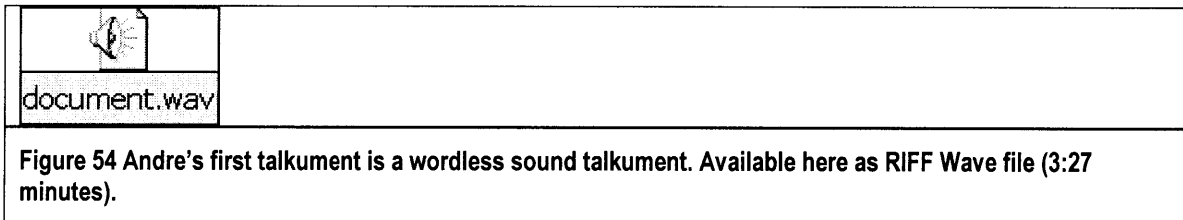
Andre was also capable of frightening people with his imagination. At one point he took my videocamera tripod and, acting as if it were a submachine gun, sprayed some of the girls in the class with imaginary bullets in a dramatic first-person enacting of the heroic-agonistic genre. I had to disarm him even as he ran from me. The girl who he "shot" took direct action in response, slapped him across the face. He nearly cried, a less macho response than one would expect. There were apologies all around. The principal confirmed that Andre could act in violent ways, and that they were working on this.

Andre was a complex character. One of his very first spriting compositions, and only one of two he was truly excited about and anxious to share with his classmates, was a wordless singing talkument. Translation to text for such a composition is obviously impossible. It is available in Figure 54 as RIFF wave file, if you are reading this in an electronic version. If not, you must rely upon a description of its effect on me rather than experiencing it directly. With respect to this piece there cannot be even the pretense of 'translation to text'.

This was his first spriting piece and finished before there were many models to suggest what might be 'proper' talkument. Andre won the random lottery that first week to demonstrate his piece before the entire class. I had no idea what to expect as I had not previewed it ahead of time. When it began, I was shocked, interested, and delighted. There

were no words, but it had interesting, intelligently developed musical ideas of rhythmic and tonal patterns and variation (perhaps requiring some editing). What were we to make of this? Is this music class or English class?

Perhaps that was the point. Speech is first and foremost *sound* and can be explored and played with without resorting to words. Perhaps when playing with sound itself, when exploring the language of music (or the music of language?), is when we become more aware of how to control and use our language. We certainly are able to recognize human emotion without understanding the language, as research on emotion has shown by scrambling the linguistic message while keeping the 'song' intact (Kappas, Hess, and Scherer 1991; Scherer 1981). Even without words the emotion of speech is recognizable. Song and rhythm of speech makes clear how the words are meant: whether the words are meant ironically, to be believed or not believed (Bolinger 1989; Ladd 1996). Arguably, the music of speech is as powerful at conveying intention and emotion than the words. Should it not then be a focus of spriting composition activity too?



When we become accomplished writers and readers, we can forget that words were sound first. When children of normal speech and hearing learn to read, they embark on a process of internalizing the sounds of voices they have heard. They use these voices to develop inner 'reading' voices that are seldom discussed in the reading literature. Soon these inner voices are treated metaphorically, and music becomes treated and understood categorically as different than speech.

There is the opportunity with spriting to maintain the bridge between language and music and children understand that immediately. A large proportion of their spriting experimentation is focused upon the musical aspects of speech, the 'material' of spriting. Just as the boundaries between writing and drawing are intentionally fuzzy during elementary stages of writing (writing is effectively making pictures with linguistic import), the boundaries between spriting and music are also bound to be fuzzy. Sometimes children's experimentations will emerge as almost pure music, as many of children's 'writings' are pure image.

8.4 Conclusion

In many of the children's talkuments, song serves important and diverse functions. For example, singing and song can express strong emotional needs that a child might be incapable of talking about because of a need to maintain a tough, aggressive or stoic exterior. Without the inclusion of such songs the remaining 'talking' spriting might present a very one-dimensional portrayal of the author's thought. Songs can provide structure to a

talkument, functioning as paragraph or section markers. They can also be descriptive examples of a scene, serving to contextualize action within a particular scene more quickly and completely than a description or name of a song might—we ‘feel’ the mood intended. Singing might provide young boys especially a viable alternative to the ‘agonistic heroic’ genre, providing more possibilities for expressing their gendered identity. And lastly, singing wordless songs or beats might help children explore how sound itself also has internal structures and ordered forms, and can be used to great effect in speaking. Composing with pure vocal sound might provide them more creative and representational options in spriting itself, ultimately improving the flexibility with which they produce, think about and interpret speech. We have much to learn about how songs and singing might fit into future models of literacy and linguistic composition.

At this point, the SpriterWriter did not permit children to import song recordings into their talkuments, so they had no choice but to sing themselves. Because of this, I witnessed the pleasure children have in singing songs they love, altering them both intentionally and unintentionally, and adapting them to specific purposes ‘on the fly.’ In comparison, there is a coolness implied by importing singing that I would discourage unless the child is physically unable to sing. How should we consider the differences between a child imitating songs or simply embedding song recordings in their work? In multimedia development currently, it is assumed that music is ‘imported’ rather than created, re-created or imitated. This is an important issue for future spriting system development and for pedagogical use of such systems. Would Niesha’s purpose of making herself feel better by singing the same song again and again have been served through ‘playing’ the same song again and again? Could Andre have learned as much by sampling and remixing rhythms as by performing them? Would Zackary have had as much pure joy in hearing Pokemon as singing it? Would the only words he would ‘voice’ himself then be the ‘fighting’ stories while he ‘played’ the singing? These are important questions about how we develop the future of singing and song in the future of spriting media.

Even as spriting technology improves and produces ‘professional’ sounding talkuments, there might be value in children singing their own songs—or re-generating a song and controlling specific parameters of its form. As a listener, I found it so informative of the child’s personality generally, and their mood specifically, when I heard them sing. Their voices are unforgettable. Even though children often choose to model their singing on songs heard elsewhere, through singing their own renditions they emphasize what it is that they consider important about that song. They also demonstrate their understanding of what they have heard, a way of re-producing their song comprehension. I hope that new spriting technologies foreground the construction possibilities of both voices and songs, providing children with powerful tools to control both meaning and material levels.

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Appendix A: Charlotte's Composition and Editing Log

In the first column of Charlotte's editing log, the actions (either composition or edit) are numbered consecutively from 1 to 317.

The second column, the time in seconds elapsed from the execution of the previous action and to the execution of the current one, provides an indication of how much time Charlotte spent planning any particular action.

The third column has the Action type, which can be one of the following composition or editing actions:

1. New (a new talkument is initiated),
2. Exit (the talkument is closed),
3. Record (a new stick and sausages is initiated),
4. Play (the content of one to many sausages is played),
5. Stop (a record or play action is terminated),
6. Delete (one to many sticks and sausages are eliminated),
7. Move (one to many stick and sausage groups are located to another position within the same composition), or
8. Paragraph (a paragraph marker is added to the composition).

The fifth through eighth columns are important if the action is a Recording Action. The fifth column contains the actual sound file recorded. If you are reading this document in an electronic format, double-clicking on the icon will play the sound file (RIFF wave format).



The column 6 contains the transcription of the recording, using the Transcription Standards described in Appendix E. If the recording remains in the final document, the transcription is in **bold typeface**.





If the recording is present in the final document, the column 7 contains the number of the order in which that file appears in the final document; that is, the document as it stood the last time Charlotte worked on it.





Column 8 contains the kind of composition or editing action this particular recording was judged to be.


Column 9, Comments, contains any observations about how the action effects the composition as a whole.



The composition and editing log from Charlotte's 'Boo' composition



1	2	3	4	5	6	7	8	9
Num	Time elapsed (sec)	Action	Item(s) selected	Sound filename	Transcription	Final Order	Composition or edit type	Comments
1	0.0	New			LOG: Apr 01 16:32:26			
2	32.4	Record	index=1	1080852853308  1080852853308.wav	(inaudible) and I were walking through the forest when we heard a bang!		Composition	The first word uttered before recording begins
3	4.7	Stop						
4	1.3	Record	index=1	1080852859387  1080852859387.wav	(.)		Unknown	Placed before previous because recording actions are in succession.
5	1.1	Stop						
6	9.4	Play	index=2 end=3					
7	4.0	Delete	len=1 pos=2					
8	2.3	Delete	len=1 pos=1					
9	1.7	Play	index=2 end=3					
10	8.9	Play	index=1					
11	3.1	Stop						




12	0.0	Delete	len=2 pos=1					Composition now empty
13	2.6	Record	index=1	1080852892314  1080852892314.wav	Esme and I were walking through the forest when we heard a *big *bang::		Add Refinement to (#1); Substitute Refinement to (#1)	Captures entire utterance clearly, adds "big"
14	5.4	Stop						
15	2.2	Delete	len=2 pos=1					deletes #13
16	14.1	Record	index=1	1080852913955  1080852913955.wav	Jasmine and I were walking through the forest		Substitute Refinement for (#1)	
17	3.4	Stop						
18	1.5	Record	index=1	1080852918852  1080852918852.wav	(.)		Unknown	
19	0.9	Stop						
20	1.0	Delete	len=2 pos=1					deletes #18
21	2.3	Play	index=2 end=3					
22	1.2	Stop						
23	0.0	Delete	len=2 pos=1					deletes #16
24	2.8	Record	index=1	1080852927004  1080852927004.wav	Esme and I were walking through the forest when we heard a *big {NVC scratching sound}		Substitute Refinement to (#1)	
25	7.9	Stop						
26	1.8	Play	index=1					




27	14.5	Delete	len=1 pos=2					
28	7.2	Delete	len=1 pos=1					deletes #24
29	2.4	Record	index=1	1080852960682  1080852960682.wav	Esme and I were walking through the forest when we heard {NVC light scratching sound}		Re-perform Refinement to (#24); Subtract Refinement to (#24)	
30	8.7	Stop						
31	2.5	Play	index=1					plays from beginning
32	16.1	Record	index=3	1080852988022  1080852988022.wav	We looked around (.) but we didn't see anything.	3	Composition	
33	3.4	Stop						
34	2.9	Record	index=3	1080852994261  1080852994261.wav	We heard it again.		Composition	placed in front of #32
35	4.1	Stop						
36	2.2	Record	index=3	1080853000570  1080853000570.wav	{NVC background noise}		Composition	placed in front of #34
37	3.0	Stop						
38	1.7	Play	index=4 end=5					
39	3.6	Delete	len=1 pos=4					
40	3.8	Delete	len=1 pos=3					



41	1.7	Play	index=2 end=3					
42	10.5	Play	index=2					
43	15.9	Stop						
44	8.5	Move	len=2 from=5 to=3					
45	2.0	Play	index=4 end=5					
46	5.2	Play	index=6 end=7					
47	35.2	Record	index=1	1080853091691	Setting. A stormy night when everyone has already gone to bed. And Charlotte and Esme are walking in the forest.		New Beginning Revision	
48	9.3	Stop						
49	3.2	Play	index=1					
50	29.2	Play	index=2 end=3					
51	1.9	Stop						
52	0.0	Delete	len=2 pos=1					deletes new beginning (#47)
53	2.9	Record	index=8	1080853138087  1080853138087.wav	{VOC howling}		Composition	
54	7.0	Stop						
55	1.6	Delete	len=2 pos=7					
56	7.8	Play	index=8 end=9					
57	8.5	Delete	len=1 pos=8					



58	3.5	Delete	len=1 pos=7					
59	23.6	Record	index=8	1080853189942  1080853189942.wav	{BEAT da da da da da da da da da da da da da da da da }		Composition	
60	8.0	Stop						
61	3.3	Play	index=7					
62	25.9	Play	index=2 end=3					
63	2.0	Stop						
64	9.8	Move	len=2 from=7 to=5					
65	6.8	Move	len=2 from=5 to=3					
66	7.6	Move	len=2 from=3 to=1					
67	1.4	Play	index=2 end=3					
68	23.4	Play	index=4 end=5					
69	24.7	Play	index=6 end=7					
70	17.3	Play	index=8 end=9					
71	46.6	Record	index=9	1080853366766  1080853366766.wav	Hello. I am (inaudible)		Composition	
72	4.5	Stop						


73	1.2	Delete	len=2 pos=9					
74	29.3	Record	index=9	1080853401817  1080853401817.wav	{SUNG um ba ba ba um ba ba ba }		Composition	
75	4.9	Stop						
76	1.8	Play	index=9					
77	16.4	Play	index=10 end=11					
78	9.8	Play	index=10 end=11					
79	1.7	Stop						
80	0.0	Delete	len=2 pos=9					
81	2.9	Record	index=9	1080853439391  1080853439391.wav	{SUNG ding dong ding dong ding dong }		Composition	
82	8.7	Stop						
83	2.5	Play	index=9					
84	11.3	Play	index=10 end=11					
85	22.0	Move	len=2 from=9 to=7					
86	33.8	Move	len=2 from=7 to=5					
87	6.5	Move	len=2 from=5 to=3					


88	50.0	Move	len=2 from=3 to=1					
89	8.0	Play	index=10 end=11					
90	8.5	Record	index=11	1080853590738  1080853590738.wav	We ran to a clearing and sat down and looked *all around.	5	Composition	
91	5.8	Stop						
92	10.2	Play	index=11					
93	7.1	Play	index=12 end=13					
94	24.1	Play	index=1					
95	126.6	Record	index=13	1080853764498  1080853764498.wav	In the clearing (.) there were blankets and *all sorts of things. We made ourselves a tent and a comfortable bed with *all the junk.	6	Composition	
96	11.6	Stop						
97	1.2	Play	index=13					
98	33.1	Play	index=14 end=15					
99	15.9	Play	index=6 end=7					
100	9.8	Delete	len=1 pos=6					
101	2.2	Record	index=15	1080853838154  1080853838154.wav	Esme and I (.) were walking through the forest when we heard {NVC soft scratching sound}		Re-perform Refinement to (#24)	
102	8.2	Stop						



103	4.4	Move	len=2 from=14 to=6					
104	4.6	Delete	len=1 pos=5					
105	2.5	Play	index=0					
106	50.1	Play	index=14 end=15					
107	9.2	Stop						
108	3.2	Play	index=14 end=15					
109	16.3	Record	index=15	1080853936646  1080853936646.wav	Just then (.) we heard {VOC howls}	7	Composition	
110	9.8	Stop						
111	18.6	Play	index=16 end=17					
112	16.6	Record	index=17	1080853981600  1080853981600.wav	Do you think we're going to be safe here? Asked Esme, very scared.	8	Composition	
113	5.6	Stop						
114	2.0	Record	index=17	1080853989211  1080853989211.wav	I hope so (.) I said, I hope they won't get close to us. We don't have any food to feed them, so they'll probably feed on *us.	9	Composition	
115	10.1	Stop						
116	4.0	Play	index=18 end=19					
117	1.5	Stop						


118	9.4	Move	len=2 from=19 to=17					
119	2.1	Play	index=18 end=19					
120	10.9	Play	index=20 end=21					
121	16.5	Play	index=20 end=21					
122	21.2	Play	index=20 end=21					
123	0.6	Stop						
124	7.6	Record	index=22	1080854073112  1080854073112.wav	We got under the covers (.) and waited for something terrible to happen.		Composition	
125	5.2	Stop						
126	1.6	Record	index=22	1080854079992  1080854079992.wav	But we were surprised to see that nothing happened. We stayed under the covers *all night and were safe and sound.	12	Composition	
127	8.8	Stop						
128	4.1	Move	len=2 from=21 to=21					
129	1.7	Move	len=2 from=21 to=21					
130	10.0	Move	len=3 from=23 to=21					





131	1.8	Play	index=22 end=23					
132	13.1	Play	index=25 end=26					
133	38.0	Record	index=28	1080854157443  1080854157443.wav	{SUNG na na-na na na na na na na:: na na-na na na na na:: }	13	Composition	
134	12.3	Stop						
135	1.3	Play	index=26					
136	12.3	Stop						
137	8.2	Play	index=28 end=29					
138	3.6	Stop						
139	4.3	Play	index=29 end=30					
140	14.4	Play	index=1					
141	104.1	Stop						
142	2.7	Play	index=22 end=23					
143	2.1	Stop						
144	0.0	Delete	len=2 pos=21					
145	4.4	Play	index=21 end=22					
146	1.6	Stop						
147	0.0	Delete	len=1 pos=21					deletes #124
148	8.1	Record	index=30	1080854336781  1080854336781.wav	Let's get under the covers (.) I said (.) in a frightened voice.	10	Transform refinement to (#124)	story line designed to follow #114
149	5.0	Stop						




150	1.3	Record	index=30	1080854343130  1080854343130.wav	Esme thought (.) that was a very (.) good idea.	11	New action, dialogue, or event Revision	Story line designed to follow #148 and dragged earlier like previous action.
151	4.2	Stop						
152	2.3	Move	len=2 from=29 to=29					
153	9.2	Move	len=2 from=29 to=21					
154	2.5	Play	index=22 end=23					
155	8.7	Play	index=22 end=23					
156	4.9	Play	index=32 end=33					
157	14.6	Move	len=2 from=31 to=21					
158	6.4	Delete	len=2 pos=1					
159	1.6	Play	index=2 end=3					
160	3.4	Stop						
161	0.0	Delete	len=2 pos=1					
162	1.8	Play	index=2 end=3					
163	13.0	Play	index=2 end=3					





164	10.3	Record	index=32	1080854426039  1080854426039.wav	{SUNG na na-na na na na na na na:: na na-na na na na na:: }	1	Re-perform Reflection; New Beginning Revision	eventually moves this to first beginning position
165	12.5	Stop						
166	3.7	Play	index=29					
167	16.7	Play	index=23					
168	37.9	Move	len=5 from=29 to=29					difficulty with dragging and dropping
169	9.5	Move	len=5 from=29 to=29					difficulty with dragging and dropping
170	2.0	Move	len=5 from=29 to=29					difficulty with dragging and dropping
171	8.7	Move	len=5 from=29 to=29					difficulty with dragging and dropping
172	29.0	Move	len=5 from=29 to=1					succeeds in moving song introduction to beginning
173	9.6	Play	index=5 end=6					
174	12.6	Play	index=1					plays composition from beginning
175	60.6	Stop						stops after one minute
176	7.8	Move	len=2 from=18 to=16					
177	3.4	Play	index=7 end=8					



