

# Children's Comprehension of Video Effects: Understanding Meaning, Mood & Message

by

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Submitted to the Program of Media Arts and Sciences,  
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In partial fulfillment of the requirements for the degree of

**Master of Science in Media Arts and Sciences**  
at the  
Massachusetts Institute for Technology

June, 2002

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May 10, 2002

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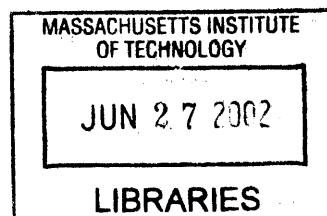
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## **Abstract**

Children's comprehension of special effects was examined in a series of digital video workshops designed for 9-14 year olds. Children assessed illusions in film, TV and video. They made observations about a mood or message conveyed through these magical "tricks" and effects, and generated hypotheses about techniques underlying their production. Children then tested their preconceptions, building action-based stories with effects in the workshop. Children's explanations and videos were compared. Film elements conveying narrative meaning and mood are described. Mechanisms driving change in understanding are discussed.

Initially, children described features or instances of effects, but not their context or purpose. Responses after the workshop reflected a shift in understanding. Kids did not describe how effects *appear* within a story (e.g. what they look like to us). Instead, they described how effects *operate* on the audience (e.g. what they evoke in us). The mean use of special effects between story conception and production increased significantly. Across and within group analysis of effect type, revealed interactions between emotional intent, camera-motion effects, and sound effects. The findings reveal preconceptions these young novices had about cinematic techniques.

The workshop interventions aimed to introduce children to an increasingly sophisticated knowledge of cinematic techniques, and to a range of tools and formats for storytelling. The research has implications for children's learning, and activities that support critical comprehension of motion picture stories – such as those seen on TV, film, and video. The research is directed towards development of activities that support imagination, comprehension and expression in storytelling.

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Nell Breyer

## Thesis Committee



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## **Acknowledgements**

This research would not have been possible without the considerable commitment of professor Brian K. Smith, and the students, teachers and organizers with whom I worked at Citizen School's Grover Cleveland Middle School in Dorchester, MA. and at the Cathedral School in New York City. I would also like to thank Walter Bender and Glorianna Davenport for the insight they brought to this research, offering their time, instruction and support.

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**CHAPTER I**  
**INTRODUCTION**

Illusions of magic in storytelling appear in ancient and modern devices: from make-up, clowns, masks, puppets, magician & circus acts, Commedia dell'arte, Noh & theater spectacles, to digital animation, TV, film, and video effects. Along this continuum, the invention of the Cinématographe in 1895 was a critical point in visual storytelling (Toulet, 1988). A proliferation of new techniques for wedding magic and realism followed. A cinematic grammar emerged (Friedman & Carterette, 1996) which, while ubiquitous today, still evokes a complex range of ideas and feelings in a story.

Some conventional “meanings” exist for standard effects. For example, a “cut” is most often used to introduce a jump in time, location or intensity; a “fade” signals the beginning or end of a sequence or scene, and “a dissolve”, commonly bridges time intervals, shows thematic relationships, or establish continuity (Zettl, 1990).

While the conventions of effects are common to see in mass media like TV, film, and video – the tools that extend these inventions to novice storytellers are just now becoming affordable household and classroom learning appliances. Activities exposing how these tools shape story meaning are only now beginning to be explored inside and outside the classroom<sup>1</sup>.

My research investigated children’s comprehension of video effects. What meanings do children attribute to specific film elements? How is this manifest when they build their own visual – action stories? This study compares elementary school students’ descriptions of special effects before and after a video effects workshop. Children’s iterations and final videos were analyzed to reveal mechanisms driving their decisions and learning processes.

I designed a series of workshops to teach 9-14 year olds about storytelling with video techniques. Students’ initial assumptions about film and illusions were compared with their descriptions and efforts to develop their own motion picture tricks. At the outset of each workshop, kids postulated why and how effects express moods or ideas in a story. They tested their theories by developing mini videos with effects (visual, audio and physical). Kids were asked to develop stories from a single “verb”, actions which



were concrete, (i.e., “jump”) or abstract (i.e., “remember”). They were then lead through the process of developing action stories into motion pictures with effects. Workshop stages included: a written text & script, storyboard & camera specifications, film direction, editing and public presentation.

I observed a) how 9-14 year olds understand effects, b) how they instantiated this understanding when challenged to make their own video stories, and c) how a “test drive” changed initial conceptions of film effects. I asked kids to invent their own techniques for story-telling, if they were dissatisfied with existing techniques, tools and filters for illusion-making.

The interventions introduced children to an increasingly sophisticated knowledge of cinematic techniques, and to a range of tools and formats for storytelling. The analysis aimed to reveal mechanisms underlying kids’ learning and comprehension. The research is based on the premise that audiovisual media change children’s daily lives and thinking. Education, psychology, physiology, and film theory research delineate ways that modality and presentational features of audiovisual tools appreciably bias children’s attention, recall and comprehension.

Given the strength and ubiquity of motion pictures, evaluating *what* children glean from motion pictures and *how* they do so is necessary but not sufficient work for educators. It is critical we design activities that encourage children to challenge their own beliefs. When kids experiment with designing their own storytelling “tricks” and “methods”, they test their assumptions by putting them into practice. Children should be able to use moving pictures, like they use a pen, to develop critical thinking, and skills for precise expression.

In this context, my research goal was to design a set of “transparent” activities that reveal children’s preconceptions, develop their understanding of cinematic conventions, and encourage them to explore storytelling with “magical” effects. I compared children’s explanations of special effects before and after the workshop. Their explanations were gathered in formal questionnaires, group discussions and individual interviews. A basic quantitative analysis of the final effects in each video, provided initial

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<sup>1</sup> Davenport/Friedlander, Wheel of Life: a transformational environment (MIT Media Lab); Friedlander, The Shakespeare Project (Stanford/ MIT), King Coit (Boston Opera), The Wooster Group (New York),

evidence for specific effect types being used to convey specific “moods”. The comparative analysis was done to see whether children’s initial and final explicit descriptions matched their practical understanding and intuitive grasp of effects. Qualitative and quantitative assessment aimed to expose the substance of kids’ understanding and the strategies they used to develop this in working with video effects.

To get at what children knew but might not articulate, I looked at the devices children found most effective to express specific ideas and feelings in each format. I compared their modulations to story content and expression across verb, text, storyboard, raw and final footage. I attempted to pinpoint underlying mechanisms that drove their choices or prompted changes at each stage. I looked for formal or structural features within each format that children found effective. I also tried to look at what motivated changes in their approach, as such change provides strong evidence for a change in practical understanding.

The research is directed towards development of activities that support imagination, comprehension and expression in story telling. It has implications for children’s learning, and designing activities that support critical comprehension of motion picture stories – such as those seen on TV, film, and video. Chapter II reviews literature in education, film and psychology underlying my rationale for curriculum design and workshop activities. They provide explanation and support for my methods of implementation, analysis and evaluation of the workshop activities described in Chapters III and IV.

## **CHAPTER II**

### **Research Background**

## **Research Problem**

My research examines children's comprehension of cinematic grammar and special effects. This chapter reviews research on basic film features that influence meaning comprehension, in general and children's comprehension of a cinematic story, in particular. I will outline:

- 1) Elements of "film grammar" that may impact children's learning
- 2) Ways in which perceptual features of this grammar may influence children's comprehension of story content, meaning and feeling
- 3) Why digital video & storytelling activities for children are important

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## **Cinematic Grammar and Learning**

Cinematic grammar (Friedman & Carterette, 1996) structures film narrative the way linguistic grammar structures written narrative. Most people today, are familiar with elements of this grammar. We see camera tricks such as zooms, pans, close-up, wide-angle, dolly shots, color filters, effects and numerous other editing techniques in everyday TV episodes, movies, commercials, and videos. The grammatical devices give structure and style to these audio-visual stories.

While continuously invented and discarded, common conventions exist for what these elements "mean". Films use shots and sequences to convey story events, the way sentences and paragraphs convey a written narrative. These shots are punctuated (spliced, linked and organized) with cuts. All cuts are jump cuts. They recognize that the camera, location or object has moved. A director uses cuts to develop a story language and clarify story sequence for the audience. Cuts cue the audience to spatial changes and temporal juxtapositions to help create a continuous sense of story time.

For example, a "cut" recognizes a leap in time, location or intensity; a "fade" signals the beginning or end of a sequence or scene, and "a dissolve", commonly bridges time intervals, shows thematic relationships, or establish continuity (Zettl, 1990). In layman's terms, cinematic grammar frames story content by controlling its spatial and temporal character. It determines tempo, organization and progression of a filmed story – which, in turn, substantially influences our understanding of a story's mood and message.

Research in education (Salomon, 1994; Rovet, 1974) has shown that acquisition of mental skills improve with exposure to specific film techniques such as the “Zoom”, layout (bird’s eye) shot and object rotation sequences. The mental skills included remembering details, visualizing rotations, and identifying imbedded figures. Film symbol systems facilitated acquisition of covert skills – specifically, visualization, identifying details, and changing viewpoints, especially in less “verbally-able” viewers in the research of Salomon & Cohen (1977) and Salomon (1974).

Salomon extends Vygotsky’s (1978) description of cognitive development (learning through internalization of sign systems such as numbers or language) to consider film’s symbol system as a means for developing mastery of specific cognitive skills. He cites specifically the abilities for singling out details, visualization, changing points of view, visualizing object rotation and identifying embedded figures (Salomon, 1979). Learning occurs as film symbols either activate or supplant these mental skills: presenting an initial state, aiding learners with some initial mastery, or a whole transformation process, interfering with more advanced, but helping less skillful learners (Salomon, 1979).

The degree to which motion picture elements occur as abstract symbolic representations for children is not known (Ramadas, 1987). How these representations acquire “meaning” or help cultivate children’s non-notational skills is not known. The semantic and emotional representations that this “symbol system” evokes in the adult viewer are not known (Hochberg & Brooks, 1996; de Wied, 1991).

Thus, characterizing basic features of these representations and how they might promote learning is a central objective of my research. In the workshops described in this thesis, I had children specify camera techniques, effects, filters and edits, in light of the ideas or feelings they wished to express. Analyzing their iterations, I looked for evidence of mental changes: whether kids were changing their attention to physical details, visualization, points of view, actions or character representations over the course of filmmaking and discussion. I attempted to characterize children’s intuitions and acquisition of film notation: by analyzing effects they used to shorthand ideas or amplify feelings they wished to express.

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### **Comprehension of Narrative Content**

Children's comprehension of narratives has been shown to be effected by presentation modality (e.g., audio, visual and audio-visual) (Beagles-Roos & Gat, 1983; Char & Meringoff, 1981; Gibbons, Anderson, Sith, Field, & Fischer, 1986; Pezdk, Lehrer, & Simon, 1984). Typically, these studies showed better recall for audiovisual over audio only narratives. However, disagreement exists over the developmental changes in young children's comprehension. Children of all ages recall visual presentation of objects and actions better than verbal presentation (Bird & Bennett, 1974; Corsini et al, 1961; Nelson et al, 1976). However, the "visual superiority effect", found for recall and explicit visual content, does not hold when the tasks require younger children analyze or interpret narrative content material (Sturm & Jorg, 1981).

The conflicting findings suggest different modal factors may influence recall / short term memory function and comprehension or semantic processing functions when a story is presented with audiovisual features. I extended and tested this hypothesis in my own research. I looked at whether the modality of a special effect was used to evoke a particular idea or feeling when children tell their own stories.

Hoffner et al. (1988) found that 5-6 year old children perform significantly worse than 8-9 and 10-12 year old children, when the task is interpretation and analysis of narrative events in visual rather than verbal stories. The results from these studies suggest that several factors may influence children's comprehension, rather than recall, of visual narratives. These factors include attentional biases for presentation modality, plot continuity and action significance based on continuous motion (Gibbons, 1986), information conveyed through dialogue and scene changes (Collins, 1983; Huston & Wright, 1983).

In my research, I looked at how children followed these parameters and conventions. For example, when kids make films, do they try to convey a complete action or event in a single shot in order to show plot continuity? Alternatively, do they build a story from multiple viewpoints, juxtaposing discontinuous shots (two people heading towards each other, for example) in order to convey a continuous action

sequence. Do words, or cuts or transitions represent time passing? Do kids attend or manipulate different modal features of a film effect to grab our attention at different rates or with different intensity? In my thesis research, I examined how children used pictures, sounds, or words to express different things when they go through the separate stages of remembering, recreating and playing back a story – often generated from real people, experiences and events in their lives.

### **Comprehension of Narrative Meaning & Feeling**

Research in cognitive psychology (Hochberg & Brooks, 1996; Hochberg, 1986; de Wied, 1991) and film theory (Eisenstein, 1942; Pudovkin, 1958) postulate predictable cognitive and affective responses to components of film “grammar”. One central line of inquiry has examined the ways we perceive time in motion picture stories. Cutting rates, – a greater rate of cuts, would be a greater number of cuts made to the reel: more cuts create the sensation of faster rate and number of frame changes – increased judged activity and potency<sup>2</sup> of film narrative (Gregory, 1961; Malpass, Dolan & Coles, 1976; Penn, 1971).

But there is disagreement in the literature about the interaction of cutting rates and film content (Reisz & Millar, 1968) upon the viewer’s emotional response (Penn, 1971; Heft & Blondal, 1987; Mehrabian & Russell, 1974). Motion and content have been found to interact with “meaningfulness” (Noble, 1952) and the potency and activity ratings given by viewers (Penn, 1971). Heft & Blondal (1987) found subject matter, rather than cutting rate alone, predicted the positive/ negative rating given by the viewer: faster cutting rates were given a positive judgement when the central actor was light-hearted, and given a negative judgement when the actor was angry.

Spottiswoode’s (1933) theoretical model for montage posits an interaction between cutting rate and visual complexity on affective tone. But, recent experimental studies have failed to confirm this interaction, assessing tone by a “pleasantness ratings” scale (Hochberg & Brooks, 1987) (Heft & Blondal, 1987; Silbergleid, 1992). An

alternative model (de Wied, 1991) suggests that feelings of “suspense” are produced by elision and compression of story time and screen time. De Wied found that viewers’ suspense ratings increased and then decreased with the continual increase in anticipated time towards an event.

Cutting rates, visual complexity, and relative time scales produced by elision and compression are a few basic film elements that have been measured for their discrete impact on viewers’ emotional response to filmed narratives. While each of these elements appears to influence viewer response, they do not seem to independently or reliably determine emotional states.

Several different measures have been used to determine the emotional intensity of response. These include: a pleasantness rating (Hochberg & Brooks, 1996,) a positive/negative rating based on an emotion state inventory (Heft & Blondal, 1987; Mehrabian & Russell, 1974), tension levels within film segments (Faulstich, 1989), and judged activity / potency levels (Penn, 1971). A single, comprehensive model, mapping emotional response to a film grammar, does not exist. However, the psychological and theoretical research on film outlined above point to discrete film techniques that may manipulate a viewer’s affective responses along the axes of time and intensity<sup>3</sup>.

### **Digital Video in the Curriculum**

How can teachers use this background of research to design curriculum activities for children around storytelling and critical reflection? Digital video is already incorporated into school and after school curriculums, as a tool for teaching storytelling (Johnson, 1990; Mellon, 1999), filmmaking (Maynard, 1997), and documentary reporting (Whyte, 2002). Preliminary research has been conducted on the types of changes that occur in children’s comprehension as they engage in storytelling activities with video and effects (Johnson, 1988).

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<sup>2</sup> Potency is used here to describe effectiveness or intensity of the picture on viewer. Connotative meaning was measured by a semantic differential and Noble’s 1952 measure. Noble (1952). An analysis of Meaning., *Psychological Review*, 59, 421-430.

<sup>3</sup> Examples of the feeling of “Time” measured in terms of the viewer’s emotional response, are, suspense (slow onset); shock (fast onset). Examples of the feeling of “Intensity”, measured in term of the viewer’s emotional response (strong/weak or positive/negative) are happiness (positive intensity) sadness (negative intensity), boredom (weak interest) excitement (strong interest). In the methods for evaluating emotional intent in this study, I chose to measure emotion along two dimensions only (onset and pos./ neg. intensity).



Retelling a story to children provides opportunities for detail and event sequence reconstruction and assimilation (Pickert & Chase, 1985; Gambrell, Pfeiffer, and Wilson, 1985; Johnson, 1988). An organizational structure (Blank and Frank, 1972) which links mental representations of story components (Whaley, 1981) into a single causal schema, helps children attend and predict the categorical, hierarchical and timing information of these narrative components (Stein, 1971). Children learn about the interconnection, structures and schemas of a story through its retelling (Stenning & Mitchell, 1985). My thesis research was based on the premise that children will learn about cinematic grammar and film effects by building their own stories and sequenced events. The next chapters provide documentation and analysis of the interventions I designed and what children learned, while building action stories with a basic set of digital video tools.

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### **Summary**

In this chapter, I reviewed basic film elements and effects that may convey meaning to children and I looked at how they impact story comprehension. My workshop and assessment designs are based on these studies in film, psychology and education. Without offering a full-scale model for storytelling comprehension in audiovisual formats, the literature provides clues for engaging children in critical reflection through visual storytelling practices.

To summarize, education research suggests elements of “cinematic grammar”, such as zooms, pans and bird-eye shots, object rotation sequences, may help acquisition of specific cognitive skills (Salomon, 1994; Rovet, 1974; Salomon & Cohen 1977). Psychology research provides perceptual evidence for film elements modulating duration and intensity of a viewer’s emotional response (Gregory, 1961; Hochberg & Brooks, 1996; Malpass, Dolan & Coles, 1976). The elements include cutting rates, visual complexity, elision and compression of relative time scales, among others (de Weid, 1991; Hochberg & Brooks, 1996; Hochbery & Brooks, 1987; Heft & Blondal, 1987).

Media and Neuroscientific research underscore the influence of modality (audio, visual and sensorimotor) upon semantic processing in general. Specifically, research on audiovisual narrative comprehension suggests that presentation modality, plot continuity,

character action, dialogue and scene changes all influence the significance of the information conveyed to the young viewer (Sturm & Jorg, 1981; Hoffner et al., 1988; Collins, 1983; Huston & Wright, 1983). Young novices with different skill sets appear to benefit from different types of representations to advance their comprehension skills. These principles drive the design and intervention strategies with children that I describe in Chapter III.

## **CHAPTER III**

### **METHODOLOGY**

## **Introduction**

My research examines how children “read” moving pictures. I designed a set of workshop activities for children to learn about film techniques. The activities prompted kids to design their own narratives, with a “feeling” and a “message” and then explore how to use or develop their own effects to express these. Assessment of the activities compared common characteristics of expression and comprehension at each level of story representation. The modality and structural features of each format were considered, in this light. Limited quantitative and qualitative measures were made of children’s explanations, iterations and final videos. The results were compared to reveal the nature and levels of developing comprehension in young novices as they were introduced to a basic set of visual story telling tools.

## **Subjects**

Interventions were conducted as hands-on workshops with elementary school children ranging between the ages of 9-14 years old. (M = 11.9 years). All participants were volunteers in after school programs, with no previous video or film experience. I worked with 3 separate groups of 5-8 children for 6-8 week periods. Groups comprised mixed sex, race, religion and economic backgrounds. The research results reported here include stories and workshop participation by 3 African American females, 6 Caucasian males and 7 African American males. Participants came from the Grover Cleveland Middle School (through the Citizen School program) in Boston and the Cathedral School in New York City. English was a second language for two of the fifteen participants.

I was the primary investigator. Each session was run with additional supervision from a teenager or adult teacher / educator. Sessions occurred inside a classroom, in the field, in school computer laboratories or at the Media Laboratory. Sessions ran for 1.5-2 hours in length. Students worked individually and in teams throughout the workshops with ongoing adult supervision. Students explained the techniques and objectives of their videos in a final public presentation to peers, family and guests.

## **Materials / Resources**

The workshops ran between November 2001 - May 2002. Videos, public presentations and final critiques were made at the end of the full workshop for each group. Digital video cameras and computing facilities were provided by the MIT Media Lab Critical Computing group.

Three video cameras (Sony, Canon and a handycam), standard firewire connectors, imacs with iMovie 2 and standard Internet resources / software were used by children to produce original mini action stores on video. All children had access to computers, digital video cameras, iMovie2 and basic editing software

## **Workshop Design**

A multi-session video workshop followed the baseline knowledge assessment. (Appendix IV and V describe workshop principles, practice and descriptions). The number of 1-2 hour meetings comprising each session varied (between 1-4) depending on the group. First sessions had children 1) Characterize a special effect (Is digital manipulation or computation required? Do illusions created with make-up, smoke or a flashlight and red candy wrapper count? Are motion pictures themselves a type of illusion or special effect?) 2) Consider the perceptual tricks our eyes play on us [persistence of vision for sequences over 15 frames per second (Gibson, 1954; Marr, 1982), or “on-off mechanisms” (Hochberg, 1986)] that create the “flip book” effect of seeing motion through fast sequences of still frames? 3) Consider some of the scientific and artistic principles the kids understood conveyed meaning in a story.

Second sessions had children consider the technical and narrative principles underlying special effects in relation to familiar examples. Analysis and critiques were made of *Titanic*, *the Matrix*, *King Kong*, *Dorothy and the Wizard of Oz*, and other mainstream movies, advertisements and videos. Children were asked to describe the effects in each case, and describe the feelings, atmospheres or meanings generated by these sequences. They then brainstormed the techniques or effects they thought might create suspense, dramatic tension, or wonderment. We discussed how music, lighting, text, and event sequence could impact what a viewer feels. Children compare these examples to their own favorite examples, discussing message intended and overall impact

of effects. We reviewed sample effects on the DV cameras, so kids could familiarize themselves with recording options / controls and begin staging their own effects.