178	10.4	Delete	len=1 pos=7					
179	2.0	Record	index=38	1080854652385  1080854652385.wav	Esme and I (.) were walking through the forest when we heard {NVC loud scratching sound}	2	Re-perform Refinement to (#24)	perfects loud-enough scratching noise
180	8.7	Stop						
181	2.9	Play	index=33					
182	15.0	Move	len=2 from=33 to=6					
183	4.3	Delete	len=1 pos=8					
184	1.4	Play	index=7 end=8					
185	14.1	Play	index=7 end=8					
186	9.9	Play	index=11 end=12					
187	4.6	Delete	len=1 pos=11					
188	2.5	Record	index=37	1080854715786  1080854715786.wav	We heard it again {NVC scratching sound}	4	Re-perform Refinement to (#34)	
189	5.6	Stop						
190	5.1	Move	len=2 from=33 to=10					
191	5.7	Delete	len=1 pos=12					
192	1.4	Play	index=11 end=12					



193	12.8	Play	index=2 end=3					
194	5.8	Play	index=0					
195	106.9	Move	len=2 from=18 to=16					
196	287.7	Exit						Stops spriting for the week; she does not edit the first story any more
197					LOG: Apr 08 16:40:09			Next week she resumes
198	6.6	Play	index=1					Plays from the beginning
199	48.4	Stop						Stops after 48 seconds
200	3.4	Play	index=15 end=16					
201	16.3	Play	index=16					
202	106.4	Record	index=38	1081454639463  1081454639463.wav	{SUNG humming }		Reperform Refinement to (#133)	Tune came as #133; microphone position changes during recording creating volume differential
203	13.8	Stop						
204	4.2	Paragraph	pos=34					
205	6.1	Play	index=36 end=37					
206	7.2	Stop						
207	0.0	Delete	len=2 pos=35					
208	1.6	Play	index=29 end=30					


209	6.2	Record	index=39	1081454678539  1081454678539.wav	{SUNG humming}	14	Material Refinement to (#202)	microphone position remains more stable throughout recording
210	12.6	Stop						
211	2.2	Play	index=36 end=37					
212	169.6	Play	index=36 end=37					
213	2.1	Stop						
214	4.0	Play	index=0					
215	22.9	Stop						
216	22.9	Record	index=44	1081454914749  1081454914749.wav	I was walking through the forest (.) when I heard a big {NVC scratching sound}	15	Subtract Reflection to (#1)	
217	11.3	Stop						
218	2.2	Play	index=40					
219	16.0	Record	index=47	1081454944241  1081454944241.wav	I ran to a clearing (.) and looked around.	16	Subtract Reflection to (#90)	
220	4.3	Stop						
221	2.9	Record	index=47	1081454951451  1081454951451.wav	There was nothing there (.) I looked again.	18	Composition	
222	3.8	Stop						
223	1.4	Play	index=43 end=44					
224	3.5	Stop						



225	10.5	Play	index=45 end=46					
226	2.0	Stop						
227	7.3	Move	len=2 from=44 to=42					
228	1.3	Play	index=43 end=44					
229	5.2	Play	index=45 end=46					
230	20.6	Record	index=51	1081455006921  1081455006921.wav	I was sure something was following me. It was very very very very very very freaky.	17	Composition	advance story
231	7.5	Stop						
232	12.7	Record	index=51	1081455027060  1081455027060.wav	Then I heard {VOC howls then evil laugh }	19	Composition	advance story
233	17.7	Stop						
234	7.0	Move	len=2 from=49 to=44					
235	6.5	Play	index=48					
236	44.7	Record	index=58	1081455102979  1081455102979.wav	I woke up and looked around.		Composition	
237	2.7	Stop						
238	2.6	Delete	len=2 pos=51					




239	3.3	Record	index=58	1081455111592  1081455111592.wav	I woke -		Unspecified edit to (#236)	
240	2.3	Stop						
241	1.3	Delete	len=2 pos=51					
242	1.7	Record	index=58	1081455116899  1081455116899.wav	I screa::med.	20	Composition	
243	2.5	Stop						
244	1.1	Record	index=58	1081455120524  1081455120524.wav	I woke up and looked around. Oh (.) it's just a bad dream.	21	Add refinement to (#236)	
245	5.1	Stop						
246	2.8	Move	len=2 from=51 to=51					difficulty with dragging and dropping
247	4.0	Move	len=2 from=53 to=51					Succeeds in dragging and dropping
248	13.6	Play	index=54 end=55					
249	9.4	Record	index=62	1081455155435  1081455155435.wav	{SUNG na na-na na na na na na na na-na-na na na na na::}	22	Re-perform Reflection of (#133)	Use of now-familiar music as story ending; end of the second story.
250	14.3	Stop						
251	33.3	Play	index=56 end=57					

252	8.8	Play	index=59 end=60					
253	14.7	Play	index=60 end=61					
254	5.8	Play	index=58 end=59					
255	4.3	Play	index=57 end=58					
256	132.4	Play	index=60 end=61					
257	7.6	Record	index=69	1081455376593  1081455376593.wav	{SUNG na na-na na na na na na na na-na-na na na na na::}	23	Re-perform Reflection of (#133)	Uses tune as story beginning
258	9.5	Stop						
259	1.5	Play	index=61					
260	18.5	Play	index=63 end=64					
261	3.3	Play	index=64 end=65					
262	12.7	Paragraph	pos=65					
263	14.8	Paragraph	pos=61					
264	123.7	Record	index=75	1081455560417  1081455560417.wav	A dark Halloween night (.) at the full moon I heard {VOC evil laugh} I've got you my little boy!	24	Composition	
265	14.3	Stop						
266	2.6	Move	len=2 from=67 to=67					difficulty with dragging and dropping

267	19.8	Move	len=2 from=67 to=62					succeeds
268	4.5	Move	len=2 from=62 to=62					difficulty with dragging and dropping
269	1.8	Move	len=2 from=62 to=62					difficulty with dragging and dropping
270	4.6	Move	len=4 from=64 to=62					succeeds
271	62.0	Play	index=67 end=68					Listens...
272	22.4	Play	index=67 end=68					Listens again...
273	16.1	Play	index=67 end=68					and again...
274	140.2	Play	index=67 end=68					And after a long minute, once again.
275	79.6	Record	index=74	1081455928276  1081455928276.wav	I ran to - behind a tree and looked around.	25	Composition	
276	3.9	Stop						
277	3.5	Record	index=74	1081455935606  1081455935606.wav	There (.) in the cemetery, there was a witch (.) with some ghosts (.) holding (.) a boy (3.0)	26	Composition	
278	10.8	Stop						

279	1.6	Record	index=74	1081455948074  1081455948074.wav	I knew that boy. He was one from my block. He was a very nice boy but he was also pretty mischievous.	27	Composition	
280	7.5	Stop						
281	1.7	Move	len=2 from=69 to=69					Ineffective drag and drop
282	6.5	Move	len=2 from=71 to=71					Ineffective drag and drop
283	6.7	Move	len=2 from=71 to=69					succeeds
284	3.3	Play	index=70 end=71					
285	10.3	Stop						
286	8.8	Move	len=2 from=73 to=69					
287	8.3	Move	len=2 from=69 to=66					
288	6.9	Move	len=2 from=66 to=66					Ineffective drag and drop
289	6.0	Move	len=2 from=68 to=66					
290	7.7	Move	len=2 from=71 to=68					

291	6.1	Move	len=2 from=70 to=68					
292	8.2	Move	len=2 from=73 to=70					
293	4.3	Move	len=2 from=72 to=70					
294	478.6	Record	index=76	1081456518795  1081456518795.wav	I hope you know (.) that w- witches lo::ve (.) the wolf		Composition	
295	6.6	Stop						
296	3.7	Play	index=71 end=72					
297	2.3	Stop						
298	0.0	Delete	len=2 pos=70					
299	2.2	Play	index=73 end=74					
300	8.8	Record	index=81	1081456542369  1081456542369.wav	I hope you *all know (.) that		Add Refinement to (#294)	
301	4.2	Stop						
302	2.1	Delete	len=2 pos=75					
303	2.0	Play	index=73 end=74					

304	10.1	Record	index=81	1081456560745  1081456560745.wav	I hope you *all know that witches (.) lo::ve to eat wolf skin. Just at the right moment (.) along came Mr. Wolf.	28	Add Refinement to (#294); Composition	
305	11.4	Stop						
306	6.8	Move	len=2 from=75 to=72					
307	6.5	Move	len=2 from=74 to=72					
308	38.6	Play	index=74					
309	14.4	Record	index=84	1081456638397  1081456638397.wav	The wolf ran towards him		Composition	
310	3.3	Stop						
311	1.5	Delete	len=2 pos=77					
312	2.3	Record	index=84	1081456645487  1081456645487.wav	The witch ran towards the wolf (.) and (.) since the ghosts (.) were her servants, they followed her.	29	Syntactic Transformation Adaptation to (#309)	
313	7.5	Stop						
314	1.9	Move	len=2 from=77 to=77					
315	9.7	Move	len=2 from=77 to=74					

316	12.5	Move	len=2 from=76 to=74					
317	132.2	Exit						Charlotte stops work for the day. The piece appears be unfinished.

Appendix B: Emily and Madeline's Composition and Editing Log

The actions (either composition or edit) are numbered in the first column from 1 to 97. The second column, the time in seconds elapsed from the execution of the previous action and to the execution of the current one, provides an indication of how much time they spent planning any particular action.

The third column has the Action type, which can be one of the following composition or editing actions:



9. New (a new talkument is initiated),
10. Exit (the talkument is closed),
11. Record (a new stick and sausages is initiated),
12. Play (the content of one to many sausages is played),
13. Stop (a record or play action is terminated),
14. Delete (one to many sticks and sausages are eliminated),
15. Move (one to many stick and sausage groups are located to another position within the same composition), or
16. Paragraph (a paragraph marker is added to the composition).



The final column, comments, contains any observations about how the action effects the composition as a whole.



The fifth through eighth columns are important only if the action is a Recording Action. The fifth column contains the actual sound file recorded. If you are reading this document in an electronic format, double-clicking on the icon will play the sound file (RIFF wave format). The sixth column contains the transcription of the recording, using the Transcription Standards described in Appendix E. If the recording is in full or part present in the final talkument, the seventh column contains the number of the order in which that file appears in the final document (the transcription is also in **bold typeface**), that is, the document as it stood the last time Emily and Madeline worked on it. Column 8 contains the kind of composition or editing action this particular recording was judged to be.


To better understand the structure of the narrative and how they continuously restructure speaker roles, I changed the text color. The narrator voice is in black text. The character of Sam is in blue, Lilliana is in pink, and the friend is in green.

Table 25 The usage log for Emily and Madeline's composition

Num	Action	Time (sec)	Item(s) selected	Audio file	Transcription	Final Num	Kind of recording	Comments
1	New	0.0			LOG: Apr 01 16:50:50			
2	Record	13.0	index=1	 1080853338304.wav	<i>Emily:</i> Sam was walking to class with his friends and a new girl passed them. <i>Madeline:</i> She's so cute and pretty. <i>Emily:</i> Sam told his friends. Then he went away from his friends and joined the girl.		Writing to spriting	Emily begins as narrator; Madeline acts as the boy.
3	Stop	14.6						
4	Record	29.4	index=1	 1080853382348.wav	<i>Emily:</i> Oh no no you don't press that one remember you press that one. (.) You got to click *off.		Mistaken capture	
5	Stop	8.6						
6	Play	2.2	index=1					
7	Delete	29.7	len=2 pos=1					
8	Play	1.5	index=2 end=3					
9	Stop	2.8						
10	Play	16.9	index=0					


11	Record	25.3	index=3	1080853469333.wav  1080853469333.wav	Emily: Sam - Come here! Sam was walking to class with his friends when a new girl passed them. {QUAL quietly} Make your voice sound like a boy. Madeline: She's so cute and pretty. Emily: Sam told his friends. Then he went away from his friends and joined the girl. {VOC whining}		Writing to spriting; Re-perform refinement edit in #2.	An interjection about the collaborative activity breaks up the introduction; Emily instructs Madeline to sound more boyish as compared to #2
12	Stop	21.0						
13	Play	2.4	index=3					
14	Play	25.2	index=4					
15	Stop	13.2						
16	Record	58.3	index=6	1080853589345.wav  1080853589345.wav	Emily: Sam the tough guy is what people called him. Was walking to class with his friends when a new girl passed them. Madeline: She's *so *cute and {QUAL drawl} *pretty. Emily: Sam said - told his friends. Then he went away from his friends and joined the girl. Ready to listen? Sean: yeah!		Writing to spriting; Re-perform refinement edit in #11.	Madeline deepens her voice, punches the articulation of most words, and resorts to a stereotypical Texan drawl to try and capture a tough guy image for Sam.
17	Stop	21.8						
18	Play	1.6	index=5					
19	Play	31.1	index=6					
20	Delete	234.6	len=2 pos=1					
21	Delete	5.7	len=2 pos=1					
22	Delete	8.4	len=2 pos=1					



23	Record	40.9	index=1	 1080853933470.wav	<p><i>Madeline:</i> Sam the tough guy {VOC inhale} was what people call him. Was walking to class with his friends, when a new girl passed him.</p> <p><i>Emily:</i> She's so cute and pretty! s-</p> <p><i>Madeline:</i> Sam told his friends. Then he went away from his friends and joined the girl. The - my - then Sam started talking with the girl. My name –</p> <p><i>Emily:</i> My name is Sam. What is your name?</p> <p><i>Madeline:</i> He asked her. {QUAL high pitched voice} My name is Lilliana.</p> <p><i>Emily:</i> The girl said to th- uh (.) The girl said to Sam. (.)</p>	Writing to spriting; Reperform Refinement edit of #2	Was Madeline's Texan imitation deemed over the top? Emily gives the boy's voice a try. Madeline assumes the critical unifying role of the narrator. With her small frame and naturally high voice, she later acts as a small, defenseless Lilliana.
24	Stop	37.5					
25	Play	1.8	index=1				
26	Delete	131.6	len=2 pos=1				
27	Record	4.0	index=1	 1080854108351.wav	<p><i>Emily:</i> Sam the tough guy is what people called him was walking to class with his friends when a new girl passed them. {QUAL low voice} She's so cute and pretty. {QUAL regular voice} Sam told his friends. Then he went away from his friends and joined the girl. Then Sam (.) started talking with the girl. {QUAL forcefully} My name is Sam (.) What's your name? He said to the girl. {QUAL lighter voice} My name is Lilliana the girl said to Sam. (.) Ready to listen?</p>	Writing to spriting; Reperform Refinement of #2	Does Emily want to practice her reading fluency? Or does she wonder if a solo speaker with stronger reading skills might do better? Or is she reading the script to Madeline to



								demonstrate the kind of dramatic intention they could bring to the reading?
28	Stop	29.9						
29	Play	1.8	index=1					
30	Spoke	31.1	What can I say?					They press the Speak button but have no text in the Writer. The Speaker synthesizes a default sentence.
31	Record	510.5	index=4	1080854681646.wav  1080854681646_names_removed.wav	<p><i>Emily:</i> Sam th- Sam the tough guy (.) {VOC inhale} is what people called him was walking to class with his friends when a new girl passed them.</p> <p><i>Madeline:</i> She's so cute and pretty.</p> <p><i>Emily:</i> Sam told his friends, then he went away from his friends and joined the girl. Then Sam started talking with the girl.</p> <p><i>Madeline:</i> My name is Sam. What's your name.</p>		Writing to spriting	The girls get all the way through the narrative for the first time. They return to their division of labor last seen in #16 where Madeline acts as the boy, Sam, and Emily acts as the narrator. Emily (probably


					<p><i>Emily:</i> Asked - asked her. My name is Lilliana the girl said to (.) Sam. Then Sam fell in love with the girl. At lunch he sat next to th- (.) girl who was all alone. (inaudible) Hi said Sam.</p> <p><i>Madeline:</i> The girl looked at him and - k- keeps eating. When *he looked away</p> <p><i>Emily:</i> {VOC quietly} when she</p> <p><i>Madeline:</i> when *she looked away, he tried to kiss her and his f- friends (.) saw (.) him and one of them stood up on (.) a ninth grade bench and yelled Sam loves the new girl Lilliana!</p> <p><i>Emily:</i> The end. The narrator of the first part was Emily. The narrator of the second part was (.) Madeline. Lilliana was Emily. Sam was Madeline and the friend was Emily. (.) Oh you were supposed to do the friend but (.)</p> <p><i>Madeline:</i> {VOC crying sounds} sorry!</p> <p><i>Emily:</i> oh wait we gotta stop it!</p>			<p>mistakenly) voices the character of Lilliana and Sam in the same utterance. Madeline has difficulty reading and dramatically voicing the script. Notably, she attributes the wrong gender to the girl and is corrected by Emily.</p> <p>NOTE: Real names have been expunged from the audio record.</p>
32	Stop	83.4						
33	Play	6.1	index=3					
34	Stop	72.9						
35	Split	10.9	108085468 1646.wav	lenInBytes=3671864 cutAtByte=1614848				They probably split off their meta-commentary while replaying recording #31
36	Delete	7.9	len=2 pos=5					
37	Play	12.6	index=0					

38	Stop	3.2						
39	Play	4.9	index=3					
40	Stop	17.6						
41	Delete	14.0	len=2 pos=1					
42	Play	11.1	index=0					
43	Exit	1324						
44	Open	0.2			LOG: Apr 15 16:35:07			Two weeks later when both girls are present in the class again, they resume.
45	Play	8.1	index=1					They begin by replaying what they have already
46	Delete	276.7	len=2 pos=1					It is unacceptable