In the third sessions, principles of optics, motion perception and camera function were introduced, in the context of understanding illusions and mechanisms behind motion picture stories. Children explained how stories are told with actions and motion pictures. We discussed questions like, how do we know something is moving? Is it camera movement (pan, dolly shot, zooms) or subject movement (car, train)? What does a "reference point" provide? Why do we "feel" we are flying faster when a plane is in clouds rather than high up above the ground? Why does a train look like its moving backwards when you are arriving into the station and the subway on the opposite track is just moving out? Children discussed the emotional impact of specific camera shots-dolly, pan, zoom, close-up and practiced these techniques with DV cams.

The subsequent sessions tackled stories: children consider how to represent actions in moving pictures. They were asked to brainstorm "easy" (concrete motor) and "hard" (abstract passive) verbs to represent, that is, two types of actions - one "easy" and one "difficult" to visualize. For example, an abstract verb (e.g., "to love", "to imagine") or passive verb (e.g., "sleep") might be contrasted with a concrete verb (e.g., "to punch", "to swim") or dynamic, motor verb ("spin"). Children were asked to select effects that might best convey dynamic feeling or message for their actions. After selection, kids developed and wrote down a story sequence for each. They designed short visual storyboards and selected a few special effects to convey each of the actions chosen. They were asked to determine a central "feeling" or "message" to convey to their audience and consider what effects would conjure this mood.

The subsequent sessions spun out the story telling process. "Seed" verbs for each story were written out as a script, a storyboard, staged, filmed, edited and presented with special effects. Kids were responsible for teaching roles, collecting props and directing shots for each film shoot. After capturing raw footage and editing their video stories individually, kids presented their movies to their peers and gave an informal review/critique of each video. In the final session, children presented their videos and insight special effects to an invited public (parents, friends, public at the Tech Expo Center). Children filled out a written questionnaire about special effects mid way through and on

completion of the workshop. Observations of their interactions and decisions were recorded with audiotape, video and written documentation.

### **Baseline Assessment**

In the preliminary session, children were given a pre-test (see Appendix I) about the nature and meaning of special effects (SFX) in motion picture stories. They were shown excerpts of movies with special effects (*Titanic*, *Dorothy and the Wizard of Oz*, *The Matrix*, and *King Kong*) and asked to describe the types of effects they saw and the meanings / feelings that each effect seemed to evoke. Answers were written down in a questionnaire format. Group discussions were recorded on audiocassette and miniDV. Children were given a brief demonstration of the filters available on each digital camera.

**Table 1. Basic image filters on digital cameras used in the workshops**

<b>Video filter / effect name</b>	<b>Image transformation / appearance</b>
Mirror	Splits image
Strobe	Slows image capture to look like flashes
Mosaic	Small, pixel squares, checkerboard image
Slim	Squeezes image horizontally
Stretch	Stretches image horizontally
Trail	Creates a ghost trail of movement
Neg. art	Inverts image to look like a negative
Sepia	Turns image to sepia tones only
B & W	Turns image to gray scale only
Solarize	Creates a pastel like, shimmering image
Pastel	Filters image with pastel colors only

Table 1 in the text, outlines basic video filters discussed and used. They were asked to describe and write down what feeling individual effects seemed to evoke and why they might be used

The baseline assessment was measured against answers given to a questionnaire distributed halfway through the workshop sessions, and to one given at the end of the workshop (see Appendix II & III). The final questionnaire was accompanied by a critique and discussion of each film at the end of the workshop. In addition to giving explicit definitions for special effects and the feelings associated with specific video filters and camera techniques, children had to decide how a movie gives the “feeling of

motion”? and whether “special effects in real life?” Overall, the questions targeted children’s understanding of the relationship between perceptual illusions in film and daily experience.

### **Final Assessment**

At the end of the video workshop, children answered questions about the meaning and feelings they associated with specific effects. They were asked to cite specific discoveries they made and limitations they found in the tools they used to build special effects. Statements before and after the workshop were compared across individuals. Explicit descriptions of film conventions were reviewed in light of the kinds of special effects students actually used for their stories and how this was intended to convey a mood or impact (as stated by the student in their initial plan). Significant effects and interactions between effect types (visual, audio, physical) and intended emotional impact were measured across individuals and groups.

### **Methods for Analysis of Special Effects**

Results were evaluated with qualitative and quantitative measures. Behavioral measures compared students’ answers before and after the workshop. My observations of what each child said, wrote, drew and filmed provided supporting evidence for assessment of individual comprehension of special effects and their meanings. Limited structural analysis of the perceptual / psychological characteristics of effects in each video was done.

Image sequences were analyzed along three perceptual dimensions: visual, audio and physical. Discrete subsets were created for each of these dimensions. Measurement of visual effects was made within categories of image color, edge, and dynamic<sup>4</sup>. Color effects were defined as any color manipulation of the story, such as: black & white, sienna, pastel, negative art. Image effects were defined as any alteration to edges of an object form within a video frame, such as a ripple effect, blur/sharpen, zoom/pan, mosaic,

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<sup>4</sup> Effects could be achieved through staging, filming, editing or reprocessing footage. In order to measure a limited number of dependent variables, I did not weight the stage at which the effect was built into the story. Instead, evaluation of the dependent variables, was restricted to measurement of the perceptual property of special effects as they appeared at the final stage of the video story.



and compositing. Motion effects were defined as effects that altered apparent motion (within or between clips), such as zooms, pans, changes to frame direction, frame rate, cuts or transitions.

Measurement of audio effects was made within the categories of sounds; voice or text built into the video. Sound effects were defined as any “added” sounds, such as sirens, toy gun noises, iMovie sound effect filters or music. Voice effects were defined as scripted or voice over edits in the story, such as a narrator speaking over/alongside the main actions, scripted lines, or recorded voice. Text effects were defined as any visible insertion of text such as credits, titles, or lines of text.

Measurement of physical effects was based on the categories of props, physical location, and costumes. Props included items like toy guns, masks, video games. Physical location included any specifically designated areas for shooting. Costumes included any specifications for clothes worn by the characters in each story.

My hypothesis was that each of these categories of effects might be understood and used differently by young children. Neurophysiological (Zeki, 1990) and psychological (Gibson, 1954, 1966; Gregory, 1964; Hochberg & Brooks, 1996) research provides foundation for this hypothesis.

The three categories of special effects described here were analyzed separately to look for reliable correlation to the intended message / mood for each story (as stated explicitly by the student). Emotional intent was quantified using a nominal variable of 0 or 1 and evaluated along dimensions of “pleasantness”<sup>5</sup> (e.g., the feeling evokes a positive or negative response) and onset rate (e.g., the feeling evokes an immediate or gradual response). 0 or 1 ratings were based on the average of 18 assessments for the words selected to describe intended feelings for each video as stated explicitly by students at the outset. Examples include “excitement” “suspense” “scare them”. Assessments were made by graduate students at the MIT Media Laboratory and an average rating was given based on 18 responses.

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<sup>5</sup> Mehrabian, A. & Russell, J. (1974) *An Approach to Environmental Psychology*. The MIT Press, Cambridge, MA. Though there are many dimensions along which to weight emotions, I selected one measure of “primary emotional responses” as articulated by Mehrabian and Russell (others included Arousal and dominance) and one measure of temporal response for design simplicity in statistical analysis of the results.

## **CHAPTER IV**

### **RESULTS & EVALUATION**

**Behavioral Results**

*Pre/ Post workshop Questionnaires: What Kids said they understood*

The Baseline questionnaire showed understanding of components but not principles or mechanisms underlying special effects production. Table 2 lists examples of students’ first descriptions of special effects. It lists some of the feelings they associated with digital filters (effects) they were shown on the camera.

**Table 2. Sample Responses to the pre-workshop questionnaire on special effects**

What are special effects?	Video filter	Feelings evoked
“lights, sounds”	PASTEL	cartoon, bright & blurry, soft, wicked
“sounds that aren’t real”	MOSAIC	things look digital, creepy, keeping an identity secret
“things you can do with a camera, like slow motion”	B&W	old movies
“like things that cant really happen but you can do stuff on the computer to make it look like we are really doing it”.	SEPIA	Old, past
“created monsters”	STROBE	flashing, remembering, flickering, movie frames
“Some are, some aren’t real”		
“robot movies”		
“clay-mation”		
“a person blowing up”		
“actions, like a boulder falling, head getting chopped off”	***	Some kids said you can see special effects in real life, some said no.
“blue screen on the weather channel”		

Overall, baseline knowledge indicated understanding of specific effect examples from daily media, and how to recognize them. Initial responses isolated features of effects (i.e., lights, sounds, actions). Post workshop responses revealed knowledge of the purpose behind using effects. Answers defined effects in light of how they can be used

and what they change in a motion picture story. When asked post workshop “What are special effects?” students answered:

**Table 3. Questionnaire on Special Effects**

#	WHAT ARE SPECIAL EFFECTS?
1	“a special effect is a effect that is imb(p)ossible or dangerous to do”
2	“effects are effects that make some scenes in movie show real”
3	effects that cannot be done in real life that shows action”
4	“Special effects are that are usually are not possible & it makes them look real”
5	effects made for a film
6	“special effects are effects that make your movie or anything that you’re filming better”
7	Effects are making features”
8	“Special effects are like you can make a cartoon with pastel in cartoons because it has more of a lesson
9	the definition of special effects is you can make something true that really cant be/ happen”
9	things you cant do in real life”

Students’ initial responses, which essentially describe features or instances of effects, do not indicate comprehension of context or purpose. Post-workshop answers reveal understanding of the application of effects and how this can change a story.



*Figures 1-5. Transitions & audio effects building atmosphere into still image sequences*

Specifically, baseline answers, given at the workshop outset, revealed the types of things children thought of, when they thought of effects. Students tended to describe examples of effects as primarily violent transformations of actions or objects (“shoots”, “heads getting chopped” “created monster”), the weather channel’s blue screen, being an exception. After the workshop, students described the sample effects they had worked with, in psychological and narrative terms. They described using effects to transform feelings, climates, and characters, along with actions. Students were asked 1). “What did

you make with you own special effects?” 2). “What mood/message did you try to convey?” and answered the questions a second time after reviewing each others movie and giving a min “critique” of each movie. Figures 1-23 show samples of effects students created. Questionnaire responses are listed in Table 4.