47	Record	29.1	index=1	<p>1082060801537.wav</p>  <p>1082060801537.wav</p>	<p><i>Emily:</i> Sam the tough guy wa- is what they called him, was walking to class with his friends when a new girl passed them. She's - {QUAL gravelly voice} She's so cute and pretty! Sam told his friends. Then he went away from his friends and joined the girl. Then Sam (.) started talking with the girl. {QUAL high pitch} My name - {QUAL low pitch} My name is Sam. What is *your name. He asked her.</p> <p><i>Madeline:</i> My name is Lilliana.</p> <p><i>Emily:</i> The girl said to Sam. Then Sam fell in love with the girl. At lunch he sat next to the girl who was all alone. Hi. Says Sam.</p> <p><i>Madeline:</i> The girl looked at him and keeps eating. When she looked away, he tried to kiss her an- his friends (.) saw (.) him (.) and one of th- and one of them stood up on ninth grade bench and yelled</p> <p><i>Emily:</i> {QUAL low voice} *Sam *loves *Lilliana! (.)</p>		Writing to spriting; Reperform Refinement to #31.	They reduce the fragmentation of the narrator across speakers that characterized the previous recordings (save for #27). They split the role of narrator in to two parts, the first and second halves. Emily assumes the role both as first narrator and Sam. Madeline's part is reduced; she acts as Lilliana and the second narrator. Emily makes a strong attempt to change voicing between character and narrator, but still gets mixed up.
48	Stop	61.4						
49	Play	1.5	index=1					
50	Delete	74.1	len=2 pos=1					

51	Record	125.4	index=1	<p>1082061063925.wav</p>  <p>1082061063925.wav</p>	<p><i>Emily:</i> Sam the tough guy is what people called him was walking to class with: his friends when a new girl passed them. She's so cute and pretty. Sam told his friends then he went away from his friends and joined the girl. {VOC mouth click} Then Sam started talking with the girl. {QUAL low monotone} My name is Sam (.) what is your name. He asked the g- her.</p> <p><i>Madeline:</i> My name is Lilliana.</p> <p><i>Emily:</i> The girl told - said to Sam. Then Sam fell in love with the girl. At lunch he sat next to the girl who was all alone. {QUAL gravelly voice} Hi (.) said Sam - said - say - said Sam.</p> <p><i>Madeline:</i> The new - the girl looked at him and keeps eating. When she looked away he tried to kiss her, and his friends (.) saw him, and - and one of them stood up on ninth grade bench and yells</p> <p><i>Emily:</i> Sam loves the new girl Lilliana!</p>	2	<p>Writing to spriting; Add refinement to #47; Material refinement to #47.</p>	<p>They maintain the speaker roles from #47. They refine the this writing to spriting by changing some words ("Sam the tough guy is what they called him" becomes "Sam the tough guy is what people called him"; "Sam love Lilliana" becomes "Sam loves the new girl Lilliana"); material refinement by trying to improve their character voices and make them less cartoonish.</p>
52	Stop	57.3						
53	Record	11.8	index=1	<p>1082061133044.wav</p>  <p>1082061133044_names_removed.wav</p>	<p><i>Emily:</i> The end. Narrator of the first part was Emily</p> <p><i>Madeline:</i> Narrator of the second part was Madeline (.) Lilliana Madeline</p> <p><i>Emily:</i> Sam was Emily and the friend was Emily. (4.0)</p>		<p>Compositio n</p>	
54	Stop	18.3						

55	Delete	59.3	len=2 pos=1					
	Record	40.5	index=5	1082061251134.wav  1082061251134_names_removed.wav	Emily: The end. Narrator of the first part was Emily Madeline: Narrator of the second part was (.) Madeline (.) Lilliana was Madeline Emily: Sam was Emily and the friend was Emily.		Add Refinement to #53.	Madeline corrects her earlier mistake of omitting the relationship between herself and the Lilliana character.
57	Stop	15.0						
58	Play	5.0	index=3					
59	Exit	36.5						
60	Open	0.1			LOG: Apr 29 16:04:00			Two weeks later after Spring Break, the girls resume work on this piece for a third day.
61	Play	226.4	index=1					
62	Stop	15.1						
63	Play	10.1	index=0					They replay the entire composition
64	Play	86.1	index=4					
65	Stop	8.1						
66	Play	3.0	index=1					
67	Delete	102.8	len=2 pos=3					
68	Record	33.2	index=5	1083268871244.wav  1083268871244.wav	Emily: Chap- Chapter one. }	1		Only the bold words make it in the final talkument
69	Stop	3.6						
70	Play	2.7	index=3					

71	Play	9.0	index=4					
72	Stop	1.0						
73	Split	1.6	108326887 1244.wav	lenInBytes=147668 cutAtByte=26624				They split off and deleted the false start (e.g. "chap-") in action #68
74	Play	3.2	index=4	end=5				
75	Stop	0.1						
76	Delete	9.0	len=2 pos=3					
77	Play	4.3	index=3					
78	Move	48.8	len=1 from=2 to=1					
79	Play	0.0	index=1 end=2					
80	Stop	0.4						
81	Play	0.0	index=1	end=2				
82	Play	3.3	index=1	end=2				
83	Stop	2.2						
84	Record	5.6	index=8	1083268965870.wav  1083268965870.wav	(1.2)		Unknown	
85	Stop	1.3						
86	Exit	73.1						
87	Open	0.1			LOG: Apr 29 16:13:39			
88	Move	8.0	len=2 from=5 to=5					
89	Move	7.1	len=2 from=5 to=1					

90	Play	6.4	index=5					
91	Play	5.7	index=1					
92	Stop	1.2						
93	Delete	5.9	len=2 pos=1					
94	Move	8.5	len=2 from=3 to=1					
95	Play	2.9	index=1					
96	Stop	5.7						
97	Exit	293.5						

Appendix C: Schedule of Curriculum 'As It Happened' at Molière Elementary

Date	Exemplar (if any)	Activity
26-Feb-04	I introduced myself and the software by playing a composition I made about myself and hopes for the class, called 'My Name is Tara'	Introductions (Name, age, school room, and one important thing about oneself). We made a story together in round-robin fashion, each child contributing 'one sentence' as they stepped up to the microphone on my laptop computer, which ranged in length from the entire Cinderella story to "He weighed 50,000 pounds!"
4-Mar-04		Demonstrated recording and playing with their new headset and desktop microphones. They each made a talkument about whatever they wanted
11-Mar-04	I composed a poetically structured piece about words that I liked to say, called 'Raindrops on Roses'. I included some sung excerpts from the Sound of Music's 'Raindrops on Roses' song to act as structural transitions between my playful discussion of words-for-the-tongue-and-the-mind.	I demonstrated how to use some new editing techniques: (1) making splits in the sausages, (2) reorganizing the order of the sausages by dragging and dropping. We talked about characteristics of the Raindrops on Roses piece (consonance, lack of empty sound, favorite words, speaking and singing spriting, etc.) and asked them to think about their favorite words, words that they liked to say because they liked their meaning or their sound. I announced that demonstration playback will be limited to one minute today, hoping to encourage editing of content.
18-Mar-04	I composed a biographical 'trptych' of small vignettes about my early years, called 'Small Girl Short Stories', featuring adventure, chickens, and a piece I was still working on at the time about weaving a house from long weeds.	I played them three (unrelated) vignettes I composed about things I did when I was a child. The children understood that they were to create 3 short stories, none of which should exceed 4 lines in length (a correlate to temporal length they easily understood and is easily enforceable), then have a friend listen to all of them and make a suggestion about which one is best. Of course, they were to be the final judge (and many children ignored their friend's opinion). If the story was too long, they were to edit it down to 4 lines in length; paragraphs were to divide each story. The best story was to be placed first in the composition (by dragging and dropping).
25-Mar-04	I srote adaptations of two Idries Shah short stories, 'Bread and Jewels' and 'The Indian Bird'. I also distributed a nearly exact textual transcription handout.	The children were instructed to think of a story they would tell to the Spriter, then tell the same story to a friend, then tell it again to the Spriter. They worked in partners, one as a listener and one as a teller. Listen to the story told first and last to the Spriter. Are they the same? Did you make the story better after telling it to your friend?

1-Apr-04	I played The Camping Trip, a dialogue story I composed with my husband Samarjit about the time we were cooking chili in a deserted campsite during a rainstorm and a hungry wolf trotted through our campsite.	I introduced collaborative spriting this week. They chose a partner to sprite with. In this arrangement they were both tellers working on the same microphone, often making a two character scenario (or more, as they tended to change their voices).
8-Apr-04		I demoed the looping capability of the player and how you could transcribe your spriting using it. I suggested they continue working on their dialogues from last week in order to produce a screen play -- the foundation and basis of all movies and television programs they watch. I asked if they knew what a play was and a number of the boys became dramatic. But only a few of them put it together (rather weakly) with the idea of the play script (a piece of writing). They don't conceive of the script as having formative power; they are impressed with the performance aspect of spriting. Perhaps I didn't emphasize enough what a script is. Or perhaps the position that writing has in school and the life of every child is too much to challenge in the late afternoon.
15-Apr-04	Character Description Template	I installed a template for a Character Description on their computers that asked questions they could answer to develop a character sketch of a fictitious or real person. I was wondering how they would respond to a template in the SpriterWriter and whether it might help them develop good sketches. I was hoping that we could work on restating question-answers, in addition to a lot of different idea combining and the syntactical structures we could talk about as a result. It turns out that they are quite good at incorporating questions into their answers already.
22-Apr-04		SPRING BREAK
29-Apr-04		<p>Today I planned to ask the kids to focus on the sounds they heard during their spring break. I thought it would be an interesting counterpoint to the usual "tell me about what you saw and did during your spring break." Further, it would be interesting to explore the memory of sounds through spriting. And lastly, hearing is too often minimized and forgotten. Might they come up with better descriptions, the use of metaphor, simile and other poetic devices to describe the sounds? I didn't prepare an example for them today, thinking that since the week before was so calm, I would do the task with them on my own computer, modeling good work habits.</p> <p>During my initial introduction, I asked them to ask questions about sounds. They contributed, "Where are you when you hear them?" "Are you somewhere special when you hear them?" "Where is it coming from?" I added, "How do they make you feel?" and "What other things make similar sounds?" They were to think of these questions in their heads and answer them in their composition. I suggested they sprite about a minimum of eight different sounds.</p>

6-May-04	I edited The Camping Trip and exported a product—a sound file.	Work on spriting, do another collaborative piece if you want. I interviewed a few children about their thoughts on spriting and writing.
13-May-04	Demonstrated sausage labels with new applet export function on The Camping Trip	I gave no assignment to encourage them to revisit old compositions they liked and rework them, rethink them, for the applet export. Four children in fourth grade were missing today because they were on a school sponsored field trip.
20-May-04	Demonstrated sausage labels with applet export--again--to all students this time	I showed them the applet export with the text annotation animation -- the second time for the 3rd graders -- and told them they could do what they wished to do. I introduced the notion that there are only 3 weeks left in the class, including this one, and that we would have a final "show" when they could demo their favorite works. Some of them were very excited about this, others were nervous. I assured everyone that no one would be forced to demo, but encouraged Charlotte, in particular, to show her work.
27-May-04	I gave them the 'Can You Help Me?' Spriting composition and writing handout that asked them to make recommendations about improvements to the SpriterWriter	I asked the kids to sprite a reflective piece on their participation in the class (how they felt being a part of research, whether they felt their suggestions were taken seriously, etc.), what suggestions they might give to other children who may work with spriting technology in the future, and suggestions they might have for me about developing spriting further. I handed out a descriptive sheet titled, "Can you help me?". I also played a spriting composition entitled the same thing that I made based upon the text sheet, but a little more conversational and elaborated (because that's just what I do with spriting). I handed out the text, then played the spriting.
2-Jun-04		I structured it today to be a demo session -- anyone who wanted to play something for the class was able to do that. They were to choose their favorite piece. Four minutes was the maximum, most were less than that. Everyone chose to participate, even those who had not played anything before in the class.

Appendix D: Schedule of Technology Introductions to Umoja and Molière Elementary Schools

DATE	TECHNOLOGY CHANGES	UMOJA	MOLIÈRE
26-Feb	Demonstrated the software and played "round-robin" story building game		X
4-Mar	Tested all boundary conditions of buttons and other input devices to make sure they don't throw exceptions when there are no recordings and when nothing is selected.		
	Reviewed read and write of user.log, it now appends to single file called user.log within each composition's directory (a SpriterWriter talkument is itself a directory).		
11-Mar	Fixed window positions and sizes to fit on an 800x600 pixel monitor (primarily a problem at Umoja Elementary with small flat-screen monitors).	X	
	Substituted the representation of null annotation and label fields to be the string "null." This failed to rectify the problem of "?" symbols appearing in annotations.		
11-Mar	New microphones received and installed at Molière		X
16-Mar	New microphones installed at Umoja	X	
	Supported the action of deleting a currently playing object or a currently recording object without throwing exceptions. The children do this regularly and it seems to be part of how they "flow" with the program. I also checked for potential errors of concurrent recording and playing with all other editing buttons, since the kids often press record and don't even know it.		
18-Mar	Removed the button labels featuring punctuation symbols that children could add to the stick representations. Only one child used them and her use seemed too metaphorical to be helpful.	X	X
	Added grey hash marks in the Spriter to show the edges of the spriting "printable" area in a stylish manner.		
5-Apr	Added Key commands to AbstractActions for most editing actions in the Spriter so that one can press Enter to get a new paragraph in the Spriter, one can press DELETE or BACKSPACE to delete a selection in the Spriter.		X

7-Apr	<p>Introduced another version of Spriter Writer today that permits a different Playing mode in order to support transcription of spriting to writing. Each sausage may be looped n number of times with a delay of n number of seconds between each iteration. The mode is accessed through a dialog box under the Play Menu. This dialog provides some radio button choices The delay is 0, 1, 2, 3 and 5 seconds. The loops are 2, 3, 5, 7, and 25 (as good as infinity). There remains some awkward interaction between the playing and the onset of the TTS system, which reads the last sentence written: they play simultaneously rather than timesharing. Currently one can simply turn off the automatic response of the TTS voice to eliminate the overlap of voices.</p>	X	
	<p>On April 6 I had introduced this version very briefly into the classroom, but formerly stable functions were not behaving properly (for example, the recorder continued recording without stopping, even through subsequent Play actions) and so I reverted to the previous stable version. Apparently in making the transcription looping capability, I had played a little fast and loose with the record function. The player was not receiving a DataEnd() object that tells the audio system that the set of instructions for playing has finished. Therefore, playing state was not concluding. I fixed it to the point where it is sending a DataEnd() object and the player is resetting (shutting off); however, it is not shutting off immediately after the final iteration of the final sausage, but rather waiting for the delay amount and then shutting off. Technical corrections to eliminate the final delay and shut the player/recorder off instantaneously were introduced on April 7. There are still some problems to be worked out with respect to clicking on individual sausages versus playing the entire composition with the play button. I don't yet know where the problems lie with this.</p>		
8-Apr	<p>Demonstrated the looping capability of the player and how it can support transcription to the Molière children.</p>		X
13-Apr	<p>Spriter now can play sausages in loops, with a specified delay between each iteration. The delay is 0, 1, 2, 3 and 5 seconds. The loops are 2, 3, 5, 7, and 25 (as good as infinity in practice). Although this version was released last week, it was so unstable I went back to the March 13 version. The changes have been stabilized and re-introduced.</p>	X	
15-Apr	<p>Made TTS fire previous sentence upon a newline character in addition to the space character.</p>		X

	Added a Runnable to Literacy's Speak ActionEvent class to load up TTS system in a separate thread. Previously, the SpriterWriter was not operational until the TTS system loaded, which caused an excessive delay on some of the slower computers.		
	Reviewed LanguagePalette.getDrawableSelections() to find possible -1 query to _rects list seen in the error dump. No obvious solution. Added local variables to make sure getSelectionStart() and getSelectionEnd() are only accessed once during the function, in case they change during very rapid interactions with the interface. Hope this does it.		
	Question marks are still being added automatically to the sausage and stick annotations! I do not know why this is happening! I parse the annotation before setting it, in ProjectLog, to substitute all '?' to ' ', which is a cheap hack, but makes it look slightly better. I must find the problem before starting again in two weeks!		
27-Apr	<i>School begins again after Spring Break</i>	X	
13-May	I tried installing java sdk today and getting the applet export to work. The program as written at this point required a local JAVA compiler to compile a unique applet in real-time. However, the application couldn't find the compiler even after I installed it -- it must not be in the environment variables. I didn't have enough time to play with the batch file to set the environment variables up correctly with only an hour before class begins and eleven slow computers on which to do a new install. I decided instead to demonstrate to the children on my laptop what will be possible for them to do next week, and suggest to the kids that they prepare their documents for exporting next week.		
18-May	Installed a new version today on the two computers at Umoja. This version exports a JAVA applet which plays the wav soundfile and animates the textual annotations on the sausage in time -- a completely new design from what I had before that copies a pre-compiled applet and writes a unique html document (containing PARAM attributes) for the timing of words.	X	
20-May	Showed them the applet export with the text annotation animation -- the second time for the 3rd graders since 4th graders were on a field trip the week before. There seems to be an error in the applet output. The textual annotations are one unit ahead of the speech units. Is the timing really off by one unit or is the timing thrown off after loading large documents while timing by machine cycles?		X

Appendix E: Spriting Transcription Standards

Designed to be robust against human error (simple and consistent) and quick for data entry (requiring minimal decisions).

1. Word-level

Proper nouns are capitalized. After final intonation (.?!) the subsequent letter is capitalized. All word tokens are delimited by space, /t or /n.

- o Orthographic
- o Small set of "spoken forms" (e.g., cuz, gonna, wanna, gotta, mm-hmm, hey, etc.)

2. Phrase-level – used to indicate spoken intonation. (Not used at all in SUNG or BEAT subtypes)

,	intermediate phrase intonation, often accompanied by an inhalation. If following pause exceeds 1 second, pause should be noted.
.	final phrase intonation, often accompanied by inhalation and pause \geq 1 second
!	final phrase intonation, emphatic and loud with following pause \geq 1 second
?	final phrase intonation that rises with following pause \geq 1 second

3. Speaker ID - for example, **A:** - one or more capital letters. Colon is used only to mark speaker IDs, line-initially or within curly bracketed comments.

Other speakers heard clearly on recording:

{SPKR Tara: nnnnn nnnn kkkkkkkkk llll mmmmm}

{SPKR Tara: (inaudible)}

{SPKR unknown: jjjjjjj kkkkkkkkkkk llll mmmmm}

4. Overlaps - are encoded with // and latching turns are encoded with a preceding =

5. Fragments (restarts, interruptions, etc.)

- a. Words - hyphen is attached to the end of the fragment - e.g., "**th-**"
- b. Larger structures - hyphen is preceded and followed by a space - e.g., "**The only - I mean, the first**"

Where they co-occur (i.e., disruption of larger structure which begins with a word fragment), use the word fragment convention.