Figures.6-8 Masks, shadows and the Internet provide props for making effects

Table 4. Questionnaire Post Workshop – The Cathedral School

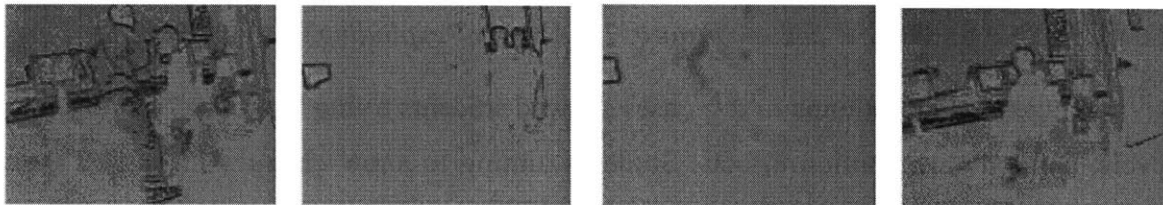
Student views	What did you make with your own special effects?	What mood did you try to convey?
pre <sup>6</sup>	I did not use any effects but I did use sound	what baseball game is like on TV
Post review	<i>the announcer and slow motion</i>	<i>it was like an instant replay and the announcers</i>
pre	I tried to show psychic blasting power and two of one person	I tried to send the message to the audience to be surprised
post review	<i>mirror effects, wagon crash, black and white, clapping, applause.</i>	<i>it was really cool</i>
Pre	A blackout	fear
Post review	<i>blackout</i>	<i>freaky</i>
pre	Action, adventures, suspense, excitement	Like the characters were in a desert
post review	<i>Sepia, sound effects - creepy laugh</i>	<i>the desert</i>
pre	[laser vision] Flashlights, toy gun	action [My laser vision was a success!] scare them – as if that can happen to you
Post review	<i>laser vision, cool pastel</i>	<i>sad</i>

<sup>6</sup> In this case study, Eric first he did not use any special effects, later he watched his own movie again, and heard others critiquing it, he wrote the effects he saw in his own movie were “the announcer and slow motion, it was like an instant replay and the announcers”. In his final public presentation he spent a few minutes describing to the audience that sound, voice and music in a film could be a special effect. He also used a zoom in, a wide-angle shot and many props to create his baseball picture.



Figures. 9-12 Transitions to show a car running over the actors

Student responses post workshop, suggest a shift in attention away from how effects *appear* within a story (e.g. what they look like to us), towards how they *operate* on the audience (e.g. what they evoke in us). Student responses, after watching and critiquing their peers' movies, included adjectives like “creepy”, “sad”, “cool”, “freaky”.



Figures.13-16 “Laser vision” – a special effect made by a student to “scare” us

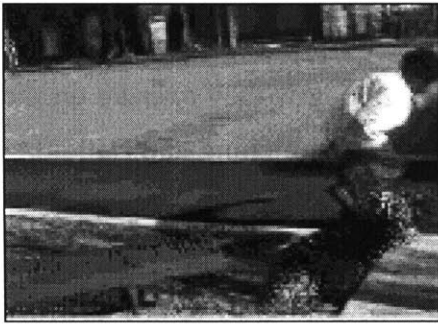
Citizen school student responses, halfway through the workshop, also indicated a change from description of features to comprehension of impact (Table 5.)

**Table 5. Questionnaire Mid-Workshop – The Grover Cleveland Middle School**

student	What special effects are you using?	What message / mood do you try to convey?
1	Negative art, zoom in, Photograph, interview, letters (maybe), narration	the feeling is that's the illest tribute (to her father) I ever seen
2	Black & white for flashbacks (music)	See how competitions arose, traitors
3	-	I want excitement
4	Slow motion: because it looks cool.	So they can see what we are doing close up; sometimes – excitement
5	Slow motion: because its cool, funnyer. Zooms, guns, dying people, people from the Simpsons	funny, entertained



*Figures. 17-22 A slow motion action sequence to show self-defense*



*Figure. 23 A body “exploding” (created effect)*

In general, questionnaire responses showed students trying to arouse “excitement” levels, applied slow motion effects. Students aiming to show changes in place / time (mental flashbacks, memories, locations such as the desert) applied color effects. Students, aiming to evoke shock or negative reactions (fear, surprise, “scare them”), used form effects, props and sound effects.

#### *Story Representations: iterations from verb, to text, storyboard and film*

What changed in students’ understanding, as they developed their story representation from a verb, to a written text, to a storyboard to an edited video? At the planning stage, students proposed “effects” which could transform the central action or character of their story. In production, effects were altered or added to enhance the intended feeling, as stated by students explicitly at the outset. In all cases, the number of effects and modal range increased from what was initially proposed. Modality of effect interacted with intended narrative (emotional) impact. Overall, film devices were used to manipulate audience experience rather than an event or sequence per se. The findings suggest a shift in students’ comprehension of effects. Final descriptions and implementations, demonstrated understanding effects as a means for transforming audience impression of experience, rather than as a technique for altering specific actions or characters in a story.

### *Action verbs*

Seed verbs for stories were on average concrete and highly imageable. I used the MRC Psycholinguistic, which is a compendium of smaller databases <sup>7</sup> (M. Coltheart, 1981) to get this rating. I used it because it measures the physical (concreteness) and visual (imageability) character of the action verb. In addition, we had discussed in the workshop, why it might be “easy” to represent some kinds of actions – like “to kick” or “to eat”, and harder to represent other types of actions – like “to wish” or “to worry”. We discussed why the verbs harder to represent physically, might require some “special effects” or creative tricks and hints to be portrayed well in motion pictures.

Of the selected verbs (or their stems) that were found in the database, average concreteness was 397, with a range of 395-461; and their average imageability was 508, with a range of 412-635. Both of these ratings are high. The range is 100-700 (M. Coltheart, 1981). Sample actions were: “sliding,” “remembering,” “dancing,” “fighting,” and “swimming”. Students proposed a range of effects, including standard filters (i.e., B&W, mirror, trail, pastel), camera motions or editing operations (e.g., pan, zoom-in, wide-angle, black out, slow motion). Sound effects, narration, physical props, and location cues were also specified at workshop outset.

### *Text*

In writing stories, 10 of 16 students established their narrator had a personal relationship to story characters. Many of the students portrayed themselves as the hero or main protagonist. Other students were the narrator, or knew the main characters. Everyone was named. Colloquial dialogue and narrative details conveyed character traits, intentions and dramatic situations. David’s story (Figure 24) illustrates these features, which also re-emerge in the case studies presented in the remainder of this chapter

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<sup>7</sup> the Edinburgh Associative Thesaurus (Kiss, Armstrong, Milroy and Piper, 1973); the Colorado Norms (Toglia and Battig, 1978); the Pavio Norms (unpublished, these are an expansion of the norms of Pavio, Yuille and Madigan, 1968); the Gilhooly-Logie norms (Gilhooly and Logie, 1980); the Kucera-Francis written frequency count (Kucera and Francis, 1967) the Thorndike-Lorge written frequency count (Thorndike and Lorge, 1944; L count); and others. M. Coltheart (1981), The MRC Psycholinguistic Database, Quarterly Journal of Experimental Psychology, 33A, 497-505.



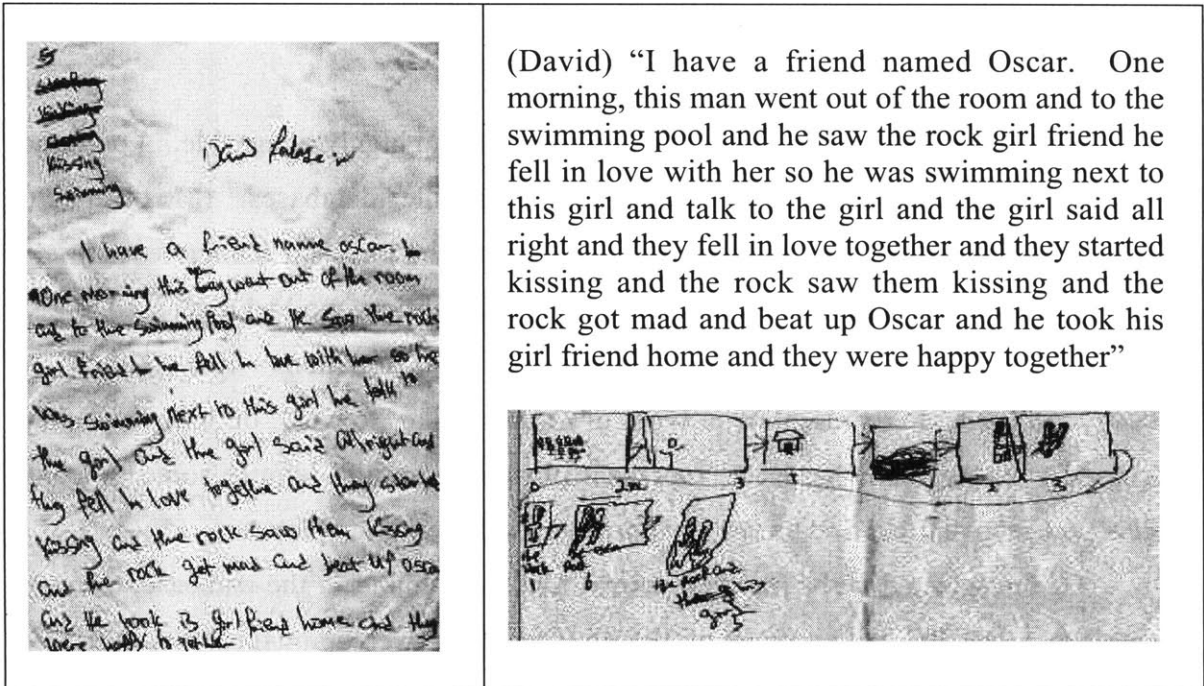


Figure. 24 David's text and storyboard

Case study 1 – Rosa:

Rosa told a story about her father who died suddenly when she was three. She and her mother found him lying on her parents' bedroom floor in their house in Florida.

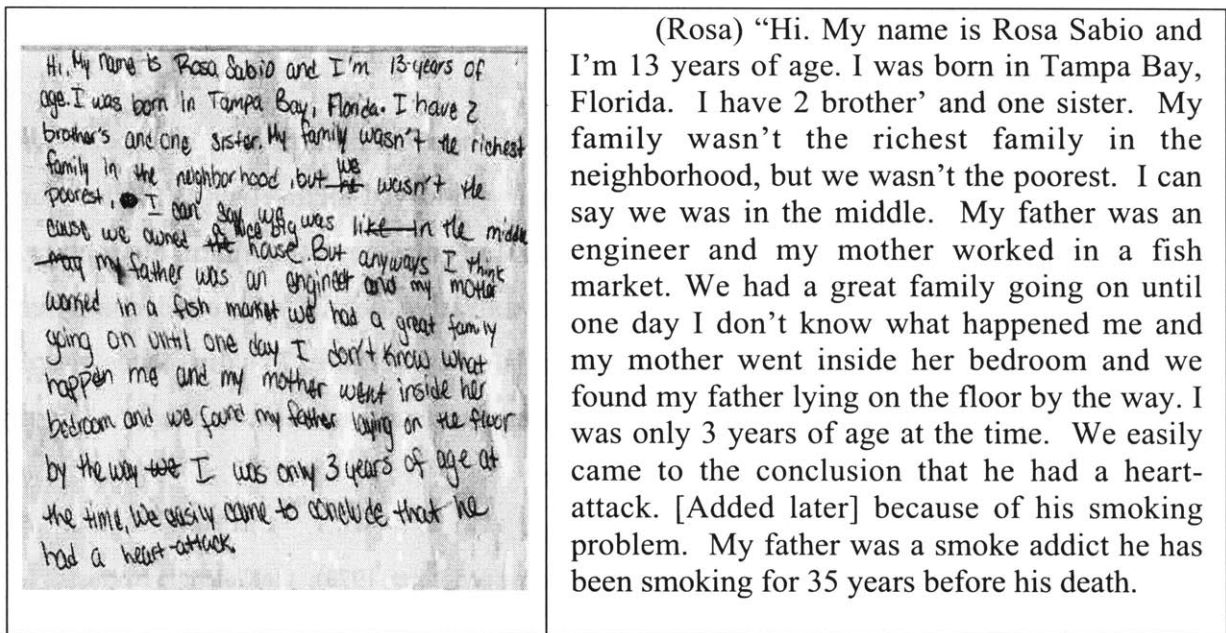


Figure. 25 A case study – Rosa's Story

Rosa’s story provides evidence of change both in her conception and use of video effects. At baseline, Rosa did not know what special effects or examples were. Initially, she did not want to learn, turned off by the fact that no other girls were participating in the workshop and “technology was stupid”. We discussed ways motion picture devices could help her convey an idea she cared about, and so she told her story.

To create a memory of a person she did not have – she began thinking of physical and symbolic “representations” that would resonate with the emotional and factual details she associated with her father. Her narration was a description of people and events. Her storyboard listed “items” to convey a narrative portrait: visual, verbal, and physical. Visual elements included “pictures of the house, pictures of the tomb, pictures of when he was younger”. Verbal/ sound elements included: “His handwriting, his favorite song by Bob Marley, an interview with my Aunt – with questions like ‘what was your memory of Roman Sailor Sabio? Who was he? What was his favorite soccer team?’ descriptions from her Mom ‘about how her and my dad fell in love and how old were they?’ Props and actions included: the wedding ring, ten balloons (white) go loose in the air, (I) “play his favorite song while letting the balloons go.”

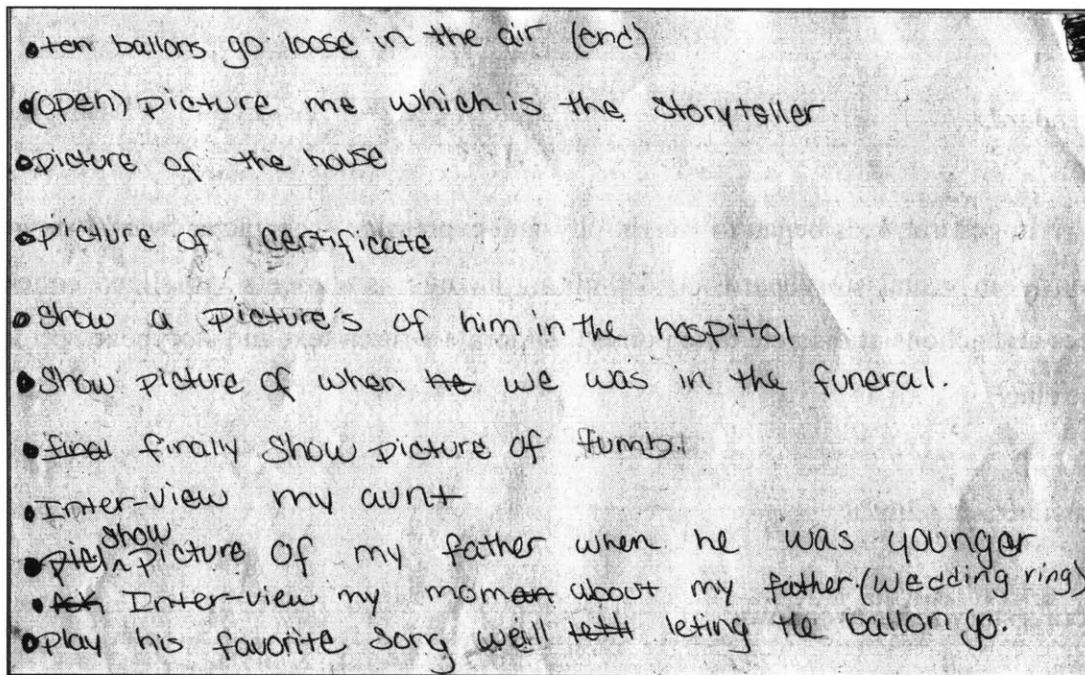
- 
- ten ballons go loose in the air (end)
  - (open) picture me which is the storyteller
  - picture of the house
  - picture of certificate
  - show a picture's of him in the hospital
  - show picture of when ~~he~~ we was in the funeral.
  - ~~final~~ finally show picture of tomb.
  - Inter-view my aunt
  - ~~pic~~ <sup>show</sup> picture of my father when he was younger
  - ~~ask~~ Inter-view my mom ~~about~~ about my father (wedding ring)
  - play his favorite song well ~~with~~ letting the ballon go.

Figure. 26 A unique bullet point organization of story elements (audio & visual)

The items were ordered. Video effects and sequence helped convey an idea of going back in time, concretizing past images while keeping narrator and present obscured. Rosa spoke but had the camera focus close-up on a still picture of her. The only live shot of her face was through a negative art filter. Still photos were introduced individually, after the narration, as memorabilia of her father, house, family, and his tomb. The interview with her aunt and the image of releasing balloons into the air, were organized for the final sequence.

Rosa experimented with multiple film and storytelling techniques like cuts, zooms, narration, music, filters, props, and still images. She organized the elements into a story dynamic that reversed time and extended her own imagination. She moved away from herself and the present and into images, objects and other people's memories of the past. The film devices were ways for her to envision a person she had no satisfying picture of in her own mind, but strongly felt. Rosa understood that her story, rather than any single device, was the illusion (and in her case, the illusion to her missing memories of a father). The film elements gathered meaning as they conveyed both a sense of the person and a sense of his absence, to herself and to an audience ("the feeling is that's the illest tribute I ever seen").

### *Storyboards*

In general, kids began to weight physical expression – character faces, locations, actions – in visual storyboards. Did thinking change as students visualized concrete spaces and actions at discrete time points? Dinora's written text and storyboard provide some clue.

### *Case study 2 – Dinora*

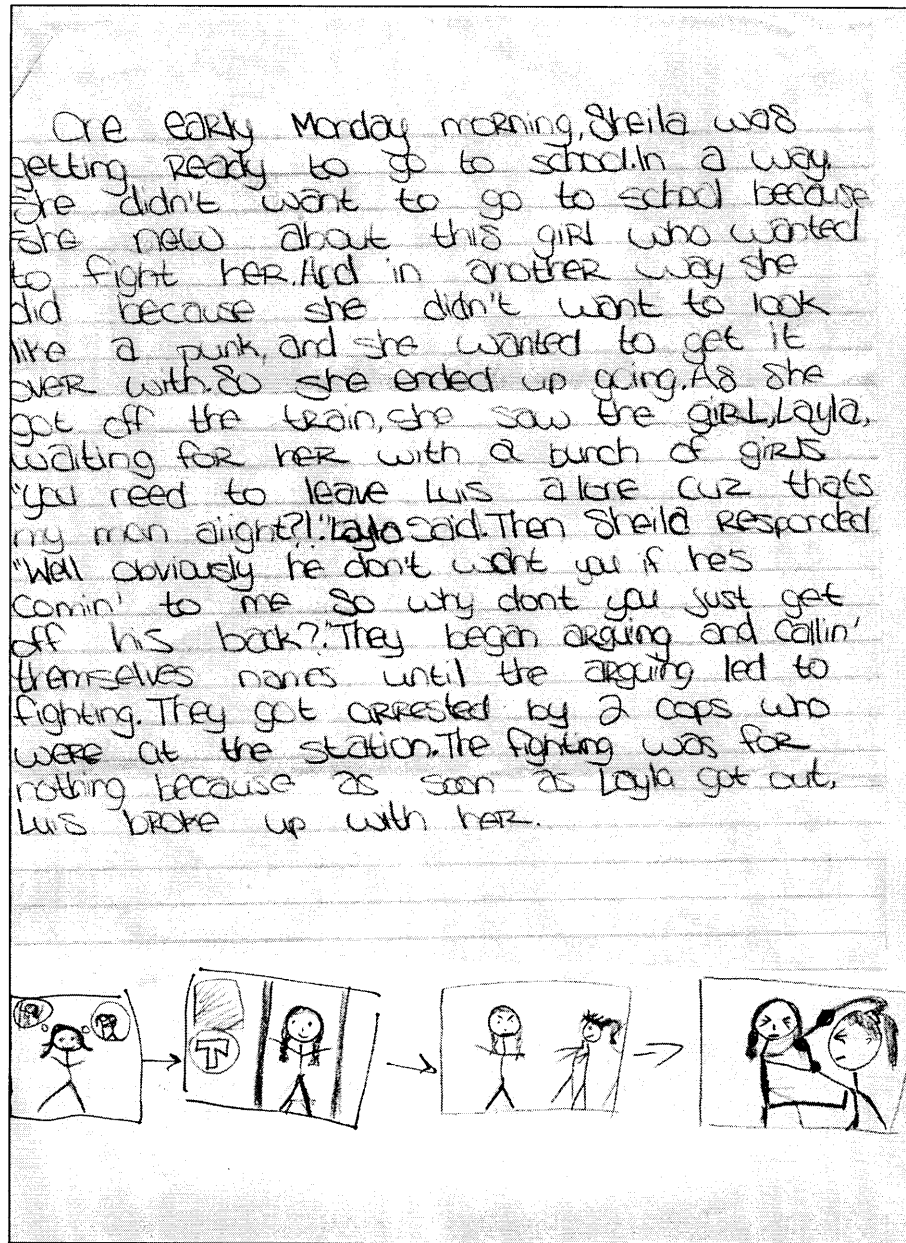
Dinora's story reads as follows:

(Dinora) "One early Monday morning, Sheila was getting ready to go to school. In a way she didn't want to go to school because she (k)new about

this girl who wanted to fight her and in another way she did because she didn't want to look like a punk, and she wanted to get it over with. So she ended up going. As she got off the train, she saw the girl, Layla, waiting for her with a bunch of girls "you need to leave Luis alone cuz that's my man all right?" Layla said. Then Sheila responded "Well, obviously he don't want you if hes comin' to me so why don't you just get off his back?" They began arguing and callin' themselves names until the arguing led to fighting. They got arrested by 2 cops who were at the station. The fighting was for nothing because as soon as Layla got out, Luis broke up with her."