6. Nonverbal events and contextual comments - use curly brackets for all of them - e.g., {NVC laugh}, {NVC door slam}, {NVC mic noise}, {NVC referring to speaker A}, and for delimited unidentifiable noise in the background use {NVC background noise}

7. Pause -

(.)	pause <= 2 second
(n.n)	pause > 2 seconds

8. Non-canonical pronunciation - marked by including a bracket delimited PRN marker and the English-cized pronunciation AFTER the word. For example, **prefer {PRN pi-fer}** means that the speaker pronounced the word in a way which seems unlikely to be recognizable by the recognizer. This is used for speech errors and, in the case of children especially, misconceptions of how the word is supposed to be pronounced. This is not to be used for a non-native's consistent versions of a word or a child's inability to pronounce a certain letter such as 'r' or 'th' (since these could in principle be recognized by a suitably trained recognizer, whereas true speech errors could not).

9. Uncertainty - If a string is totally indecipherable for reasons of unfamiliarity with the topic, lack of clarity in the recording, or noise masking, use (inaudible).

10. Contrastive stress or Emphatic stress: *

This is *Adam, talking on mike *one, channel *zero.

or

I *do think so.

11. Elongated sounds, unstressed

: elongation of immediately preceding sound

:: extraordinary elongation of immediately preceding sound

SPKR, SUNG and BEAT, FRENCH marks may contain other embedded convention sets.

Embeddedness of transcription marks is limited to two levels, however.

1. Comments:

- o PRN (non-canonical, with respect to orthographic expectation): **'them {PRN em}**
- o NVC (produced by non-vocal means): **{NVC door slam}**; for background noise that is limited in scope: **{NVC background noise}**.

- VOC (produced by the vocal tract): {VOC laughs}, {VOC screams}, {VOC burps}, {VOC combative sounds}
 - QUAL (comments on situation or speech) that PRECEDE the events referred to: {QUAL two words were spoken while laughing}, {QUAL while whispering}. For steady background noise permeating the entire recording: {QUAL background noise}
 - SUNG (If the spriter continuously intones): {SUNG And I'm buying a stairway to heaven. Oo oo oo mm mmm hmm mmm ooo}; or a subset of singing is BEAT, highly rhythmic yet not continuously intoned, {BEAT Welcome to McDonald's may I take your order}
 - SPKR (If another speaker is recorded in the background, particularly when addressing the spriter): {SPKR Tara: You should hold the mic closer to your mouth} or to indicate both speakers when spriting collaborative conversational talkments.
 - FRENCH (If the speaker switches to French language): {FRENCH c'est la vie}, or if the transcriber does not know French: {FRENCH (3.2)}
2. Acronyms or "techie" terms:
 - spelled: P_S
 - spoken as words (not used consistently, yet): _ICSI
 3. Small set (approx. 20) of spoken forms (cuz, etc., listed above, plus the following: ah, eh, ehm, hmm, huh, mm-hmm, nn-hnn, mmm, nnn, nope, nuh-uh, oh, ooo (rhymes with "cool"), oops, oy, ugh, uh, uh-huh, uh-uh (meaning no), um, whoa!, yeah, yep, wanna, dat, dis, mm (while singing).
 4. Numbers - all spelled out - five, twenty-nine

NOTE: an (substitute for 'and') should not be used as it can be confused for 'an' the word. The convention

and {PRN an}

should be used instead

Appendix F: Writing Transcription Standards

Two different versions are produced. The first is for publication purposes and meant to convey the child's actual writing ability. The second is for statistical processing; thus, all superficial mechanical errors are corrected to present the child's writing ability in the most favorable light.

Thesis Copy Version

Emerging letteracy is represented in typed copy as close to 'as it is' as possible. However, with so many scribbles, uncertain lines and characters, growing knowledge of spelling and representation, the benefit of interpretation is always given to the child.

- Any letters that are clipped off the edge of the photocopy (usually first line letters) are positively interpreted using standards of convention and correctness.
- Spellings are rendered as accurately as possible to the original (in the Standard Version used for statistical purposes, all spell errors are corrected).
- Spacing between words is rendered as accurately as possible to the original
- Capital and lowercase letters are rendered as accurately as possible to the original
- All numbers are rendered as accurately as possible to the original representation
- Punctuation is included as accurately as possible to the original
- Attempt is made to recognize the teacher's written assignment (sometimes on the same page for Paige children) from the child's response to the assignment. All teacher's writing is behind // symbols.
- If any illustration is included, it is briefly described behind // symbols.
- Words that are crossed out are not included.
- When rough and final compositions appear on the same page, just the final version is included.
- Dots placed between words to help the child learn spacing between letters are not transcribed.

- Compositions by pre-literate children that include proto-letters and drawings cannot be transcribed.
- Compositions (as they might occur) that cannot be the work of the child (perfect cursive when the child cannot write print yet) are not transcribed or included (e.g. letter from Aaliyah)

Standard Copy Version

Standardized versions are intended to render the written composition in a typed form for the singular purpose of producing descriptive statistics in an automated fashion:

- All numbers that are not representations of time or a date are transcribed as words
- All spelling errors (e.g. exepte), words rendered in another language (e.g. bleu), or spoonerisms (e.g. 'chip' for 'ship' after writing about potatoe chips) are represented in conventional form. No additional words are added or subtracted.
- Capitalization remains the same as in the non-standard version
- All time is rendered as 7:00AM or 9:30
- Some particular words are rendered as: OK, Yugioh
- Particular symbol representations are changed to words: '&' to 'and'
- Plural written as possessive is changed to plural (e.g. 'we took our ticket's and ...' to 'we took our tickets and ...')
- With sentences that are numbered (a sentence production assignment rather than an extended topical composition), the numbers are removed.
- Unfinished words that can be extrapolated from context are completed to full conventional form (e.g. 'celebr' to 'celebration')

Appendix G: Molière Elementary Children's Recommendations for Making Improvements in the SpriterWriter

Full transcriptions of the talkuments to text are available below.

8.4.1 Edith's "my opinion mineee"

It's fun (.) it's really fun helping you do searching. um it didn't really feel like we're doing research it just feels like (.) a very fun computer class. (7.6) uh well I didn't feel very different when I told you about the problems on the computer (.) it was just like tattle tailing on the computer you know just saying there is a problem I didn't really feel any helpful. um (3.2) I did notice some changes like - it was - there were changes so it was like really good. um (.) um one thing about learning how to sprite is the on button, it's the red little square once you press it once, it goes boom! And you start talking and talking and it goes on forever. Then there is a little play button and you, put the, red button again it turns red again, it normally turns green then it then when you press the little kind of slide thing that goes play, you click it and you can hear whatever you whatever you said. Then when it's highlighted you can press the trash can (.) up top which is what makes everything get thrown in the trash. um that's pretty much all the basic things (.) it's not very complicated. um what I found kind of difficult was when we had to like, um (.) when we have to use like paragraphs (.) scissors and all that stuff, that was kinda hard because well we didn't have not much, and for the sounds the sound effects that was kinda hard because like the only thing we had was maybe some hard thumps (.) and the mouse clickings (inaudible) but not really much else. But I really enjoyed just talking that was really fun. I learned that well that my dad is not the only one that knows a lot about computers. mm hmm it's a very good lesson. You should really really listen to it a lot. um (.) I really wouldn't give you any big recommendations. oh except for one thing um there's like to see everything you wrote you gotta make everything *big to the side (.) and it's going to make this huge thing like purple thing go down so it can make it go down again. Now that's a *great recommendation. (3.8) nothing else (.) that I want to recommend you (.) um (4.0) um also for things that you could add in (.) you could add maybe have like this little thing so that like you make smiley faces or little pictures (.) and being able to draw on it (.) and also so that on the bottom everytime you say something, all the words get written down? So you don't have to like so if you would rather read it (.) then listen to it that could be cool too. um you could also um eh the little thing that you have to make bigger to get all the purple things getting down that maybe you should make a little bit more simple, because it's kinda like, alright like you stretch it out (.) bring it back out again, and ah:: I've one more thing to suggest

Maybe you should add all the directions, in the like the front page of SpriterWriter so if somebody wants to know how this works, um they can just read it? And you can also (.) that

was my friend not me! {VOC laughs} um um I'm sorry. Also maybe, if you take out the background and the breathing? And try to find a way to do that? Because (.) so that it sounds a little bit better when you're not the only one who listen - to did it and it gets kinda of like worse? and (8.0) um think some of the most important of these is try to take out the sound background and all that stuff (.) and to try to add in like sound effects? Like to have a little column that says like sound effects? And like (inaudible) blah blah blah blah that would be cool and then like {VOC car sounds} {VOC laughs} and a beep beep {VOC laughs}

8.4.2 Emily's "oooooooooooooooooooooooooooooooooooo"

Number one. What is it like to help me do research on Spriting. Well it feels (.) um like I'm really important (.) and I feel good that way.

Question one of one. Do you think what we- we are doing is research? um I don't think it's research because (.) I think we're kinda playing on the computer and having fun, and we're:: expressing ourselves.

Two (.) of one. Many of you told me about problems with Spriterwriter. like seeing junk (.) error messages did you feel like you were being helpful? No not that much because you were, um you were the one who fixed all those errors and I just feel *better without those because they're junk, and, my mom said I really shouldn't look at those.

Three of one. Did you ever notice that I changed the SpriterWriter because of some problem you noticed? or new designs - feature you suggested? Actually no I never noticed that. um I don't know why (.) but it's just weird.

Other children might use Spriterwriter next year. what can you tell them about learning how to Sprite.

What did you find difficult? u- What I found - I didn't find anything difficult (.) it was a::ll really easy.

What did you enjoy doing. We::ll (.) I enjoyed doing:: everything.

(.) Three of two. Did you learn anything that you would like share? um (.) no (.) except that you should never really get discouraged.

Four of two. Would you give them any recommendations? Um:: yeah I'd give them a recommendation about (.) you should be a little quiet otherwise you'll hear (.) um (.) hear everyone else in the background and then someone would probably hear *you in the background and that wouldn't be nice because you know how it feels like.

Number three. I have made changes and added new things to the SpriterWriter. there are still many things to fix and add - and - and *add that you suggested.

One of three. What changes and new things would you want in SpriterWriter . um

Two of three. Out of these changes which are the most important. (inaudible)

8.4.3 Madeline's "dmnmfcmh"

Hi today I would like to tell you, what I would like to change about Spriterwriter. Sorry my class is so noisy. I would like to change it to make it like (.) a movie. For example, if you made a story about uh (.) princess whose name was Cinder and she turned into a witch (.) named Wanda. Then (.) they would make like a movie (.) on the computer media player. I

really think that would be great. I also have another idea. To have the pictures to go with it. Like - let's take the story about the princess turned into a witch. We would make pictures for each {VOC inhale} (.) sausage I made. Like (.) a princess when I said, there once was a princess who lived in a castle. (.) and then, at the end of castle we could put like another c- like a drawing of a castle, that we made by ourselves. These are two ideas I think are - that are good.

Good day. My news report just finished. Sorry I didn't tell you that it was a news report at the beginning.

The most important of the tw- changes is I think number one. Because that's very - I mean number two. Because - then you are - like we don't have to draw good on the computer. And it's a good idea (.) even though I like (.) number one the most.

8.4.4 Andre's "new"

My name is Andre and Tara gave us a sheet called can you help me to change the SpriterWriter to have to make um it to make it better and I choose that we can make a slide show with pictures with that what we said in the spriter.

I do not see stuff changed only when Tara told me.

I will read the page can you help me you have been helping me by coming to spriting class every week by watching listening to you I have learned about what to change in the SpriterWriter to make it better I would like to ask you for help one more time please use the Spriterwriter to make a composition based on your experiences in class I am interested in your thought about the following things what is it that like what is it like you like you like to help me to research on spriting do you think what we are doing is research? Many of you told me about problems with SpriterWriter like seeing junk, error messages did you feel like you were being helpful did you ever notice that I changed the SpriterWriter because of some problems that you noticed or new design features you suggested, other children might be using SpriterWriter next year what can you tell them about learning how to sprite what do you find difficult? What do you enjoy doing? Did you learn anything important you would like to share? Would you give them any recommendations I have made changes and added new things in the SpriterWriter, there are still many things left to fix and that you suggested. What changes or new things would you want in SpriterWriter out of these changes which are the most important?

I learned that a (inaudible) (13.3)

I also like to have something that would um that would write on his own what you said that on the page where the spriter spriting is there's there's a button that says next and if you click on it the the next page with all what you said is written on it.

8.4.5 Elizabeth's "UNTITLED"

O_K I'm in computer class, and I'm going to read some questions. O_K the first question is, What is it like to help me do research - do research on the SpriterWriting. um there are three choices. Do you think what we are doing is resear- research? Second. Many of you told me about problems on the SpriterWriter like seeing junk errors and messages. Did you feel like you were being helpful? Do you? Did you ever notice that I changed the SpriterWriter because of some problem you noticed or a new design feature you suggested. On the first question it says, do you think th- what we are doing is research. I don't really know what we're doing, all I know is that we're using the SpriterWriter. I basically think we're having fun just having a club, so I don't really think we're having research. The second one is many of you told me about w- (.) about problems, with the SpriterWriter, I seen junk errors messages (.) messages. Did you feel like you were being helpful. Well I think I was being helpful, and all the club was being helpful, when we (.) told that we saw errors and junk on the computer because it made it - may have started a virus so I think that was really helpful. And the third one is did you ever notice that I had - I - that I changed the SpriterWriter because of some problems, you noticed or a new design feature you suggested? Well I sort of (.) um noticed that, because now when I click something wrong (.) the junk doesn't appear it just (.) I - I really like (.) what you did. The second paragraph says, other children might use the - the - use the SpriterWriter next year. What can you tell me - what can you tell them about learning how to sprite. And there are three things. What did you find difficult? Two. What did you enjoy doing. Three. Did you learn anything important (.) you would like to share. Four. Would you give them any recommendations. Well the first one is what did you find difficult I didn't find anything really diffi- difficult because it was much happier than difficult. Why - the second. What did you enjoy doing. Well I enjoyed going well what I'm doing right now. um (.) Using the SpriterWriter. Having fun with my friends, its all part of life you know I really appreciate its really fun I basically really like it! (.) The third one did you learn anything important? Well I:: did learn things that were important. That I won- that I want to share. An::d (.) an::d I'm sharing it with you right now, so I'm really happy (.) that you're here to listen to me. Four is did you give any recommendations? What would you give them any recommendations and yes I'll give them some recommendations I'll tell them that really (.) its really interesting doing that. And so it's really (.) basically what I have to do. And:: the:: (.) the third paragraph is (.) is (.) I have made changes and added new things to the SpriterWriter. There are so many things left to fix, and add to the research suggested and add that you suggested. The first question - question is what changes or new things would you want in the SpriterWriter. I wouldn't like any new changes. I like it how it is. And the second one is out of the these changes (.) which are the most important. Well:: in:: well I didn't think but now that it is this question, the thing is like I wouldn't like any virus in it. Like any if you accept them they can still appear again. And that's all I think so bye see you next time. Ciao!

8.4.6 Charlotte's "last day"

I think what we are doing is fun (.) but it is also research for you.

When I told you about problems I felt (.) helpful in some ways (.) but in other ways I felt like I was just giving you more work.

When you fixed problems I was talking about, I felt like you were spending a lot of time on me.

All of my spriting experience I only found one thing difficult

changing around the sausages.

I liked everything about Spriting class, there was no one that I didn't like.

I have a very important recommendation for people who might use Spriting and Writing after us.

When you're opening a new document,

Click

new (.) not open. Don't forget.

Changes I wanted done got done so there's nothing I really want changed from the spriting.

Appendix H: The *Living Word Vocabulary*, Expansions and Additions

The 1981 Living Word Vocabulary list is used by courtesy of Word Book International. Special thanks to Andrew Biemiller for reducing the vocabulary to root words, with grade level 2-12 specifications.