Her story, like others, creates a psychological backdrop (an introduction), a scene change and then a confrontation / dramatic climax in action. She conveys the emotional intensity of anxiety -- confronting and fighting a rival -- with facial expressions and a camera close-up. The film effects enforced the drama and moral of Dinora's narrative. Slow motion and close ups of the fight, highlight tension between characters. The final written text she had flash against a black screen read: "the fight was for nothin, because when Layla got out, Luis broke up with her."

Dinora represents the voice of her character in the text by acquiring a "style" of voice, though it runs pretty seamlessly into the voice of the narrator. Her text conveys ambiguity between two points of view by repeating the same grammatical structure and putting a different semantic content into each. "In a way she didn't want to go to school because she new about this girl who wanted to fight her. And in another way she did because she didn't want to look like a punk and she wanted to get it over with." Sheila's internal dialogue is made explicit. Her state of quandary is revealed through a parallel grammatical structure in language – the basic idea that two concerns are being weighed against each other in the introduction. At the storyboard stage, Dinora's idea remains but the way she represents the idea changes: she employs thought bubbles. Dinora draws two identical circles on either side of Sheila's head and fits them with different visual content.



*Figure.27 Representing a state of indecision in text and visual icons. Thought bubbles, body closeness and facial expressions convey character moods and predicament*

Both David and Dinora used conventional visual icons (thought bubbles, water ripples, "T" for the subway) to show physical and mental location. David's storyboard depicts a relationship in a setting (water) and tries video effects -- water ripples, negative art, and follow shots -- to convey the physical (sense of water) and the intimacy of his story.

The story frames mainly focus on the spatial organization of characters to convey what is going on. Closeness or touching (fighting, holding hands, kissing) indicates story dynamic: conspiracy, intimacy, rivalry or combat. Facial expressions, how bodies are organized in each frame (alone, in a group, standing up, lying down) give clues to character interactions, reactions and allegiances. Story tempo shifted, point of view changed (the narrator's personal presence was not indicated, and the contextual introductions were removed). In narration David and Dinora explain underlying motivations and character psychology ("In a way....and in another way", "the rock got mad"). In visual icons, they specify emblems, facial features, body clustering and body contact. The representations evoke both internal and external "states". They specify peaks of emotional tension or physical expression between characters.

To summarize the results thus far: three cases provided illustration of basic changes occurring between how kids envisioned an action, wrote a story for it, drew and filmed it. Written stories established:

- 1) A narrator
- 2) A rationale behind events and actions (psychological or motivational)
- 3) An event sequence
- 4) Flow / shifts in story time using grammatical function words ("meanwhile", "suddenly")
- 5) Narrative conventions or colloquialisms to punctuate and cue important events ("One day" "two weeks passed...")

Storyboards established:

- 1) Layout / organization of characters and events
- 2) Facial expressions to convey emotional states
- 3) Pictorial icons for objects and locations
- 4) Character features to identify characters (hats, hair color).

When visual/spatial and acoustic/verbal story elements were transposed into film two basic trends emerged:

- 1) Attempts to elicit emotions with a fast onset relied on more sound effects than stories eliciting more gradual onset emotions (“excitement” vs. “suspense”)
- 2) Attempts to elicit emotions with “negative” pleasure rating (“fear” “shock”) relied on more camera motion effects than stories with positive emotions (“excitement”)

### *Videos*

#### Case study 3 – Eric:

Students outlined and developed their action stories within stages laid out by the workshop. Eric’s iterations provide a clear example of change in understanding. In Eric’s case, his perspective of effects changed, specifically in regards to sound. From the outset, he was visualizing sounds – of an announcer and the atmosphere of a baseball game. He used colloquial voice and rhythms in his text and began to overlay voice with script, narration with sound effects to manipulate the feelings that were generated from his video. The stages of developing his story are outlined below:

- 1). **Action** = “sliding”
- 2). **Feeling** = “excitement/ thrilled”
- 3). **Message** = "baseball is an exciting sport"
- 4). **Effects** = “no effects, only sound effects” (though in his storyboard he specifies the camera pulls back to wide angle shot, then zooms in to a close up shot)
- 5). **Text** =

~~Mike~~ Mike runs. The home ball gets to  
 the shortstop half way down the line gets  
 to the third baseman he slides  
 he's... he's... Safe!  
 Tom running from the lasers and  
 bullets flips over the generator booth!  
 a fiery explosion turning <sup>he</sup> negative  
 and escaping the building  
 @ Eric

Figure 28 Text (top) that conveys sounds and styles of a narrative voice: baseball

To convey the “thrill” of a runner sliding safe to home plate Eric’s narrative splices two simultaneous actions, through brief phrases. Our attention shifts from player to ball to player to final slide. (<Mike runs to home><ball gets to the shortstop><half way down the line><gets to the third baseman><he slides he’s...he’s...safe!>) Punctuation, repetition, sustained focus on the central character and a delay in the final results of the action (“he slides he’s....he’s.....Safe!”) are Eric’s verbal means for communicating suspense. The action happens in real time: so fast, the announcer skips out pronouns, and adds pauses to sustain suspense of an event unfolding in real time. Eric’s text, without the feeling, might read: “(THE) ball gets to the shortstop (MIKE IS NOW) half way down the line (THE BALL) gets to the third baseman (WHILE MIKE SLIDES AND IS SAFE). Instead, Eric manipulates a narrative style to simulate the voice of a commentator. He creates a narrative structure to slow our experience of time, juxtaposing two simultaneous focal points, and delaying pronouncement of the end result.



## 6). Storyboard =

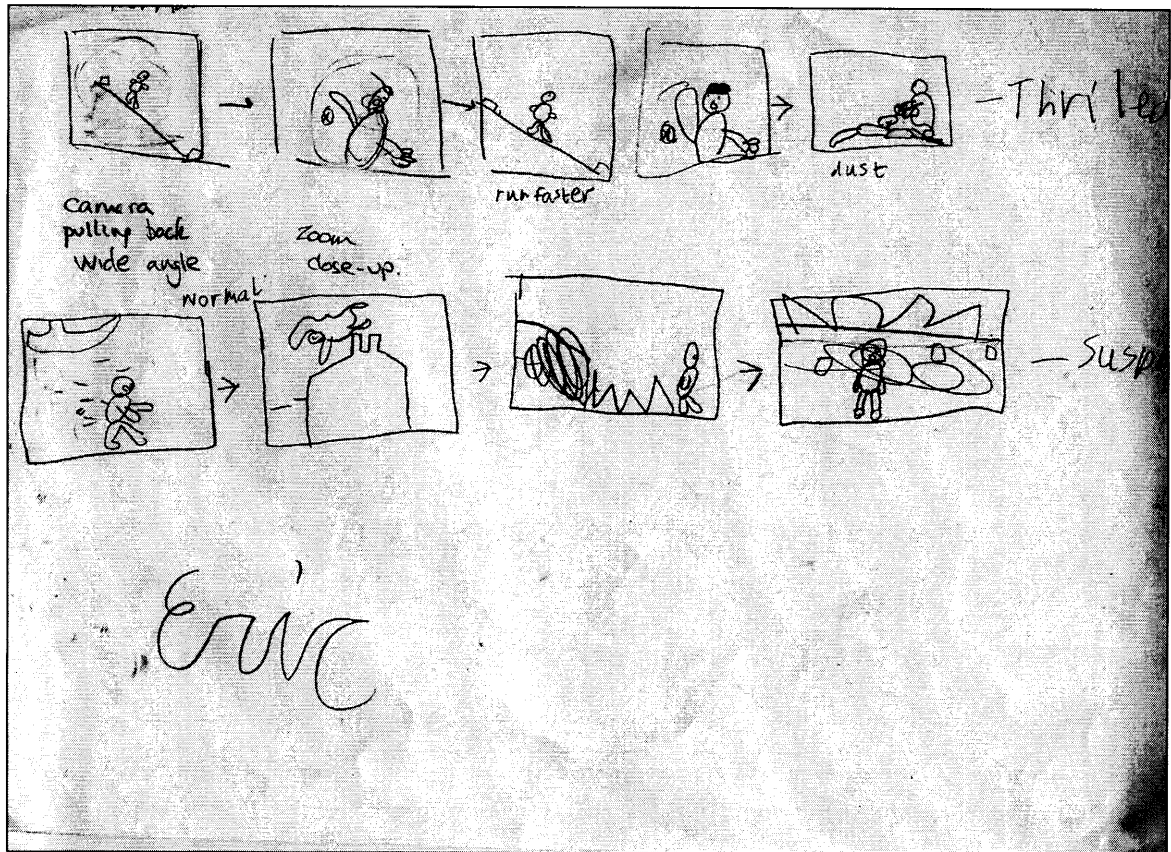


Figure. 29 Frames (top) showing camera location, focal length and cuts to convey “thrill”

Eric’s storyboard frames counterpoint cuts (ball to player), creating visual mechanisms for shifting our attention back and forth between simultaneous events. He also switches between wide-angle shots and zoom-in or close-up frames, suggesting he understands how the z-axis might be used to draw an audience closer to or further away from actions in a story. He also uses close-ups and facial expression to enhance story “drama”.

Eric’s final video, “Rookie Try Outs” has continual sound effects (applause, cheering, fanfare) and running commentary (made by splicing narration in the raw footage, with post-production announcer-like script he made up). The video replays the same action three times. The first time, Eric uses a pan shot (side angle) of the runner

sliding home. The second time, he uses a front-end, wide view so “Mike” runs directly at the camera (and viewer). The third time, Eric uses a commentator prompt: “Now, if you look at that play again, that slide was perfect enough so...” and replays the whole scene in slow motion finishing with the camera zooming right into the runner’s face.

Eric happens to be the runner. He is also the commentator. He is also the film director and SFX producer. What drives his mode of expression? A desire to convey his own excitement about baseball. How does he learn to manipulate the content and impact of his idea through several iterations? He uses the same grammatical structures in text, pictures and moving pictures to build suspense. Namely, he juxtaposes unresolved, simultaneously unfolding actions. He also amplifies specific tones of voice and facial expression to create the “sports fan” mood. While he imitates the audiovisual style of common sports programs, he is also improvising with his own sound and camera motion effects from those initially outlined. Eric first intuitively and then with explicit understanding, began to use these effects to manipulate the mood of his audience and convey intense excitement. Eric’s particular insight began to emerge as a pattern in several other case studies. The mechanisms that might push children to probe the how an effect’s modality influence the intensity of audience feeling, is examined in the case study I review next.

### Case study 3 – Matthew

Matthew’s story exemplifies a third process driving the students’ iterations through a storytelling process. The desire to role-play or insert themselves into their stories as their own heroes.

- 1). **Action** = joking,
- 2). **Feeling** = scare them (the audience), as if that can happen to you
- 3). **Effect** = laser vision,
- 4). **Text** =

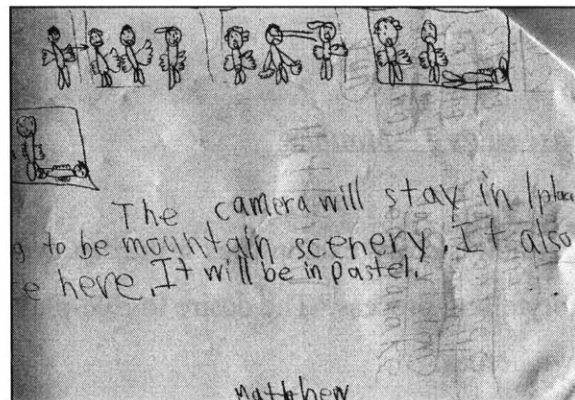
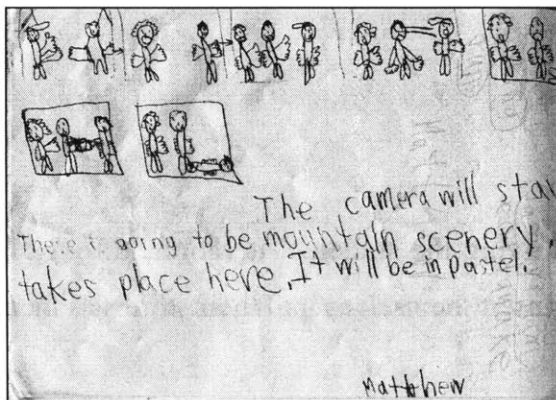
Bad guys talk about catching Professor Einstein. Back at the lab Matt and Einstein are joking. When Joker and Ingo come in, Matt uses laser vision and defeats Joker. Matt throws a bucket of water at Ingo which kills her.

as if that can happen to you.

Score them

Figure. 30 A morality tale of good and evil (the student plays the hero). A special effect with props, sounds and filters is created to show laser vision

5). Storyboard =



Figures. 31-32 Storyboard with camera direction. Hats, hair, expression show character identity. Facial expression and character interaction reveals moods and intensity of story stages

Mathew's story develops a moral framework: good guys fight bad guys, and win. Mathew is the main good guy: "Matt", the hero. Mathew describes, pictures, and acts as

himself, protecting professor Einsteiner from forces of evil. Matthew's storyboard, depicts Mountain scenery for the "bad guy" remote, holdout. To film a "secretive" equivalent (within cost-constraints), he chooses the school stairwell. The sense of remove is enhanced by Matthew's film effect decisions. He uses a black and white filter and a bird's eye view to show the conspirators at some remove.

He remains consistent in what he wants to show (an idea about characters and an atmosphere) but open to achieving the best way of showing this with the tools he has. For example, his characters in the story, identified first by name, are then given consistent hair colors, or physical attributes in the storyboard (a cap etc). The facial features of his characters illustrate how Matthew plans to intensify the moods he wants the audience to have, demonstrating an insight into the ways you can manipulate audience reaction by encouraging empathy, or showing the audience something that they know the characters in the story don't know. His storyboard structure reveals intuitions about how to instill fear in a listener. He builds up a picture of something about to happen to unsuspecting, happy characters (he draws their smiles). He then dramatizes the shock of a surprise attack with facial expressions to make it feel, "as if that could happen to you".

What drove the way Matthew developed or created his own effects? His wish to make his story "appear real". He worked out his own combination of filters and props to create a laser vision effect to "kill" one villain by fire. He edited cross fade transitions into reverse motion clips to "kill" another villain, Inga, by water. He seems to have discovered along the way, that sound effects help amplify the speed of the shock the viewer feels, and adds many sound effects in the laser vision seen.

\*\*\*

Overall, students changed how they spoke about effects. Moving one level down from what changed the way they talk, to expose what changed the way they think, I began to look at patterns in their decisions for final video effects. Basic quantitative analysis was done of students' videos to probe their intuitions about how sound, camera motion, and other specific types of effects might modulate narrative mood. I observed patterns in

how they described effects, used effects, or employed different effect types (visual, audio, and physical) for different purpose, such as creating faster reactions or more intense feelings in the viewer. The qualitative analysis and results are described next.

### **Video Effect Analysis**

Mean use of effects increased between prediction (storyboard) and production (final movie) stages for all students. This increase was significant for sound effects in the Cathedral school group [t paired = -2.6 (4), p=0.05 see Table 6] and a trend for voice effects [t paired = -1.6 (4), p<0.1].

**Table 6. A T-Test: Paired Two Sample for Means: Cathedral school students**

<b>Effect type</b>	<b>Pretest mean</b>	<b>Post test mean</b>	<b>Standard Deviation</b>	<b>P-value</b>
color	0.6	1.2	0.88	0.15
form	0.4	1	0.82	0.10
motion	0.8	1.4	0.99	0.23
sound	0.6	3.2	2.13	<b>0.05*</b>
voice	0.8	1.2	0.67	<b>0.09</b>
text	0	2	--	--
props	2.6	2.6	0.84	0.50
location	1	1.2	1.10	0.19
costumes	0.6	0.6	--	--

- denotes significant value where  $p \leq 0.05$  and  $\alpha = 0.01$

A Single Factor Anova revealed significant interaction of effect type (color, form, motion, sound, voice) and change (pre/post)[F(4)=2.9, P= 0.05].

In addition to the kind of action and the kind of effect they were going to make, each student specified a feeling they intended to give the audience. These were rated along the temporal dimension of onset rate (fast = 1, slow = 0) and along the intensity dimension of pleasure (positive = 1, negative = 0). I looked at the final movies with this additional information, to assess whether there were any reliable correlation between the type of “feeling” students wished to generate and the type of special effects they used.

Cathedral students’ stories with fast onset emotions (like “excitement”) used more sound effects. The interaction between onset rate and effect type was significant

[F(2)=6.31, P<0.05]. Stories with more negative emotions (“scare them”) used significantly more motion effects [F(2)=4.67, P<0.05].

Significant interactions were also found between camera motion effects and story “feeling” across all the students’ movies [F(2)=8.05, P<0.01]. A trend between sound effect and emotion occurred across all movies [F(2)=3.08, P=0.06]. As Cathedral School students had ready access to their lab, they had more time at the editing stage to explore software features (like sound effects) and how they impact story pace, than the other groups of students. This may explain why the interaction between onset rate and sound effects was significant for the Cathedral school, but was only a trend in analysis of all the movies. Given more time, the other children may have come to the understanding that dramatic sounds manipulate speed of our attention, often more effectively than pictures

Charting the results of this analysis showed that students whose stories conveyed negative emotions (“shock”, “scary”, etc.) enlisted significantly more camera motion effects, such as zooms, pans, and slow motion than students wishing to convey a positive mood. In addition, students who wished to provoke fast onset reactions (“thrill”) used significantly more sound effects than those wishing to provoke feelings with more gradual onset (“suspense”).

This analysis can be understood in light of the specific examples (cited above) that illustrate why children might have found certain effects evoked certain reactions. Stated reactions, such as Eric describing what he saw in Michael’s movie as: “the sound effect. It was more like an active movie” or Nigel describing what he felt about a camera “trail” filter (“a kind of ghostly feeling”) help illuminate their understanding. The mechanisms that drove their realizations emerged over multiple iterations of story and effect development. Students’ intuitions about sound and motion effects emerged in both qualitative and quantitative analysis of their videos. Significant interaction between these effect types and emotion – onset rate and intensity occurred.

\*\*\*

In the final chapter of my thesis, I summarize the basic findings of my research. The workshop results and case studies outlined in Chapter IV are distilled. The major

findings are highlighted and their implications are discussed. Possible application of the workshop / curriculum design to teaching settings and after school activities are proposed and principles for teaching storytelling to children with audiovisual tools are summarized.

## **CHAPTER V**

## **CONCLUSION**



## Summary & Research Implications

The major findings from my results can be summarized as follows. Children's understanding of special effects shifted from understanding specific features or examples of special effects to understanding the impact they have on a story. Their descriptions of effects changed from discussions of an "object" or "product" to discussions of a process for producing specific "feelings", "sensations" and impressions conveyed to an audience. Students' descriptions given explicitly, before and after the workshops, support this finding.

I tested the hypothesis that 9-14 year-olds perceived different genres of special effects to mean different things. Modifications made to the color, form or dynamic (Zeki, 1990) of a filmed action sequence were used by students to convey dissociable feelings in a series of video making workshop sessions. Significant correlation between effect type and semantic / emotional content was found. Findings suggest children's comprehension of cinematic conventions, and their meaning can be developed as a way to reflect on their own intuitions and preconceptions of a motion picture story.

Novice filmmakers were asked to think about the impact of effects processing on their stories, considering how a "style" or film device effects meaning. Each group engaged in discussions about their modifications, and tried to develop "theories" about how effects can help convey messages, capture and express ideas in a story. At each stage of the story telling process, children established different aspects of their own ideas working towards a final expression with digital video and effects.

In writing students established:

- 1) A narrator (to whom they often had personal connection)
- 2) A rationale behind events and actions (psychological or motivational)
- 3) An event sequence
- 4) Flow / shifts in story time using grammatical function words
- 5) Narrative conventions or colloquialisms to punctuate and cue important events

In visualization using storyboards students established:

- 1) Layout / organization of characters and events

- 2) Facial expressions to convey emotional states
- 3) Pictorial icons for objects and locations
- 4) Character features to identify characters (hats, hair color).

In filming and editing with effects students established:

1) Emotion onset was a factor in how children added, controlled video effects in their stories. Specifically, sound effects tended to be used in stories with fast vs. gradual onset emotions (“excitement” vs. “suspense”).

2) Intensity of pleasure also influenced children’s use of effects. Negative feelings (“fear” “shock”) were invoked with more camera motion effects than stories with positive emotions (“excitement”).

To summarize, my thesis research examined the ways children understand special effects change the meaning of motion picture stories. I analyzed student discussions, written responses, story development, and videos. Children’s descriptions of what an effect were changed over the course of the workshop. Initially, children described features or instances of effects, but not their context or purpose. Responses after the workshop reflected a shift in understanding. Kids did not describe how effects *appear* within a story (e.g. what they look like to us). Instead, they described how effects *operate* on the audience (e.g. what they evoke in us).

Mean use of special effects increased significantly between story conception and production. Across and within group analysis of effect type, revealed interactions between emotional intent, camera-motion effects, and sound effects. The findings revealed some of the basic preconceptions these young novices had about cinematic techniques.

The workshop interventions aimed to introduce children to an increasingly sophisticated knowledge of cinematic techniques, and to a range of tools and formats for storytelling. The research has implications for children’s learning, and activities that support critical comprehension of motion picture stories – such as those seen on TV, film, and video. The research is directed towards development of activities that support imagination, comprehension and expression in storytelling.