High frequency words, shortened spoken forms, proper nouns, pronouns, and more were added initially to reduce and refine the rare word count. These added words are in the first part of this document. The Living Word Vocabulary, level grade two only, follows as marked. It was also expanded (verb inflections and nouns pluralized). All words added to the Vocabulary itself are indented in form.

cuz
nope
oh
oops
yeah
yep
yay
yo
kinda
wanna
gonna
gotta
dat
dis
em
wow
o_k
ok
tv
t_v
ow
ouch
hey
um
umm
uh

the
a
an
it
it's
its
no
not
and
or

has
had
have
having

want
wants
wanted
wanting

play
plays
played
playing

give
gives
gave

giving

am
is
are
was
were
be
might
will
willing
won't
would
wouldn't
do
don't
doing
does
doesn't
did
didn't
could
couldn't
can
can't
have
haven't
having

go
going
goes
gone
went
get
gets
got

I
I'll
I'm
I've
I'd
my
mine
we
we'll
our
ours
you
you're
your
yours
who's
him
her

them
they
they're
their
theirs
his
hers
she's
he's
it's
that's
there's
where's
here's
why's
what's
who
what
where
why
when
how
that
those

really
because

like
likes
liked
liking

let
lets
letting
let's

January
February
March
April
May
June
July
August
September
October
November
December

momma
mommy
mom
daddy
dad

brother	OF	afraid	angel
sister	STUDENTS	after	angels
	WERE	after	angel food
hi	HERE	again	
SpriteWriter	-----	against	food
sprite		age	angel_food
sprited	LIVING	age	
spriter	WORD	age	anger
sprites	VOCABULARY	ages	anger
spriting	BEGINS	agree	angers
spriterwriting	HERE	agrees	angered
ecole	-----	agreed	angering
bilingue	a	agreeing	angry
paige	able	ahead	animal
academy	about	ahoy	animals
boston	about	aid	ankle
arlington	about	aim	answer
massachusetts	about	air	answers
french	about	alarm	ant
english	above	alarms	ants
o_clock	above	album	any
oclock	above	alike	any
goodbye	absent	alive	ape
com	accident	alive	apes
dot	accidents	all	appear
mr	account	all	appears
mrs	acid	all	appearing
a	acorn	alley	appeared
b	acorns	alligator	apple
c	across	alligators	apples
d	act	allow	April
e	act	allows	apron
f	act	allowing	aquarium
g	act	allowed	area
h	acts	almost	arithmetic
i	acting	alone	arm
j	acted	along	arm
k	add	aloud	arms
l	adds	alphabet	army
m	adding	alphabets	armies
n	added	always	around
o	address	amaze	around
p	address	amazes	arrange
q	addresses	amazed	arranges
r	admire	amazing	arranged
s	adore	America	arranging
t	adult		arrive
u	adults	US	arrives
v	adventure	USA	arriving
w	adventures		arrived
x	advice	amount	arrow
y	afraid	amount	arrow
z	afford	amounts	art
	affords	an	art
-----	affording	and	as
NAMES	afforded	angel	as

ask		ball point		beats		billing
	asks			beating		billion
	asked		point	beauty		bingo
	asking		ball_point	beaver		bird
astronaut				beaver		birds
	astronauts	bamboo		became		birth
at		banana		become		bit
atlas		bananas		becoming		bite
attend		band		bed		bites
August		banjo		beds		biting
aunt		bank		bee		black
aunt		bank		beef		black widow
	aunts	bank		beet		blackberry
	aunt's		banks	beetle		black_eyed peas
author			banked	before		peas
auto			banking	begin		
	car	bar			begins	blackjack
	cars	bar			beginning	blacksnake
autumn		barbecue	sauce		begun	blade
avenue				behind		blank
	street		sauce	belief		blank
	streets		barbecue_sa	belief		blanks
awake		uce		bell		blanket
awake				bell		blankets
award		barber			bells	blast
away		barbers		belly		blast
away		bare		belong		blasts
awful		bark		below		blasted
awhile		barn		belt		blasting
baa		bashful			belts	blaze
baby		basket		bench		bleach
	babies	basket		bench		bleed
back		bat			benches	bleeds
back		bat		bend		bleeding
back			bats	bend		bled
back			batting		bends	blend
bacon			batted		bended	blend
bad		bath			bending	blends
bad		baths		beneath		
badminton			bathes	berry		blending
bag			bathing	beside		blended
bag			bathed	best		
bag		battle		bet		bless
	bags		battles		bets	blessees
bait		bazooka			betting	blessed
bake		beach			betted	blending
	bakes	beach		between		blind
	baking	beak		beyond		blind
	baked	beam		bib		blink
balance		bean		Bible		blink
balance		beanbag		big		blinks
bale		beanstalk		bill		blinking
ball		bear		bill		blinked
ball		bears		bill		
ball		beat		bills		block
	balls	beat		billed		block
						block

block		bowls	buckled	buzz
block		bow_wow	buckling	by
	blocks	box		cab
	blocked	boy	bud	cabbage
	blocking		budge	cabin
blond		boys	buffalo	caboose
blonde		brace	bug	cactus
blood		braces	bugs	cafe
bloom		bracelet	build	cage
blot		bracelets	build	cage
blouse		brag		
blow		braid	builds	
blow			building	cages
	blows	braids	built	cake
	blowing	brain	bulb	calendar
	blown	brake	bull	call
				call
blubber		brakes	bulls	call
blue		braked	bulldog	
blue ribbon		braking	bull's_eye	calls
		branch	bull's_eye	called
		brand_new	bump	calling
		brat		
	ribbon		bumps	camel
	blue_ribbon	brats	bun	camera
		brave	bunch	cameras
		bread		
		break	bunches	camp
bluebird			bundle	camp
board			bundle	camp
boat		breaks		
bobcat		broke		
		breaking	bundles	camps
	bobcats	breast	bundled	camped
		breath	bundling	camping
body		breeze		
body		brick	bunk	can
bolt			bunk	candle
bomb		bricks	bunks	candle
	bombs	bride	bunny	candy
		bridge		cane
bonnet		bridge	bunnies	cannon
boo				canteen
book		bridges	burgers	canyon
boom		bright	burglar	cap
boot		bright	burn	captain
bootee		bring	burro	captain
bore			bus	captain
	bores	brings	bus	captain
	boring	brought	buses	car
	bored	bringing		car
born		britches	bush	care
boss		brontosaurus	business	care
	bosses	brook	but	
		broom	butler	cares
both		brother	butter	cared
bottle		brothers	butterfly	caring
bottle		brotherhood	butterscotch	
bottom		brown	button	carnation
boulder		brush	button	carol
bounce		bubble	buy	carpenter
bow		bucket		carpet
bow		buckle	buys	carpet
bow		buckle	bought	carport
bowl		buckles	buying	carriage
			buzz	carriage

carrot			chasing		chooses		closing
carry			chased		chosen		closed
	carries	cheap			choosing	cloth	
	carried	cheat		chop		cloud	
	carrying		cheats		chops	cloud	
cart			cheated		chopping	cloud	
cartoon			cheating		chopped		clouds
carve		check		chop suey			clouding
carve		cheer		chop_suey			clouded
	carves	cheer		suey		clown	
	carved		cheers	chopsticks		coa	
	carving		cheering	Christ		coast	
cat			cheered	chubby		coat	
cat		cheese		chuckle		coat	
	cats		cheeses	chuckle			coats
catch		chemical			chuckles	cock_a_doodle_doo	
catch		cherry			chuckled	cocktail	
	catches	chest			chuckling	cocktail	
	caught	chestnut		chum		cocoa	
	catching	chestnut		church		coin	
catfish		chew		church		cold	
catsup			chews	Church		cold	
cattle			chewing	churn			colds
cause			chewed	circle		collar	
	causes	chicken		circle		collect	
	caused	chicken		circle		college	
	causing		chickens	circus		college	
cave		chief		city		color	
celebrate		child			cities		colors
celebrate			children	clap		comb	
	celebrates	chili			claps	comb	
	celebrated	chili			clapping	come	
	celebrating	chimney			clapped	comfort	
cent		chimp		class		comic	
	cents		chimps	class			comics
center		chimpanzee		class		comma	
center		chin			classes	command	
cereal		china		claw		command	
chain		chip		clay		command	
chair		chip		clean			commands
	chairs	chip			cleans		commanded
chalk			chips		cleaned		commanding
change			chipped		cleaning	complete	
change			chipping	climate			completes
change		chipmunk		climb			completed
change		chirp			climbs		completing
	changes		chirps		climbed	cone	
	changing		chirping		climbing	connect	
	changed		chirped	clip			connects
channel		chocolate		clock			connected
charge		chocolate			clocks		connecting
charm		choke		close		control	
chase			chokes	close		cook	
chase			choking	close		cook	
chase			choked	close			cooks
	chases	choose			closes		cooked

	cooking		crayons	darling		dialing
cool		cream		dart		dialed
cool		creature		dash		dice
coon		cricket		dash		dice
cop		crime		date		did
		crime		daughter		did
	cops		crimes		daughters	do
copy		cripple		day		doing
copy		crisp		day		does
		croak			days	done
	copies	crook		daylight		die
	copied	crop		daylight		died
	copying	cross		dead		dying
cord		cross		deal		dies
cork		crow		deal		diet
corn		crow			deals	diet
corner			crows		dealing	diets
correct			crowing		dealt	dieting
cottage			crowed			dieted
cotton		crowd		dear		difficult
cotton		cruel		dear		dig
could		crust		December		
	can	crust		decide		digs
count		crutch			decides	digging
count		cry			deciding	dug
count			cries	deck	decided	dim
	counts		crying	deep		dim
	counted		cried	deer		dime
	counting			defend		dimes
country		cub			defends	dine
country		cup			defended	dinner
		cup			defending	dinnertime
	countries		cups			supper
couple		cut		deliver		ding
couple		cut			delivers	dinosaur
course		cut			delivered	dinosaurs
cousin			cuts		delivering	dirt
			cutting	den		disgrace
cover		dad		describe		dish
cow			dads		describes	dishes
	cows		dad's		described	dive
cranberry		daddy_longlegs			describing	dive
crank		daily		design		dives
crank		dairy			designs	diving
	cranks	dam			designing	dove
	cranking	damp			designed	divide
	cranked	dance		desk		divide
crash		dance		dessert		divides
	crashes		dances	destroy		dividing
	crashing		danced		destroys	divided
	crashed		dancing		destroying	dizzy
crawl		danger			destroyed	dizzy
crawl			dangers	detergent		do
	crawls	dare		dial		dock
	crawling	dark		dial		doctor
	crawled	dark		dial		doctor
crayon		dark			dials	doctors

dog			drowning		enemies		faces
	dogs	drug		engine		fact	
doll			drugs	engine		factory	
	dolls	drum			engines		factories
dollar		drum		enjoy		fade	
	dollars		drums		enjoys	faint	
donkey		dry			enjoying	fair	
	donkeys	duck			enjoyed		fairs
door			ducks	enough		fairy	
	doors	dugout		enter		faith	
dope		dummy		equal		fall	
dot		dump		equal		fall	
dot		during		errand		fall	
double		dust			errands		falls
double		eager		escape			fell
down		eagle		escape			falling
dozen		ear			escapes	false.	
drag			ears		escaping	false.	
dragon		early			escaped	family	
	dragons	early		Eskimo		family	
drain		early		even			families
draw		earn		even			family's
	draws	earth		even		fan	
	drawn	earth		even		fan	
	drawing	earth		even			fans
dream		east		evening		far	
	dreams	east		evening		farm	
dress		East			evenings		farms
dress		Easter		ever		fast	
dress		eat		every		fat	
	dresses	eat		evil		fat	
	dressed		eats	example		father	
	dressing		eating		examples	father	
drill			ate	except			father's
drink		edge		exit			fathers
drink		eel		exit			dad
drink		egg			exits		daddy
	drinks		eggs	expert			dads
	drinking	eight			experts		daddy's
	drank	eighteen		explain			dad's
drive		eighth		explain		favor	
drive		eighty			explains		favors
	drives	elastic			explained	fawn	
	drove	elbow			explaining	fear	
	driving	elephant		explore			fears
drop			elephants		explores		fearing
drop		eleven			explored		feared
drop		elm			exploring	feast	
drop		else		eye		feast	
	drops	empty		eye		feather	
	dropped	encyclopedia		eye		feather	
	dropping	end			eyes		feathers
drown		end		fa		February	
drown		end		fabulous		feed	
	drowns	end		face		feed	
	drowned	enemy		face			feeds

	fed		fixes	foot		fried
	feeding		fixed	foot		frying
feel			fixing	foot		fudge
feel		fizz		football		full
	feels	flag		football		fun
	felt	flag		for		fur
	feeling		flags	for		furniture
feet		flame		for		further
feet		flap		for		gal
	foot		flaps	force		gallon
fence	fences		flapped	force		gallop
			flapping		forces	gamble
fern		flash			forced	gamble
ferry		flash			forcing	game
fever			flashes	foreign		gang
few			flashing	forget		garage
few			flashed	fork		garbage
fiddle		flavor			forks	garden
fiddle		float		form		garden
field			floats	fortune		gardens
field			floated	forty		gardened
fight			floating	forward		gardening
fight		flock		forward		gargle
fight		flock		four		garter snake
	fights	flood		fox		snake
	fought	flood		fox		garter_snake
	fighting	floor		foxhound		
file		floor		frame		
film			floors	freckles		gas
film		flour		free		gas
film		flower		free		gas
	movie	flower		free		gate
	movies		flowers		frees	gates
fin		fluff			freed	gather
find		flunk			freeing	gather
	finds		flunks	freeze		gathers
	found		flunked	freeze		gathered
	finding		flunking	freeze		gathering
finger		flute		fresh		gauge
	fingers	fly		fresh		gay
finish		fly		Friday		gee whiz
fire		fly		friend		general
fire		fly			friends	gentle
fire			flies		friend's	geography
	fires		flied	frog		get
first			flying		frogs	get
first		follow				giant
fish		follow		from		giant
fish			follows	from		giant
fit			followed	front		gift
	fits		following	frost		gift
	fitted	food		frost		gifts
	fitting		foods	frost		presents
five		fool		fruit		present
fix		fool		fruit		
fix		foot		fry		giggle
					fries	giggles
						giggled

	giggling	grass		guy		heard
gill			grasses	guys		hearing
gingerbread		grave		gym		heart
giraffe		gravel		hail		hearts
girl		gravy		half		heat
girl		gray		half		heat
	girls	grease		hall		heaven
give		grease		hall		heaven
give		great		Hallowe'en		heaven
		green				heavy
	gives	green		Halloween		heel
	gave	green				helicopter
	giving	greet		ham		hell
glad		grill		hammer		hello
glance		grin		hamster		hello
glance		grind		hand		hi
glare		grip		hand		helmet
glass		grizzly			hands	hen
glass		groan		handle		her
	glasses		groans	handle		her
globe			groaning	handsome		herd
globe			groaned	hang		herd
glove				hang		here
glow		grocery		hang		hero
glow		groceries		hang		hero
glue		ground			hangs	high
glue		ground			hanging	high
	glues	ground			hung	high
	glueing	groundhog		happen		high
	glued	group			happens	high
go		group			happened	hike
go		grow			happening	hill
go		grow		happy		hillbilly
go		grow		harbor		history
goat		grow		hard		history
	goats		grows	harm		hit
God			grown	harmony		hit
gold			growing	harp		hit
gold		growl		harvest		hits
golf		growl		has		hitting
good			growls	hat		hit
	geese		growled		hats	hitch
goose			growling	hate		hitch_hike
grab		guard			hates	hive
	grabs	guard			hated	ho
	grabbed		guards	have	hating	hobble
	grabbing		guarded			hobby
grace			guarding		has	hockey
grade		guess			had	hoe
	grades		guesses		having	hog
grain			guessed	hawk		hog
grand			guessing	hay		hold
	grandma	guest		he		hold
	grandpa	guide		head		holds
	grandmother	gum			heads	held
	grandfather	gun		hear		holding
grape		guns		hears		hole

hollow		hundred		invite		jumping
holster		hunger			invites	June
home		hunt			invited	junk
honey		hunt			inviting	just
honey		hurricane		iron		just
honk		hurry		iron		just
honk		hurt		iron		kangaroo
	honks	hurt		is		keep
	honked		hurts		am	keep
	honking		hurting		were	
honor		husband			was	keeps
hood			husbands	island		kept
hood			husband's	itch		keeping
hoof		hush		itty_bitty		ketchup
hook		hush		jack		kettle
hook		husky		jack rabbit		key
hoot		husky		jack up		kick
hop		hut		jackass		kicks
hop		hymn		jacket		kicked
hope		ice		jacket		kicking
hope		ice			jackets	kickball
horn		idea		jail		kickoff
horn		idea			jails	kickstand
horse			ideas	jam		kid
	horses	if		January		kid
horsefly		igloo		jar		kids
hose		ill		jaw		kill
hospital		in		jawbreaker		kills
	hospitals	in		jay		killed
host		in		jeans		killing
hot		in		jeep		kind
hotel		in		jellyfish		kind
	hotels	inch		jerk		kindergarten
hound		inclose		jet		king
hour			enclose	jet		king
hour		Indian		jewel		kings
	hours		Native American		jewels	king's
house				job		kiss
house		ink		job		kisses
	houses	inn		join		kissed
how		insect			joins	kissing
howl			insects		joined	kit
	howls		bugs	joke	joining	kitchen
	howled	inside		jolly		kitchens
	howling	inside		journey		kitten
huckleberry		inside		joy		kittens
huge		instead		judge		knee
hula_hula		interfere		jug		knee
hum			interferes	juice		knife
	hums		interfered	July		knight
	hummed	into	interfering	jump		knit
	humming	invent		jump		knob
human			invents	jump		knock
	humans		invented	jump		knock
hummingbird			inventing		jumps	knocking
humor					jumped	knocked

	knocks	left	little	machine
knot		left	live	machines
	knots		lives	computers
know		leave	lived	computer
know		leaves	living	machine gun
know		leaving	living room	machine_gun
	knows	leg	room	gun
	known	lemon	living_room	mad
	knowing	lemon		made
la		lemon drop	lizard	
ladder		drop	load	make
lady		lemon_drop	load	makes
lady			loaf	making
	ladies	lens	loaves	magic
ladybug		leopard	lobster	magnet
lake		less	lobsters	mail
	lakes	letter	lock	malted milk
lamb		letter	lock	milk
lamp		letters	locks	malted_milk
land		lettuce	locksmith	man
land		level	log	man
land		library	lollipop	man
land		lick	lone	men
land		licks	long	manage
lane		licked	look	manages
language		licking	looks	managed
	languages	life	looked	managing
lantern		life	looking	mane
large		lives	loop	many
last		lift	loose	many
late		lift	Lord	map
laugh		lift	lot	map
laundry		lifts	lot	marble
laundry		lifted	alot	marble
law		lifting		marbles
law		light	loud	march
	laws	lightning bug	love	march
lawn		bug	love	marches
leaf		lightening_bu	love	marched
	leaves	g	loves	marching
leak		lily	loved	March
	leaks	line	loving	mark
	leaked	line	low	mark
	leaking	line	luck	market
leap		line	luggage	supermarket
	leaps	lines	lullaby	marvelous
	leaping	lined	lumber	mash
	leaped	lining	lunch	mask
learn		linen	lunches	mask
	learns	lion	lung	match
	learned	lip	lunkhead	mate
	learning	liquor	luxury	material
leave		list	luxuries	May
leave		list	ma	Mayflower
	leaves	lists	mom	me
	leaving	listen	mother	meal
	left	little	macaroni	meals

mean		model		much		next
mean			models	mud		next
	means	moment		muffin		nibble
	meant	Monday		mule		nibbles
	meaning	money			mules	nibbled
measure		monkey		multiply		nibbling
medicine			monkeys	multiply		nice
	medicines	monkey wrench		mumps		nice
meet			wrench	murder		nickel
	meets		wrench	museum		nickel
	met	nch	monkey_wre	museum		nickels
	meeting	monster			museums	nickname
melon			monsters	mushroom		nigger
member		moo		music		night
memory		moon		mustard		night watch
mend		moose		my		watch
menu		mop		mystery		night_watch
meow		mop			mysteries	nightmare
mermaid		more		name		nightmares
merry		morning			named	nine
mess		most			naming	ninety
message		motel			names	no
middle		moth		nanny		nod
midget		moth ball		nap		nod
mild			moth	narrow		nods
mile			ball	nature		nodding
milk			moth_ball	naughty		nodded
milkshake		mother		navy		noise
milkweed		mother		near		noises
mill			mothers	near		none
mind			mom	near		noodle
	minds		mommy	neat		noodles
mine			moms	neck		normal
minister			mommies	need		nose
mink			mom's	needle		noses
mink			mommy's	needle		note
minnow		motor			needles	notes
mint		motor		Negro		nothing but (trouble)
minus			motors		Black	but
minute		mountain lion			African_Amer	trouble
	minutes		lion	ican		troubles
miracle			mountain_lio		African	November
mirror		n			American	number
miss			lions	neither		number
miss		mouse		nest		number
mistake			mice		nests	number
mister		mouth		net		number
mistook			mouths	net		numbers
mitt		move			nets	numbskull
mix		move		never		nurse
moan		move		never		nurses
	moans		moves	new		nut
	moaned		moved	new		nut
	moaning		moving	new		nuts
mob		movie		new		nylon
model			movies	newsstand		oak

oars	oaks	organ	parakeet	pecan	
oar		Our Father	pardon		pecans
	oars	father	parent	pedal	
obey		out			pedals
ocean		out	park		pedaling
	oceans	out	park		pedaled
octopus		out		peel	
odd		outer space			peels
of		space			peeling
off		outer_space	parrot		peeled
off		outfield		peep	
off		oven	parrots	peep	
off		ovens	part	pen	
offer		over	part	pen	
	offers	owl			pens
	offered		parts		
	offering	own	parted	pencil	
		owls	parting		
office		owns	partner	pencil	pencils
	offices	owned	party	penguin	
often		owning			penguins
oil		ownership	pass	penny	
	oils	oxcart			pennies
okay		pack	passes	people	
old		pack	passed	pepper	
old		pack	passing	pepper	
old		pack	passport		peppers
old		pack	passports		
on		packs	paste	peppermint	
on		packed	paste	percent	
on		packing		perfect	
on		padlock	pasture	perform	
on		page			performs
on		pages	pat		performed
on		pain	pat		performing
once		pains		pats	perfume
one		paint		patted	perfume
one		paint		patting	perfumes
one		paint	patch		perhaps
one		paints	path		period
onion		painting	path		periods
	onions		paths	permit	
onward		pair		person	
open		pair	pave	person	
open		pairs	paw		people
	opens	pajamas	pay	paws	
	opened	palace	pay		pest
	opening	palaces		pays	pests
opossum		pan		paying	pet
	possum	pan		paid	pet
	possums	panda	pea		pets
orange		panties	peace	phone	
	oranges	pants	peace pipe	phone	
orbit		papa			phoned
orchard		paper		pipe	phoning
	orchards	paper		peace_pipe	phones
order		paper	peach		
	orders	papers		peaches	phony
ordinary		parade	pear		pick
				pears	pick
					picks

	picked picking	plantation plaster	poppy porch		prevented preventing
picnic picture		plate plate	porches	price price	
	pictures	plates	pork porridge		prices
pie	pies	play play play	post post postpone	primary prince	
pig	pigs	plays played playing	postpones postponed postponing		princes prince's
pigeon	pigeons			print print print	
pigpen pigtail pile		playpen plow plow	pot pots		prints printing printed
	plies	plows plowed plowing	potato pound		
pill	-pills		pounds pounded pounding	prison	prisons
pillow	pillows	plum plums	pour pour	prize	prizes
pilot	pilots	plumber plus pocket poem		program	programs
pimple	pimples		pours poured pouring	promise	promises promised promising
pin pin	pins	point point	prairie prairie schooner schooner prairie_schoo	proof protect	
pine ping_pong pink pipe pipe pipe		points pointed pointing	ner pray pray		protects protected protecting
	pipes	poison ivy ivy poison_ivy	prays prayed praying	proud prove	
pistol	pistols	bear bears			proves proved proving
pit	pits	polar_bear	prefix prepare	puddle	puddles
pitchfork pizza	pizzas	pole police police	prepares prepared preparing	puff puff pull	
place place	places placed placing	police policeman	present present present		pulls pulling pulled
		polite polka dots dots polka_dots	presents presented presenting	punch	
plan	plans planned planning	pony ponies	President presidents president's		punches punched punching
plane	planes	poodle pool pools	press press press	pup pupil	students student
planet plant plant	plants planted planting	poor pop pops popping popped	presses pressed pressing	puppet	puppets
		popgun gun	pretty prevent prevents	purple purse push	

	pushes	rat		rent		rips
	pushing		rats		rents	ripping
	pushed	rattle			renting	ripped
put		rattle			rented	ripe
	puts		rattles	repair		risk
	putting		rattled		repairs	river
puzzle			rattling		repaired	rivers
pyjamas		raw			repairing	road
quack		reach		repeat		roads
quart		reach		repeat		roar
quarter			reaches	repeat		roar
	quarters		reached		repeats	
queen			reaching		repeated	roars
queen		read			repeating	roared
queen		read		reset		roaring
	queens		reads	reset		roast
	queen's		reading		resets	roast
queer		ready			resetting	roasts
question		receipt		rest		roasting
quick		receive			rests	roasted
quiet			receives		resting	rob
quilt			receiving		rested	robs
quiz			received	restaurant		robbing
rabbit		record		restaurants		robbed
raccoon		record		return		robin
race		record		return		rock
race		record			returns	rocks
	races		records		returning	rock_and_roll
	raced		recorded		returned	rocket
	racing		recording	reward		rockets
radio		red			rewards	rocking horse
	radios	redbird			rewarding	
radish		redbreast			rewarded	rocking
rag		redcoat		rib		horse
rail		reel in			ribs	rocking_hors
rail			reel	ribbon		
rain			in	rice		e
	raining		reel_in	rich		roll
	rains	reindeer		rich		
	rained	rejoice			riches	rolls
raise			rejoices	riddle		rolling
raise			rejoicing	ride		rolled
	raises		rejoiced	ride		romance
	raising	relax			rides	roof
	raised	relax			rode	rooster
rake			relaxes		riding	root
rake			relaxing	right		roots
	rakes		relaxed	right		root beer
	raking	remember			rights	beer
	raked		remembers	ring		root_beer
ran			remembering	ring		
	run		remembered		rings	rope
	runs	remind			ringing	ropes
ranch			reminds		rung	
range			reminded	rip		rose
rascal			reminding	rip		rose

rot	roses	sale		scooped	sent
	rots	sales	score		September
	rotting	salt	score		serve
	rotted	salts		scores	serves
rough		same		scored	serving
round		same		scoring	served
round		sample	scratch		service station
round		sample		scratches	gas
round		samples		scratched	stations
		sand		scratching	station
	rounds	sand	scream		service
	rounding	sands		screens	services
	rounded	sandwich	screen		station
route		sandwiches		screams	service_station
	routes	sap		screaming	
row		sass		screamed	set off
	rows	Saturday	scrub		off
royal		save		scrubs	seven
rubber		saves		scrubbing	seven
	rubbers	saving	sea	scrubbed	seventy
rug					sex
	rugs			seas	sexes
run		see	seal		shade
run		sees	season		shake
	runs		season		shake
	ran	saw		seasons	shakes
	running	saw	seat		shaking
rush		saw	seat		shaken
	rushes	say		seats	shampoo
	rushing		second		shampoo
	rushed	said		seconds	sharp
rust		says	secret		shave
rust		saying	secret		
rye			secret		shaves
sack		scale		secrets	shaving
	sacks	scales	see		shaved
sad		scalp	see		she
saddle		scamper	see		sheep
safe		scare		sees	shepherd
safe		scare		seen	shine
safe		scares		seeing	shines
	safes	scaring		saw	shined
safety pin		scared	seed		shining
		scatter	seed		ship
	safety			seeds	ships
	pin	scatters	seesaw		shirt
	safety_pin	scattering		seesaws	shirts
		scattered			shoe
		school	sell		shoes
sail		school		sells	shoelace
sail		schooled		selling	shoeshine
	sails	schools		sold	shoo
	sailing	schooling	send		shoot
	sailed		send		shoot
salad		scoop	send		shoot
	salads	scoop		sends	shoots
sale		scoops		sending	shooting
		scooping			

	shot	sincere		sleeping	sneezed
shop		sincerely	sleigh		sneezing
shop		sing	slice	sniff	
	shops	sings	slices		sniffs
	shopping	singing	slide		sniffed
	shopped	sung	slide		sniffing
shore		single	slide	snow	
	shores	single		slides	snows
short		singles		sliding	snowing
short		sink		slid	snowed
shortcake		sink	slim		snug
shot		sinks	slip		so
	shots	sinking		slips	soak
shotgun		sunk		slipped	soak
shoulder		sip		slipping	
	shoulders	sissy	slope		soaks
shove		sister		slopes	soaking
	shoves	sisters	slosh		soaked
	shoving	sit	slow		soap
	shoved	sits	slowpoke		soaps
shovel		sitting	smack		social
	shovels	sat	smack		sock
show		six		smacks	soda
show		six		smacking	sodas
show		size		smacked	soft
show		sizes	small		soft
show		skate	smallpox		soil
	shows	skate	smart		solid
	shown	skates	smash		solve
	showed	skating		smashes	solves
	shew	skated		smashed	solved
	showing	skin		smashing	solving
shrunk		skins	smell		some
shucks		skip	smell		some
shy		skip		smelled	some
sick		skips		smells	son
side		skipping		smelling	son
side		skipped	smog		sons
	sides	skull	smoke		song
sight		skunk	smoke		song
sight		sky	smoke		songs
	sights	skies		smokes	soon
	sighted	slacks		smoking	sore
	sighting	slam		smoked	sorrow
sign		slap	smooch		sorrows
	signs	slaps	snack		soul
silence		slapping	snail		sound
silk		slapped	snake		sounds
silk		slave		snakes	sounded
sill		slave	snatch		sounding
silly		slaves	sneak		south
silver		sled		sneaks	space
sin		sleds		sneaked	space
	sins	sleep		sneaking	spaces
	sinned	sleeps	sneeze		spaghetti
	sinning	slept	sneezes		spark

spark		squeal		steal		strap	
	sparks		squeals		steals	strap	
sparrow			squealed		stealing		straps
speak			squealing		stole		strapping
	speaks	squeeze		steamship			strapped
	speaking	squeeze		steel		strawberry	
	spoke		squeezes	step			strawberries
spear			squeezing	step		stream	
speck			squeezed	step			streams
speech		squirrel		step		street	
	speeches		squirrels		steps		streets
speed		stable			stepping	streetcar	
	speeds	stack			stepped	strength	
	speeded		stacks	stick		strike	
	speeding	stale			sticks	strike	
spend		stalk		stiff		strike	
	spends		stalks	still		strike	
	spending	stamp		sting			strikes
	spent		stamps	sting			striking
spick_and_span		stand			stings		struck
spider		stand			stinging	strike out	
	spiders		stands		stung		
spill			standing	stink			strike
	spills		stoodd	stink			out
	spilled	star			stinks		strike_out
	spilt		stars		stinking		
spin		starch			stunk	string	
spin		stare		stocking			strings
	spins	starfish		stone		strip	
	spinned	start			stones	strong	
	spinning	start		stool		strong	
splash			starts	stool		studio	
splash			starting		stools	studio	
	splashing		started	stop			studios
	splashes	startle		stop		study	
	splashed		startles	stop			studies
split			startled		stops	stunt	
split			startling		stopping		stunts
	splits	starve			stopped	sub	
spool		starve		store		subtract	
spoon			starves	store			subtracts
	spoons		starving		stores		subtracted
sprain			starved		storing		subtracting
spray		state			stored	sudden	
	sprays	state		stork		sugar	
spread			states	storm			sugars
	spreads		stating		storms	suit	
	spreading		stated	story			suits
squash		station		story		sum	
	squashes	station		story		sum	
	squashed		stations	story		summer	
	squashing	statue			stories	sun	
squeak		stay		stove		Sunday	
	squeaks		stays		stoves	sunflower	
	squeaking		staying	straight			sunflowers
	squeaked		stayed	strange		suntan	

supper		take		tells	thunder
sure		take		telling	thunder
sure		take		told	thunders
surface		take			Thursday
surgeon			takes	tend	ticket
suspect			taking		ticket
	suspects		took	tends	tickets
	suspected	tale		tended	tickle
	suspecting		tales	tending	tickles
swallow		talk		tent	tick_tack_toe
swallow		talk		tent	tie
	swallows		talks	tents	tie
	swallowing		talking	terrible	
	swallowed		talked	terrible	
sweep		tall		test	ties
	sweeps	tame		tests	tied
	sweeping		tames	theater	tying
	swept		tamed	theater	tiger
sweet			taming	theaters	tigers
	sweets	tan		theatres	time
sweet potato		tan		theatre	time
		tan		their	time
		tangle		theirs	times
	sweet		tangles	then	timing
	potato		tangled	there	timed
	potatoe		tangling	they	tin
		tap		thin	tins
sweetheart			taps	thin	tiny
swift			tapping	think	tissue
swim			tapped	think	tissues
	swims	tape		thinks	to
	swimming		tapes	thinking	today
	swum		taped	thought	today
swing			taping	thirst	together
swing		tattle			together
swing			tattles	thirsts	toilet
	swings		tattled	thirsted	toilets
	swinging		tattling	thirsting	
	swung	tattoo		thirty	ton
swirl			tattoos	this	tonight
	swirls		tattooed	thousand	too
	swirling		tattooing	thread	top
	swirled	tax		thread	top
switch			taxes	threads	tornado
switch		tea		threading	torpedo
	switches		teas	threaded	total
	switched	team		three	total
	switching		teams	three	totals
sword		teddy bear		throat	touch
swordfish				throats	touches
syllable			teddy_bear	through	touched
	syllables		teddy	throw	touching
table			bear	throws	toy
	tables			throwing	trace
taffy		tell		thrown	traces
tag		tell		throw up	track
	tags			up	tracks
				thumbtack	tractor

	tractors		trying	up		walnut	
trade		T_shirt		upset		wander	
	trades			use			wanders
traffic			t_shirt		uses		wandering
trail					used		wandered
trail		tube			using	war	
	trails		tubes	Valentine		war	
	trailing	Tuesday		Valentine			wars
	trailed	tug		valley		warm	
train		tug			valleys		is
	trains		tugs	vanish		was	
trap			tugging	varnish			were
trap			tugged	vase			weren't
	traps	tummy		vegetable		wash	
	trapping	tuna			vegetables	wash	
	trapped	turkey		very		wash	
trash		turn		vest			washes
travel		turn		view			washed
travel			turns	view			washing
	travels		turning	view		wasp	
	traveling		turned		views		wasps
	traveled	turnip			viewing	watch	
treasure		turntable			viewed		watches
	treasures	twas		visit			watched
tree		twenty		visit			watching
	trees	twig			visits	water	
trespass		twilight			visited	water	
	trespasses	twist			visiting	water	
	trespassed	twist		vitamin			waters
	trespassing	twist			vitamins		watered
tribe		two		voice			watering
	tribes	typewrite		vote		wave	
trick			type		votes		waves
	tricks		types		voting		waved
trip			typing		voted		waving
trip			typed	vowel		wax	
	trips	ugly			vowels	we	
	tripped	umbrella		waffle		Wednesday	
	tripping		umbrellas		waffles	week	
triple		uncle		wagon			weeks
trombone		uncle		wagon		weigh	
	trombones		uncles		wagons		weighs
troop		under		wait			weighed
	troops	understand		wake			weighing
trophy			understands		wakes	went	
	trophies		understandin		waking		gone
truck		g			woke		go
truck			understood	walk		west	
	trucks	United_States			walks	wet	
true.					walking	we've	
trunk			US		walked		we're
trunk			USA	wall		wheat	
	trunks			wall		wheel	
try		up		wall			wheels
	tries	up		wallet		when	
	tried	up			wallets	while	

whip		winter		wood	yard	
whistle			winters			yards
	whistles	wipe		woods	yarn	
white			wipes	woodchuck		yarns
whose		wire		woodpecker	yawn	
why			wires	woof		yawns
wide		wise		wool	year	
wife		wish		work		years
	wives		wishes	work	yell	
wigwam			wished		yell	
wild			wishing	works		yells
wild		witch		working		yelled
wild			witches	worked		yelling
wildcat			witch's	worm		
win		with		worms	yellow	
win		without		worth	yellow	
	wins	wizard		wrap	yes	
	winning	wolf		wreck	yes	
	won		wolves	wren	young	
wind			wolf's	wrinkle	young	
wind		woman		wrinkle	young	
	winds		women	wrinkles	youth	
wing			woman's	wrist	zebra	
wing		wonder		write		zebras
	wings		wonders		writes	zoo
wink			wondered		wrote	zoos
wink			wondering	wrong	written	
	winks	wood		yard		

Appendix I: Writing Vocabulary Similarities and Differences between Umoja (U) and Molière (M) Elementary Schools

Overlapping Vocabulary (includes Usage Frequencies per School)

<i>M freq</i>	<i>U freq</i>	<i>word</i>			
			2	16	like
2	2	all	1	1	more
1	6	an	2	1	movie
84	28	and	1	2	nice
1	1	ask	5	1	park
24	4	at	6	7	play
5	3	ate	9	1	played
14	4	because	9	2	sister
5	1	best	1	2	teeth
1	3	bought	9	1	time
4	6	brother	90	28	to
1	2	candy	1	2	toys
8	1	car	10	1	up
2	1	clothes	1	3	way
1	2	come	87	5	we
4	2	didn't	29	7	when
1	1	dog	1	8	will
1	1	eating	1	1	would
4	3	food			
22	8	for			
4	1	fun			
4	3	games			
2	6	gave			
9	1	get			
5	3	going			
23	2	had			
1	1	has			
1	3	him			
5	1	his			
4	1	hockey			
4	2	hours			
6	1	house			
83	67	i			
1	1	light			