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APPENDIX I

**Pre-workshop Assessment Questionnaire**

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**QUESTIONNAIRE                      CITIZENS SCHOOLS                      NAME                      DATE**

1. What are special effects? LIST EXAMPLES
2. What are your favorite movies/ or shows with special effects?
3. Describe the feelings or mood they give you
4. Describe the mood or feeling of digital camera effects listed:

Effect	meaning/ feeling
PASTEL	-----
MIRROR	-----
NEGATIVE ART	-----
TRAIL	-----
MIRROR	-----
BLACE & WHITE	-----
MOSAIC	-----

**WATCH EXAMPLES OF MOVIES AND EFFECTS**

- 5, Describe the effects you saw & what they made you think or feel
- Dorothy & the Wizard of OZ
  - KING KONG
  - The Matrix
  - Titanic

**EXTRA CREDIT:**

How does a movie give the “feeling of motion”?  
Can you see any special effects in real life?

## Appendix II

### **Mid-workshop Assessment Questionnaire**

---

- 1. What is the message of your story?**
- 2. What feeling do you want the audience to have?**
- 3. What kinds of special effects are you using?**
- 4. Why?**
- 5. What do you need to tell your story?**
  - a. what will the camera/ visuals convey?**
  - b. what will sounds/text convey?**
  - c. what wil characters and actions convey?**
- 6. What are special effects?**
- 7. Give an example from something you know in real life.**
- 8. What do you plan to change/ add to your story still?**



APPENDIX III

**Post-workshop Assessment Questionnaire**

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**QUESTIONNAIRE                      CITIZENS SCHOOLS                      NAME                      DATE**

1. What are special effects? LIST EXAMPLES
2. What did you try to make or show with your own special effects?
3. Describe the feelings or mood or dynamic you tried to convey with each effect you used
4. What couldn't you do with the tools you had?
5. Describe the mood or feeling of digital camera effects listed:

Effect	meaning/ feeling
PASTEL	-----
MIRROR	-----
NEGATIVE ART	-----
TRAIL	-----
MIRROR	-----
BLACE & WHITE	-----
MOSAIC	-----

**AFTER WATCHING OTHER STUDENTS MOVIES AND EFFECTS**

- 6, Describe the effects you saw & what they made you think or feel in each video:  
eric  
nigel  
mathew  
mark  
sam

\*\*\* Can you see any special effects in real life?

## Appendix IV

# Curriculum Guidelines - Video & Special Effects

**Breyer**

## **Principles:**

### ***I. Action & reflection***

What do actions & events tell us? How do we understand the physical interactions we see & do everyday? Observe actions in your daily life that convey something without words. Create storyboard (something u want to say about how people interact/behave). Describe frames in the story. Draw & film them.

Topics:        What is Motion?

How do “Motion Picture” & Special Effects produce the sense of motion?

Time (vectors) & sequence

Motion (film frames, TV scan lines, slow/accelerated motion)

Primary (subject) x. secondary (camera) x tertiary (sequence) motion

### **Examples:**

- *fast zoom-in* = apparent motion (vectors of high magnitude for object on z axis)
- “*dolly-in* – we appear to move into of scene, “*dolly-out*” we appear to move out of it
- *Film*= static frames shown in small, incremental series (24 frames/second= perception of motion). Motion appears when object location changes drastically btwn frames
- *TV* = frame always in motion b/c of “reading” mechanism of electron beam which continuously scans odd and then even numbered lines (dots) that light up and decay while image being filmed

## ***II. Optics & light***

The sun & the eye– shadows/reflection/refraction/ focal length (mirrors, microscopes, telescopes, camera lenses)

Topics:       What is Light?

How do we perceive & manipulate light to represent moving images?

Actions with light – recording/ projecting, splitting, adding, subtracting, scattering

Properties of light – EM, reflection, obstruction, refraction, diffraction, interference

Absorption of light at different wavelengths

Types of light

### **Examples:**

projectors/film

rainbows/prisms

RGB/ CMY

Wave vs. particle

Visible & full spectrum...radio...gamma spectrum

Light sources - electric, laser, holograms

## ***III. Cinematic Conventions, Editing techniques & Special Effects***

Zoom, wide-angle, blur, close-ups, RGB filters, masks, chroma etc.

Topics:       TV, Video, Film & Special effects: how do they work?

Cinematic conventions: history & effects in film, video & TV

### **Examples:**

Compositing

Back Projection

Stationary vs. Travelling Mattes

Optical & Digital Compositing

Blue Screen

Computer Animation

Jump Cuts vs. slow dissolves/fades

editing principles, montage

#### ***IV. Math & computation: tools for representing motion***

Topics:        Ways to use Math

Special effects with digital tools

Mathematical representations & real-world experience

Examples:

Pixel representation of special effects (see QT & java application examples)

Understanding dynamics & computation as representations of dynamics/flow/direction etc.

Graphing (distance vs. time, velocity vs. time graphs, or other dynamics which correspond to the recorded video clips of motion kids have made)

## **Field Research/ Workshop Proposal**

### ***Task 1. (Simple)***

Build a story board, around one action – a verb, Discuss dynamics of action and how best to convey this. Shoot, edit, & present sequence. Discuss what film conveys & how. Choose a second verb in contrast to the first (abstract vs. concrete, or passive vs. active). Discuss and lay-out second storyboard. . Shoot, edit, & present sequence. Discuss / compare what film conveys & how.

### ***Task 2. (Complex)***

Change the *dynamic* of each action – a verb. Discuss effects of visualizing motion: velocity, focal length/viewing distance (wide angle or close-up/zoom), color, brightness, masks, blur. Explore mathematical approximation for visual and physical effects (on computer). Review cinematic conventions. Discuss ways to change the representation of each verb or action idea- the mood or message underlying the narrative. Shoot, edit & present. Discuss addition of special effects camera conventional uses to modern day TV/film etc. Compare film sequences.

<b>THE CURRICULUM IN PRACTICE</b>	<b>Breyer</b>
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### **Practice:**

*Guidelines for Teaching Video Effects & Critical Reflection to Elementary School Children*

### **Method**

Introduce small groups of middle school children to digital video recording methods.

## **First lesson covers basic principles of optics:**

Properties of light (Reflection/refraction/ angles of incidence, color)

Mechanical objects which manipulate light (cameras, lenses, projectors, mirrors, prisms, lasers, digital cameras)

## **Second lesson covers basic principles of filming**

Storyboard/ narrative subject

Camera angles/ frames and transitions

Light (front/back) and color

## **Third lesson covers basic principles of editing with a limited intro to special effects features**

Motion Rates, direction

Focal changes (zoom, blur, pixelation)

RGB and chroma changes (masking, overlays)

Samples distortions: small explosions look bigger if filmed at a faster speed. 2. "falls" look more dramatic with prolonged motion (high speed camera) 3."car chases" look more dramatic if action is sped up (slow speed camera). 4 fight sequences enhanced if sped up (slowed-down camera) (Wilkie, Creating special effects for TV and video,1977)

## ***Description***

### **Lessons**

- Each lesson would be accompanied by field work: filming a small story based on an "action verb". Each team develops the "action shot", laying out a storyboard with camera angle decisions, camera movement and effects decisions, then shoots and edits the movie sequence.
- Each lesson will include reference to preliminary background on the history of cinematic conventions.
- Each lesson would also look at the means for arriving at optical effects using digital/computational means (do kids understand blur as a pixel or as a photograph with bits underneath it? Do they understand the mathematical representation that enables altering edge detection/relation of a pixel to its neighbors as something which reproduces visually the optical effect?)
- Each lesson would reflect on narrative tropes and techniques used across tools to convey something through motion. Select examples from black and white film to contemporary DV and animation based effects....perhaps tagging frames or tools with this information

or having it as additional background information accessible through the editing software. Have additional “discussions” interviews which explore what the effects are intended to evoke, what they communicate, why they are used, what they convey etc.

## **Goals**

Building a set of environments that help reveal what kids think about the science and the meaning behind video and film effects. By developing action-based stories and working with existing editing effects processing tools kids will discuss, explore what they understand about effects such as :

Blur,  
RGB filters  
Masks  
Brightness filters

Lines of inquiry include:

- What do kids learn about the levels of representation and conventions in film and cinematography evoked with through use of video effects.
- What do kids learn about the principles of optics, kinetics, math, computation, algorithms supporting creation / manipulation /experience of effects in digital contexts.

The research aim to look at what it takes to deepen people’s experience of special effects in video. I will observe how kids manipulate video and use the tool to narrate and communicate their ideas. The research will provide a basis for developing a set of interactions and/or tools for story telling in motion pictures and help evaluate alternative ways to deepen their exploration and critical understanding of the medium.

## APPENDIX V

### **Video Workshop Session Descriptions**

#### *Samples with Descriptions*

**Session 1/2** Children are asked to characterize a special effect (Is digital manipulation or computation required? Do illusions created with make-up, smoke or a flashlight and red candy wrapper qualify? Are motion pictures also an illusion/ special effect?) What perceptual tricks do our eyes play on us (persistence of vision for sequences over 15 frames per second (Gibson, Marr\*\*), and possible “on-off mechanisms” (Hochberg, 1986) to create the convincing “flip book“ effect of a moving story?

**Session 2/3** Children review special effects in Dorothy & the Wizard of Oz, the Matrix, King Kong and Titanic and are asked to define what effects they see and what their meaning and emotional impact is. (What moods, feelings and atmospheres do these sequences generate? What effects create suspense, dramatic tension, wonderment; how do music, lighting, text, event ORDER change what the viewer feels?) Children compare these to their favorite movies, advertisements, TV shows and videos discussing message intended and overall impact of effects. Review sample effects on the DV cameras, with kids familiarizing themselves with recording options/ controls.

**Session 4** Children are asked to describe how stories are told with actions and motion pictures. [How do we know something is moving: camera movement (pan, dolly shot, zooms) vs. subject movement (car, train). What does a “reference point” provide? Why do we “feel” we are flying faster when a plane is in clouds rather than high up above the ground? Why does a train look like its moving backwards when you are arriving into the station and the subway on the opposite track is just moving out?] Children are asked to describe the emotional impact of camera shots- dolly, pan, zoom, close-up. Practice techniques/options with DV cams.

**Session 5** Children consider how to represent different actions in moving pictures? Brainstorm “easy” (concrete motor) and “hard” (abstract passive) verbs to represent. Select one easy, one hard verb from the full list, develop and write a story sequence for each. Design short visual storyboards selecting a few special effects to convey each of the actions chosen. Decide on the objective “feeling” and “message” conveyed to the audience and what effects will help instill this mood.

**Session 6/7/8** Children teach parts, collect props and direct the shooting of their stories (directing camera angles, effects, actors etc). Work in teams. Roles are switched.

**Session 8/9/10** Children capture and edit their video stories

**Session 11** Children present, review and critique. Fill out post workshop questionnaire