Written Words Found Only in Umoja Texts (includes Usage Frequencies)

freq	word	1	california	1	might	1	weight
12	am	1	call	1	mommy	1	women
8	thankful	1	cats	1	money	1	won't
7	buys	1	cause	1	months	1	yesterday
7	liked	1	celebrating	1	mothers		
6	name	1	celebration	1	movies		
4	leann	1	cheeseburgers	1	much		
4	rasheed	1	church	1	nae		
3	darious	1	computers	1	new		
3	january	1	cup	1	nobody		
3	kiya	1	dance	1	november		
3	lee	1	darren	1	offense		
3	ling	1	december	1	ought		
3	takes	1	dentist	1	pizza		
2	26	1	dogs	1	plays		
2	crosby	1	doug	1	poem		
2	daddy	1	earrings	1	police		
2	date	1	exercise	1	pollution		
2	grass	1	fancy	1	president		
2	love	1	firmar	1	ps2		
2	neighbor	1	flash	1	question		
2	september	1	flashing	1	reads		
2	whole	1	fork	1	sense		
2	world	1	forty	1	sing		
2	year	1	gives	1	six		
2	yugioh	1	glen	1	skate		
1	5	1	greenwood	1	smores		
1	14	1	hair	1	snug		
1	21	1	having	1	society		
1	27	1	hay	1	song		
1	9/25/2003	1	hopper	1	spiderman		
1	11/14/2003	1	horses	1	stay		
1	3:00pm	1	hot	1	stefan		
1	8:30am	1	kena'e	1	swim		
1	adopt	1	kenny	1	taste		
1	against	1	king	1	teepee		
1	anyone	1	kisses	1	theater		
1	baptist	1	kittens	1	tiny's		
1	bestfriend	1	leave	1	title		
1	boston	1	lose	1	toy		
1	buy	1	manuwell	1	turkey		
			marshmallows	1	use		
					video		
					volcahs		

Written Words Found Only in Molière Texts (includes Usage Frequencies)

freq	word	4	ride	2	crying	2	part
26	then	4	roller	2	cute	2	person
19	got	4	woke	2	deep	2	picture
13	so	3	as	2	direction	2	pieces
12	two	3	big	2	doing	2	red
10	dad	3	bumpier	2	door	2	room
8	after	3	coming	2	drove	2	sand
8	first	3	could	2	ever	2	second
8	next	3	done	2	excited	2	see
8	one	3	down	2	eyes	2	shark
8	three	3	down	2	fast	2	sick
8	very	3	finally	2	finish	2	soccer
7	happy	3	five	2	four	2	some
7	no	3	heard	2	funny	2	sometimes
7	said	3	jump	2	garden	2	stayed
7	saw	3	last	2	goggles	2	stroller
7	took	3	least	2	grandpa	2	swimming
6	about	3	long	2	gunner	2	tag
6	great	3	long	2	guys	2	taking
6	little	3	minutes	2	half	2	thing
6	started	3	ok	2	henry	2	thought
5	around	3	other	2	how	2	told
5	arrived	3	river	2	idea	2	toys-r-us
5	called	3	sad	2	invented	2	tv
5	came	3	sandwiches	2	invited	2	uncle
5	did	3	something	2	jet	2	used
5	from	3	walk	2	jumped	2	vacation
5	out	3	watch	2	junk	2	want
5	summer	2	well	2	katie's	2	won
5	where	2	actually	2	later	2	wouldn't
5	while	2	also	2	lego	1	7:00
4	asked	2	always	2	life	1	9:00
4	back	2	away	2	line	1	9:30
4	hour	2	bit	2	log	1	19
4	into	2	boys	2	made	1	93
4	left	2	built	2	many	1	100
4	not	2	cake	2	morgan	1	5:30am
4	off	2	castle	2	near	1	7:00am
4	or	2	cheese	2	nemo	1	accidently
4	our	2	chicago	2	now	1	adults
4	over	2	chips	2	once	1	airport
4		2	computer	2	only	1	albums
4		2	couldn't	2	open	1	almost
4		2	crept	2	outside	1	america

1	annoying	1	coasters	1	foggy	1	lap
1	another	1	coca-cola	1	fountains	1	lara
1	aunts	1	coffin	1	front	1	lasted
1	baggage	1	colors	1	full	1	laugh
1	balloon	1	comes	1	funerals	1	laughing
1	balloons	1	confused	1	further	1	legs
1	bathing	1	couple	1	gadget	1	lemonade
1	bathroom	1	crossing	1	gets	1	lessons
1	bear	1	curk	1	girls	1	lexington
1	beautiful	1	cut	1	goal	1	listening
1	been	1	dam	1	goalie	1	lived
1	believe	1	dana	1	goals	1	lives
1	belongs	1	david	1	goes	1	living
1	belt	1	deserts	1	grandmother's	1	look
1	beverages	1	die	1	green	1	looked
1	bigger	1	died	1	group	1	louis
1	bike	1	dies	1	guess	1	luckily
1	black	1	dinner	1	guessed	1	macdonalds
1	blood	1	disappointed	1	guy	1	makes
1	blue	1	do	1	ham	1	march
1	board	1	don't	1	happened	1	math
1	bowl	1	dragon	1	harry	1	mathieu
1	box	1	drank	1	head	1	meat
1	bpbb	1	driving	1	hedge	1	megan
1	brat	1	drop	1	help	1	mile
1	bread	1	dug	1	helper	1	moat
1	breath	1	ears	1	henry's	1	morgan's
1	bridge	1	eight	1	hole	1	morning
1	bring	1	electronic	1	homme	1	most
1	brookline	1	elevator	1	hose	1	mostly
1	brought	1	ended	1	hotel	1	moving
1	browse	1	even	1	huge	1	mudge
1	brown	1	every	1	hundred	1	music
1	brushed	1	everybody	1	hungry	1	naltie
1	bumpy	1	everyone	1	hurray	1	names
1	burgerking	1	except	1	hurted	1	nap
1	bushes	1	exciting	1	including	1	needed
1	camille	1	far	1	isabelle	1	nemo's
1	canadian	1	faster	1	jade	1	net
1	card	1	father	1	jelly	1	never
1	carl	1	fell	1	jessica	1	oatmeal
1	cat	1	felt	1	jogging	1	ocean
1	caught	1	fight	1	just	1	o'clock
1	century	1	finding	1	kept	1	oh
1	christmas	1	finished	1	kind	1	ones
1	closed	1	fit	1	kitchen	1	otherwise
1	closer	1	floor	1	known	1	pacific
1	cloths	1	fly	1	lady	1	pack

1	papa	1	salad	1	thinking
1	parents	1	same	1	thirty
1	parked	1	sapphire	1	threw
1	party's	1	save	1	through
1	peanuts	1	scary	1	tickets
1	peewies	1	scored	1	till
1	penny	1	screamed	1	tom
1	people	1	screaming	1	tomatoes
1	people's	1	screen	1	too
1	personal	1	seal	1	top
1	photo	1	seat	1	tornado
1	pig	1	seven	1	train
1	pixies	1	shoot	1	tried
1	plastic	1	shoots	1	tries
1	playdate	1	shopping	1	try
1	playground	1	shorts	1	t-shirt
1	point	1	skates	1	turned
1	points	1	ski	1	turtles
1	ponuts	1	skies	1	under
1	potable	1	sleeping	1	unfortunately
1	potter	1	slices	1	usually
1	pretended	1	slide	1	version
1	probably	1	slow	1	versions
1	problem	1	slowed	1	vita
1	punishments	1	snorting	1	wait
1	pure	1	someone	1	waited
1	put	1	soon	1	walked
1	quickly	1	sound	1	warm
1	quietly	1	splashed	1	watched
1	quins	1	stages	1	waves
1	ran	1	stairs	1	wearing
1	real	1	staying	1	week
1	reason	1	still	1	wendy's
1	remember	1	stockade	1	wheat
1	rental	1	suddenly	1	which
1	represent	1	suits	1	who's
1	restaurant	1	suposed	1	why
1	restaurants	1	supposed	1	wine
1	restaurent	1	surf	1	without
1	right	1	swam	1	wonder
1	roads	1	take	1	xiv
1	rock	1	taxi	1	yugio
1	rope	1	team		
1	rose	1	theaters		
1	ruby	1	their		
1	russia	1	them		
1	russian	1	there's		
1	sadly	1	think		

Appendix J: Spriting Vocabulary Similarities and Differences between Umoja (U) and Molière (M) Elementary Schools

Overlapping Vocabulary (includes Usage Frequencies per School)

<i>M</i> <i>freq</i>	<i>U</i> <i>freq</i>	<i>word</i>	1	1		9	16	
			9	3	been	1	1	car
4	2	actually	5	1	before	9	1	care
3	1	added	3	1	beginning	2	8	cats
1	1	afraid	2	3	behind	4	1	cause
15	6	again	1	1	believe	2	2	change
5	1	ago	9	13	bet	46	1	choose
25	2	also	25	16	better	2	3	class
14	10	always	2	1	big	2	1	clothes
14	3	am	2	1	bigger	1	2	club
433	600	and	2	9	birthday	2	2	coach
10	4	another	3	3	bit	2	1	color
17	8	any	7	4	black	1	2	com
3	1	anybody	2	3	blue	14	16	comes
2	2	anymore	2	9	book	4	2	coming
10	6	anything	4	8	books	1	1	computer
1	1	anyway	1	1	boss	5	4	computers
2	1	appreciate	2	6	both	1	1	cool
2	5	april	1	1	bottom	1	6	coolest
52	33	are	3	2	bought	1	1	cost
12	3	around	1	6	bow	2	3	cousin
18	2	as	8	9	boy	4	1	cousins
1	1	asleep	2	3	boys	7	5	cup
3	2	ate	1	1	breakfast	2	12	cut
8	4	away	4	4	bring	3	10	cute
7	2	baby	2	4	broke	1	4	cuz
9	11	bad	9	13	brother	1	2	dad
4	1	ball	2	1	brothers	2	5	dance
1	2	bar	2	1	but	9	4	danced
3	2	basketball	69	41	buy	1	2	dancing
2	3	battle	7	10	bye	51	4	days
36	23	be	12	23	call	26	11	destroy
1	5	bears	4	1	called	1	4	did
7	6	beat	12	4	came	5	4	didn't
2	6	beautiful	15	5	can	2	1	die
1	1	become	40	29	cannot	1	2	died
2	8	bed	1	1	can't	3	3	different
			10	3				dinosaur
								does

4	3	doesn't	1	5	forever	1	5	hid
27	7	dog	10	2	forgot	1	1	higher
22	2	doing	6	6	found	1	7	hit
8	1	dollars	12	3	four	2	1	homework
6	5	done	1	1	freaky	6	1	hope
30	33	don't	4	1	french	4	2	horse
2	10	dot	2	3	friday	3	6	hot
14	17	down	12	8	friend	1	1	hotdogs
9	2	dragon	10	10	from	11	10	house
1	1	dream	4	2	front	3	1	huge
1	2	dress	2	1	full	7	3	hundred
2	1	dump	16	11	fun	1	4	hurt
3	3	each	3	4	funny	358	349	i
1	1	easy	4	2	gave	32	31	if
12	6	eat	3	4	gets	4	8	inside
1	2	eating	4	2	getting	16	5	into
7	7	else	22	10	girl	20	2	its
17	16	end	2	3	girlfriend	9	1	i've
14	2	even	1	4	girls	5	1	james
9	13	ever	11	2	give	1	3	jeans
8	7	every	8	2	goes	2	2	jones
8	3	everybody	42	47	going	2	1	keep
1	1	everyday	1	1	gold	3	1	kid
1	2	everyone	10	86	got	1	1	kidding
12	2	everything	17	4	great	2	4	kids
1	1	everywhere	5	1	green	7	5	kill
4	5	evil	2	4	ground	7	2	kind
1	1	exact	1	1	gun	6	1	king
5	6	except	5	2	guy	4	1	knew
8	1	eyes	8	5	guys	10	2	knock
1	1	face	1	13	had	1	1	knocked
1	2	fairy	24	4	hand	8	5	last
1	8	family	2	1	happy	2	2	later
8	3	fat	6	1	hard	13	2	learn
4	7	favorite	8	1	having	3	3	learned
14	4	feel	5	61	he	1	2	leave
6	4	fell	135	3	head	4	3	left
3	1	felt	2	1	healthy	5	4	let
2	5	fight	1	4	hear	2	1	lets
9	9	find	11	2	heard	21	5	let's
2	2	fine	22	8	hello	1	1	letter
16	4	first	5	3	help	5	3	life
8	4	five	9	1	helped	1	1	light
4	2	fix	1	11	here	9	1	liked
2	1	fixed	11	2	he's	1	5	likes
1	1	floor	8	11	hey	5	5	listen
2	6	food	10	5	hi	3	5	live

11	1	lived	7	2	nine	5	7	red
2	1	locked	3	1	ninety	2	2	remember
7	2	long	30	18	no	1	1	rescue
2	3	look	4	3	nobody	1	1	ride
12	1	looked	3	2	normal	17	4	right
1	3	looking	6	5	nothing	7	5	room
3	1	looks	48	14	now	4	4	sad
3	7	lots	2	1	o	35	15	said
5	1	loud	151	51	of	9	1	sam
11	21	love	8	5	off	11	3	same
4	1	loved	41	34	ok	17	13	say
8	3	lunch	17	5	old	3	4	saying
2	5	mad	67	62	on	7	6	says
23	6	made	1	1	one's	3	2	scared
21	5	make	12	6	only	1	1	scary
6	1	makes	14	14	other	23	9	school
1	1	making	3	11	over	1	3	scratch
16	16	man	2	2	own	10	3	second
8	2	many	1	1	p_s	4	2	seeing
57	62	me	1	1	pack	6	1	set
13	9	mean	4	2	page	1	3	shall
2	1	met	4	3	parents	1	2	shark
7	3	might	4	5	part	82	33	she
1	1	mind	1	1	pee	4	6	shirt
2	2	mine	1	1	penguins	1	1	shoot
3	1	minutes	2	1	person	2	1	shot
3	11	mom	2	1	place	10	3	should
1	1	money	5	16	play	4	3	show
1	5	monster	3	6	played	1	6	side
15	24	more	3	7	playing	3	1	since
3	1	morning	4	2	please	3	5	sing
19	1	most	1	7	point	1	1	singer
7	8	mother	1	6	points	3	3	singing
2	2	mouth	2	2	police	3	3	single
1	3	movies	1	1	pool	5	9	sister
10	7	much	1	3	pop	4	1	sisters
1	1	muscles	6	2	pretty	9	1	six
7	1	music	3	2	problem	1	1	sixteen
111	183	my	1	4	puppy	2	1	slap
8	3	named	3	3	purple	4	5	sleep
8	5	need	8	6	put	1	7	sleeping
1	1	needs	1	1	quick	1	1	slippers
13	2	never	1	3	quiet	99	60	so
7	1	news	2	1	r	2	5	somebody
18	4	next	9	13	read	13	2	someone
11	5	nice	4	1	ready	9	3	something
8	4	night	86	13	really	11	6	sometimes

5	11	song	6	1	thought	20	27	went
2	1	soon	6	6	thousand	12	12	we're
6	1	sorry	1	2	threw	7	3	whatever
2	3	special	11	1	through	12	4	what's
1	1	square	4	4	throw	5	6	where
7	3	start	2	3	times	12	1	which
5	2	started	1	1	tiny	2	3	while
2	2	starving	6	4	today	3	7	white
2	3	stay	1	2	together	23	7	who
1	8	step	17	4	told	7	5	whole
7	8	still	4	1	tomorrow	6	2	who's
5	7	stitch	11	9	too	17	8	why
4	8	stop	2	3	took	25	7	will
1	1	stretch	1	4	top	1	3	wins
3	1	strong	1	1	tough	64	38	with
10	9	stuff	3	1	town	3	1	without
2	1	stupid	2	1	trash	1	2	woke
3	1	supposed	1	1	tree	2	2	woman
2	1	sword	2	1	tried	2	3	won
10	2	take	3	3	try	2	4	won't
5	3	talk	1	1	tummy	5	2	work
6	6	talking	4	2	turn	1	1	worse
1	1	teach	5	4	turned	4	1	wouldn't
11	1	teacher	2	1	turns	2	5	wow
2	1	teachers	1	8	tv	1	3	writing
2	3	teased	6	1	twenty	1	1	wrong
4	1	telling	1	1	understand	11	2	year
7	2	ten	1	1	unlock	9	4	years
1	1	tennis	21	22	up	11	4	yes
6	1	tent	1	3	upon	2	4	yesterday
5	1	testing	10	1	us	2	3	you'll
1	1	testing	6	6	use	1	1	young
1	2	texas	5	7	vacation	28	30	your
4	4	than	38	17	very	17	5	you're
13	8	thank	2	3	virus	2	1	zero
34	76	that	2	3	voice			
494	265	the	15	9	wait			
14	2	there's	3	1	walking			
12	2	these	3	8	wanna			
60	95	they	17	22	want			
4	1	they'll	7	2	wanted			
21	4	thing	133	64	was			
24	4	things	3	3	wasn't			
38	14	think	1	3	water			
2	3	thirty	11	2	way			
61	49	this	4	2	wearing			
10	11	those	62	10	well			

Spriting Words Found Only in Umoja Talkuments (includes Usage Frequencies)

<i>freq</i>	<i>word</i>						
		4	dominique	2	cast	2	miss
		4	ho	2	chain	2	moons
		4	jimmy	2	characters	2	mostly
24	al	4	lady	2	chinese	2	neighborhood
22	scooby	4	lost	2	christmas	2	nephew
18	doo	4	mode	2	cj's	2	neutron
17	watch	4	pizza	2	cloth	2	nose
12	cards	4	theatre	2	colors	2	ogre
9	channel	3	bones	2	dat	2	online
9	games	3	buys	2	daycare	2	orange
9	round	3	chase	2	dear	2	pain
9	shaggy	3	crystal	2	deck	2	parts
9	shrek	3	cyber	2	desiree	2	pc
9	yugio	3	exercise	2	directed	2	phone
8	donkey	3	gamecube	2	dollar	2	pie
8	means	3	grandmother	2	drive	2	piece
8	monsters	3	indian	2	driving	2	playstation2
8	shows	3	kitty	2	dueling	2	popcorns
7	attack	3	laughed	2	excuse	2	popular
7	ones	3	lords	2	finding	2	pulled
7	osaro	3	momma	2	flamethrower	2	reeboks
6	cedrick	3	order	2	flat	2	rice
6	cj	3	reading	2	freddy	2	ring
6	nickelodeon	3	rude	2	gameboy	2	saturday
6	playstation	3	slapped	2	grandpa	2	signed
6	rasheed	3	stars	2	harlem	2	somewhere
6	screen	3	stepping	2	hat	2	spend
6	tom	3	store	2	hummer	2	starfish
6	toys	3	tall	2	it'll	2	suns
6	uncle	3	toy	2	jlo	2	sweetie
5	anyone	3	alive	2	johnson	2	swimming
5	card	3	alphabetical	2	joseph	2	t_v
5	charmmander	2	angels	2	jumped	2	takes
5	daddy	2	bag	2	k_p	2	tasted
5	darius	2	balloon	2	keys	2	theatres
5	kitten	2	baseball	2	kiya	2	trouble
5	mommy	2	beauty	2	laptop	2	truck
5	peoples	2	behave	2	level	2	turtle
5	senequel	2	cake	2	licks	2	tweety
5	watched	2	cars	2	lie	2	unusual
4	dad's	2		2	machine	2	video
				2	mcdonalds	2	wash
				2	meow	2	weak
				2	merry	2	wow's

2	yet	1	cell	1	duels	1	hearing
2	yugi	1	cellphone	1	during	1	hears
2	zone	1	cereal	1	earl	1	he'd
1	aaliyah	1	chasing	1	earrings	1	he'll
1	action	1	chickens	1	em	1	helpless
1	ad	1	christopher	1	ending	1	highway
1	africa	1	cjs	1	energy	1	hired
1	african	1	clap	1	entertainer	1	hokey
1	amaru	1	coaster	1	erskin	1	holler
1	american	1	coconut	1	esmeralda	1	holographic
1	angel	1	consumed	1	esmeralda's	1	hour
1	aquarium	1	container	1	everybody's	1	hulk
1	arthur	1	cook	1	exercises	1	jada
1	asks	1	cook's	1	exercising	1	jail
1	aunt	1	costumes	1	expect	1	jamaican
1	backyard	1	cover	1	explaining	1	jellyfish
1	badges	1	craziest	1	father's	1	jewels
1	bags	1	creating	1	favoritest	1	joe
1	barbarian	1	credit	1	feeling	1	joey
1	barbera	1	crown	1	field	1	juan
1	barbershop	1	culture	1	fighted	1	juice
1	bathroom	1	cups	1	fill	1	jump
1	battling	1	dads	1	fired	1	junior
1	bear	1	dan	1	fishes	1	kenae
1	beds	1	daphne	1	fixer	1	kenae's
1	bell	1	darn	1	flippers	1	kings
1	belong	1	darrin's	1	football	1	knees
1	belt	1	dat's	1	forgotten	1	large
1	bending	1	daughter	1	fridge	1	leaving
1	boing	1	dazzling	1	fries	1	lightning
1	bored	1	destroys	1	girlfriend's	1	louder
1	bounces	1	digimon	1	glad	1	lower
1	bowl	1	digis	1	globetrotters	1	macdonald's
1	bracelet	1	ding	1	globetrotters'	1	mark
1	bracelets	1	dinosaurs	1	godparents	1	maxwell
1	bubbles	1	dirt	1	goggles	1	mcnuggets
1	bumpy	1	dis	1	goodbye	1	messed
1	bunch	1	discover	1	grace	1	microphone
1	burger	1	discovered	1	granddad	1	milk
1	burgers	1	documentary	1	grandmother's	1	mirror
1	burns	1	doggy	1	grew	1	missing
1	buster	1	doh	1	grounded	1	model
1	butt	1	doo's	1	hands	1	mom's
1	c_c	1	downstairs	1	hanna	1	mop
1	candy	1	drank	1	hardest	1	move
1	capris	1	drinking	1	harpe's	1	moves
1	cartoon	1	drinks	1	harvey	1	nana
1	cedrick's	1	drove	1	haul	1	nemo

1	nephews	1	rob	1	tight
1	nick	1	rockstar	1	todd
1	nite	1	roller	1	toes
1	noelle	1	rollercoaster	1	tore
1	noelles	1	rugrats	1	touch
1	none	1	santa	1	trade
1	nuggets	1	schools	1	transformers
1	o_clock	1	selanes	1	trap
1	oddparents	1	shanti	1	trip
1	older	1	shelves	1	tucks
1	ooh	1	shorts	1	twice
1	opponent	1	simpsons	1	type
1	ow	1	sinbad	1	unable
1	packed	1	sit	1	underwears
1	papers	1	sleaped	1	unleashed
1	parting	1	slept	1	upstairs
1	peed	1	smart	1	vanessa
1	persons	1	soda	1	velma
1	phat	1	sounding	1	versus
1	picked	1	spaghetti	1	visiting
1	plan	1	speak	1	w_g_a
1	plenty	1	spended	1	waist
1	pokey	1	spends	1	wars
1	potatoes	1	spicy	1	wear
1	pour	1	spider	1	weekend
1	power	1	spiderman	1	we's
1	powerful	1	squished	1	whales
1	powers	1	starfox	1	whenever
1	precious	1	staying	1	william
1	prefer	1	stenthrum	1	williams
1	present	1	steven	1	winner
1	pretend	1	stevens	1	word
1	protect	1	stitch	1	working
1	ps2	1	stopping	1	wrestling
1	push	1	stuck	1	wristband
1	puss	1	sunday	1	y_g_g_r_s
1	quit	1	superstar	1	yay
1	rascal	1	suppose	1	ymca
1	raven	1	swings	1	zipper
1	recognize	1	taco		
1	record	1	tacos		
1	retarded	1	tanks		
1	reunion	1	team		
1	riding	1	tease		
1	right-ro	1	tenth		
1	rings	1	thinking		
1	ritchie	1	throat		
1	roared	1	thursday		

Spriting Words Found Only in Molière Talkuments (includes Usage Frequencies)

		6	war	4	probably	3	gobble
		5	ask	4	sent	3	ha
<i>freq</i>	<i>word</i>	5	build	4	share	3	helping
30	spriterwriter	5	course	4	sports	3	hours
14	changes	5	dead	4	sprite	3	hunt
13	research	5	grade	4	stopped	3	i'd
12	hair	5	guns	4	sweet	3	internet
11	best	5	hill	4	teeth	3	interview
11	important	5	leah	4	theater	3	jasmine
11	joker	5	leah	4	toad	3	kills
10	coq	5	messages	4	under	3	knows
10	emma	5	millions	4	until	3	late
10	idiot	5	outside	4	using	3	max
10	number	5	prince	4	win	3	may
10	period	5	seen	3	yourself	3	mice
9	gaulois	5	third	3	already	3	mr
9	brown	5	twelve	3	animals	3	myself
9	enjoy	5	wolf	3	apologies	3	noise
9	helpful	5	background	3	art	3	open
9	junk	4	bird	3	arts	3	ourselves
8	add	4	blah	3	batgirl	3	particularly
8	alexi	4	boo	3	british	3	party
8	annoying	4	button	3	builded	3	pay
8	spriting	4	castle	3	camp	3	poor
8	yum	4	check	3	cheat	3	press
7	cinderella	4	constructors	3	clearing	3	ray
7	classes	4	dark	3	clock	3	recommendation
7	god	4	describe	3	copyright	3	rights
7	learning	4	director	3	country	3	short
7	mail	4	draw	3	court	3	sixty
7	maybe	4	enjoyed	3	cowboy	3	sorcerer
7	noticed	4	errors	3	design	3	sounds
7	question	4	following	3	door	3	spriter
7	report	4	forest	3	effects	3	stayed
7	tara	4	fourteen	3	esme	3	street
6	asked	4	free	3	fall	3	studying
6	cello	4	jack	3	fast	3	surfing
6	changed	4	jackson	3	faster	3	surprised
6	couldn't	4	maria	3	feature	3	twin
6	kinda	4	panther	3	feed	3	unfortunately
6	sound	4	passed	3	feels	3	vita
6	stephanie	4	pictures	3	finally	3	wants
		4	princess	3	foot	3	ways
				3	generally	3	we'll
					ghost	3	western

3	whoa	2	elegant	2	ladies	2	seem
3	wind	2	eleven	2	landed	2	seventeen
3	wizard	2	error	2	laugh	2	seventy
3	write	2	exactly	2	least	2	sharky
2	accept	2	exploded	2	lilliana	2	ship
2	against	2	extracurricular	2	lines	2	shouldn't
2	age	2	fact	2	lives	2	skin
2	alright	2	far	2	loves	2	sky
2	amigo	2	fatter	2	lucky	2	slam
2	ant	2	feet	2	mansion	2	sleepover
2	appear	2	few	2	massachusetts	2	slice
2	armor	2	finds	2	master	2	slide
2	arrived	2	finished	2	mathieu	2	slipper
2	awesome	2	fit	2	matter	2	small
2	baggage	2	folks	2	messing	2	smarter
2	beard	2	forty	2	mid	2	someone's
2	became	2	fourth	2	months	2	sounded
2	bee	2	ghosts	2	mouse	2	spriterwriting
2	beep	2	gigantic	2	names	2	standing
2	between	2	giving	2	nathaniel	2	stomach
2	biggest	2	glass	2	nineteen	2	strongest
2	billion	2	godmother	2	noisy	2	suit
2	billions	2	gross	2	oops	2	sumo
2	blister	2	gym	2	opera	2	tank
2	brookline	2	happen	2	otherwise	2	tayasha
2	burp	2	happened	2	ouch	2	teacher's
2	burped	2	happily	2	paragraph	2	teamwork
2	carry	2	hated	2	pasta	2	theaters
2	cave	2	herself	2	patricia	2	thirteen
2	challenge	2	himself	2	pieces	2	thumb
2	chapter	2	hola	2	plane	2	tiger
2	cheeks	2	hoo	2	prancing	2	tired
2	choice	2	horses	2	president	2	tony
2	cinderella's	2	hotel	2	principal	2	totally
2	close	2	hundreds	2	program	2	train
2	copies	2	impossible	2	pulling	2	transform
2	couple	2	inches	2	putting	2	treated
2	covers	2	information	2	questions	2	trees
2	crater	2	instead	2	rhythm	2	turning
2	created	2	invention	2	romain	2	twins
2	creature	2	january	2	s	2	volcano
2	crying	2	jessica	2	safe	2	walk
2	decides	2	johnny	2	sat	2	wand
2	d_n_a	2	jone	2	save	2	warehouse
2	dracula	2	killed	2	scissors	2	wears
2	dusty	2	kindergarten	2	screaming	2	week
2	earlier	2	knife	2	seconds	2	weird
2	easier	2	laboratory	2	secret	2	wide

2	wolves	1	bang	1	captured	1	date
2	written	1	banged	1	caress	1	daughters
2	yahoo	1	bark	1	caribbean	1	debby
2	yellow	1	barlors	1	cash	1	december
2	youngest	1	based	1	cassette	1	decided
1	abby	1	basement	1	cattle	1	dedicates
1	able	1	basic	1	cemetery	1	delightful
1	accident	1	beads	1	center	1	describing
1	accidents	1	beating	1	changing	1	designs
1	account	1	began	1	cheating	1	destroyed
1	acts	1	bench	1	cheek	1	diana
1	addresses	1	bike	1	chest	1	dies
1	adults	1	bilingual	1	choices	1	dinner's
1	afterschool	1	birds	1	chopped	1	directions
1	airplane	1	blankets	1	choral	1	directors
1	airs	1	block	1	chorus	1	dirty
1	aisle	1	blood	1	chosen	1	discouraged
1	alexi's	1	blowing	1	christine	1	divided
1	alison	1	boat	1	ciao	1	document
1	alligator	1	bodies	1	cinder	1	dodo
1	allow	1	boom	1	clarise	1	doors
1	alone	1	born	1	classmates	1	dragon's
1	along	1	bosses	1	clickings	1	drawing
1	alp	1	boyfriend	1	climb	1	drilling
1	alphabet	1	boy's	1	cod	1	dudes
1	americans	1	bragger	1	codock	1	duke
1	ands	1	brain	1	colorful	1	dummy
1	animal	1	break	1	column	1	dunes
1	answered	1	breathing	1	comfortable	1	duplex
1	antartica	1	bringing	1	completely	1	dust
1	antoine	1	brings	1	complicated	1	early
1	anyways	1	brother's	1	compliments	1	ears
1	apartment	1	brought	1	composition	1	earth
1	arena	1	brushed	1	conserved	1	egypt
1	argued	1	bucket	1	constructions	1	elegancy
1	argument	1	buddy	1	continued	1	emily
1	arlington	1	bumped	1	control	1	ends
1	arm	1	burned	1	conversation	1	engaged
1	artic	1	business	1	cop	1	enough
1	artistic	1	buts	1	courage	1	entire
1	attacking	1	buttons	1	courageous	1	essay
1	attention	1	c	1	cowardly	1	everytime
1	autopayer	1	cadia	1	coyote	1	example
1	awake	1	cage	1	crackle	1	exist
1	babies	1	calls	1	crash	1	experience
1	babooboo	1	calm	1	create	1	experiences
1	backs	1	calmer	1	cuddly	1	explained
1	badly	1	cape	1	customs	1	exploding

1	explosion	1	girl's	1	hypnotized	1	majesty
1	expressing	1	gives	1	ideas	1	male
1	extinct	1	glockenspiel	1	ilana	1	males
1	faces	1	goods	1	imani	1	marriage
1	faint	1	googles	1	includes	1	mars
1	falling	1	gotta	1	informative	1	match
1	falls	1	gown	1	interested	1	materials
1	famous	1	grade's	1	interviewed	1	meaner
1	fantasia	1	gray	1	interviewing	1	mechanics
1	fantastic	1	grooming	1	inventions	1	media
1	farting	1	guard	1	invitation	1	mediterranean
1	fashioned	1	hadn't	1	island	1	men
1	favorites	1	half	1	itself	1	mess
1	feast	1	halloween	1	jealous	1	metallophone
1	features	1	handball	1	joined	1	mexico
1	female	1	handle	1	joker's	1	million
1	females	1	hang	1	journals	1	mischievous
1	fifteen	1	hanging	1	judith	1	mixed
1	fighting	1	hannah	1	jumps	1	moment
1	fingers	1	happens	1	kaboom	1	montessori
1	finish	1	happier	1	keeps	1	moon
1	fire	1	harry	1	kentucky	1	moving
1	fishy	1	haunted	1	key	1	muscular
1	flashlight	1	healed	1	kicks	1	musical
1	flew	1	heart	1	killing	1	muzach
1	flexible	1	heavy	1	kiss	1	nadia
1	flowers	1	helps	1	knowing	1	name's
1	fluffy	1	hideout	1	language	1	near
1	fly	1	highest	1	laughing	1	neck
1	followed	1	highlighted	1	leaking	1	nest
1	food's	1	hitting	1	leap	1	nicer
1	forget	1	hobbies	1	less	1	ninth
1	fork	1	hold	1	lesson	1	non
1	forth	1	holding	1	lessons	1	normally
1	foul	1	holes	1	lied	1	numbers
1	fractions	1	honor	1	lift	1	o'clock
1	francisco	1	hoofs	1	lilo's	1	october
1	freckles	1	horns	1	line	1	oldest
1	fred	1	houses	1	lined	1	ole
1	frightened	1	housework	1	listening	1	onto
1	furious	1	hugest	1	lonely	1	opened
1	further	1	hung	1	lorenzo	1	opening
1	galaxy	1	hungrier	1	losing	1	opens
1	garden	1	hungry	1	loudest	1	outrageous
1	geez	1	hurray	1	louisiana	1	owner
1	ghost's	1	hurting	1	luckily	1	painting
1	giant	1	husband	1	lunches	1	pair
1	gift	1	hyper	1	magic	1	paragraphs

1	particular	1	respect	1	simple	1	swore
1	pass	1	rest	1	sister's	1	tail
1	pause	1	revolutionary	1	sixtine	1	tailing
1	per	1	rich	1	slams	1	tapping
1	perfect	1	riddles	1	slowing	1	tasty
1	personal	1	ripped	1	slugs	1	tattle
1	person's	1	rock	1	smallest	1	teams
1	pet	1	rocket	1	smiley	1	technically
1	piano	1	rough	1	snap	1	tentacles
1	pirate's	1	rule	1	snow	1	terrible
1	plain	1	rules	1	snuck	1	terrified
1	planet	1	run	1	soccer	1	thanked
1	plate	1	running	1	soft	1	thanks
1	player	1	rush	1	something's	1	that'll
1	pleasant	1	rusty	1	songs	1	thompson
1	plunge	1	san	1	sophie	1	thrown
1	plus	1	sandstorm	1	sort	1	throws
1	polite	1	sandwich	1	sorts	1	thumb's
1	ponytails	1	sausage	1	space	1	thumps
1	pooped	1	sausages	1	spanari	1	tires
1	portion	1	saved	1	speed	1	tocar
1	post	1	savings	1	spending	1	toe
1	postages	1	saviour	1	spit	1	towards
1	potter	1	scar	1	splashed	1	tower
1	pounds	1	scare	1	splashes	1	transformed
1	practically	1	scene	1	sport	1	transformer
1	pray	1	schmelagancy	1	squeaking	1	travel
1	presses	1	score	1	stained	1	truth
1	products	1	screamed	1	stand	1	trying
1	protections	1	screams	1	starts	1	turks
1	provost	1	searching	1	stepmother	1	twentieth
1	puffy	1	seas	1	sting	1	u_s
1	pumpkin	1	sebastian	1	stitch's	1	ultra
1	puts	1	selections	1	stood	1	um
1	quebec	1	self	1	storekeeper	1	unbeatable
1	quickly	1	send	1	stories	1	uncourage
1	rather	1	separate	1	straight	1	unlocked
1	raymond	1	servants	1	strange	1	unpleasant
1	reach	1	sexy	1	strangled	1	unsayable
1	rebecca	1	sharing	1	strikes	1	used
1	recommend	1	sheet	1	strings	1	vacations
1	redosi	1	shiny	1	students	1	varieties
1	regine	1	shirts	1	sudden	1	variety
1	remarried	1	shoes	1	suggest	1	version
1	remembered	1	shop	1	suite	1	victims
1	remote	1	showing	1	super	1	village
1	reported	1	sick	1	supposes	1	virginia
1	reserve	1	sign	1	sure	1	vival

