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The Boom and Bust and Boom of Educational Games

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MIT Teacher Education Program and The Education Arcade

The history of computer-based learning games has a story arc that rises dramatically, and then plummets steeply. In the early days of personal computers, creative minds drawn to the new medium explored a variety of approaches to learning games, ranging from behaviorist drill-and-practice exercises, to open-ended environments suitable for either exploration or construction. Early practitioners were inventing new forms, and even the fundamentally limited drill-and-practice games were infused with a measure of creative energy and humor. For users of these early products, each new title represented another interesting step into unknown territory.

The CD ROM Era

These products were first delivered on floppy disks and marketed alongside pure entertainment games in the few computer stores of the time. By the early 90's the adoption of compact disk (CD) drives, and improved processing speeds led to a flowering of products with increasingly rich art, animation and more sophisticated computational possibilities. As the educational titles proliferated they spawned their own industry complete with mail order catalogs for parents and teachers. The titles from this era include long-enduring lines like *Where in the World is Carmen San Diego*, *Math Blaster*, and *Reader Rabbit*, but notably includes many more titles that were primarily found in the bargain bins of mass retail stores. Indeed this era saw a broad infatuation with CD's as the ultimate delivery mechanism. Publishers raced to develop interactive CD's that not only occupied the computer game and educational space, but that would (as many people saw it) in theory supplant

traditional reference books (encyclopedias, atlases, etc.) if not eventually all book publishing. In many ways the CD became the product, rather than merely the delivery mechanism. Parents and teachers purchased “educational CD ROMs”, not “educational games”, “educational references”, or “multimedia guides”. The CD ROM was a method for delivering educational and entertainment content of many kinds, and in fact muddled the waters of educational publishing, such that publishers focused more on the mechanism and marketing than the contents.

This era came to a crashing halt with the sudden emergence of web-browsers, opening up the Internet and all of its free content to average users. The gold-rush mentality that previously animated CD publishing was abruptly redirected toward the Internet, and in that early delirium of the dot com boom, content was suddenly offered for free on-line, in the hope that money-making models would eventually emerge. Games and other products for children were a major part of this mix of web-served content, putting great stress on the market for shrink-wrapped, CD-based software. As was characteristic of many markets that emerged during the Internet boom, products were rapidly produced so that companies could be the “first movers”. This left little room for the development of time intensive learning games.

The delivery mechanism itself also influenced the products that were produced. A CD had to be purchased. This investment meant that most people had access to only a few titles, and subsequently could and would in turn invest time into a more in-depth experience. When things started moving at Internet speed, the way in which games had to appeal to their audience changed. They needed to be immediately and continually appealing, or the player could just leave for another site. Games became a means to attract people to a site, rather than the destination themselves.

There were other coincident pressures on the learning game industry that contributed to its decline. The rising popularity of personal computers led to their commodification. Software products that were once sold in specialty stores were now appearing on Wal-mart’s shelves. Big box stores required publishers to offer

products at lower prices, and for lower profit margins. The need to distinguish their products in this environment led publishers to invest heavily in licensing characters with built-in market appeal (Rug Rats, Sponge Bob, etc.) that would stand out on the shelf. In an environment of diminishing profits, funds that previously went into R&D were now dedicated to these licenses. Publishers had little choice but to recycle last year's product with this year's hot character.

The Sinking Edutainment Ship

The final factor in this perfect storm was the rising demand by buyers (i.e. parents) for products narrowly focused on improving school performance. Drill-and-practice, led by the *Math Blaster* and *Reader Rabbit* line of products, was always a large component of the industry, but the appearance of the *Jump Start* series represented a turning point. The product name appealed perfectly to parents' anxieties that other people's children were getting a jump-start on education and all the future rewards that would follow in its train. Not only did these products play to the cultural moment, but they also had the kind of simplistic marketing appeal that worked in the big-box retail environment. In its two-word title, *Jump Start* told parents everything they needed to know about the product, what marketers called the "why to buy." In response (representative of the industry at large) to the success of *Jump Start*, Broderbund Software, long regarded as the leader in creative software design, replaced its marketing manager with one new to the software industry, but experienced in placing packaged goods on store shelves. A diverse range of creative children's products were suddenly marketed in the "Active Minds" series, with uniform packaging and lengthy checklists of "educational" features. Development of new product slowed, and within a few years Broderbund was swallowed up by the less adventuresome Learning Company.

The checklists on the back of software boxes that narrowly defined academic skills worthy of developing, along with the catalogs that boxed software into specific academic categories also left little room for what became known as "Thinking

Games". These games did not necessarily connect to academic standards, but clearly involved a diverse set of intellectual skills from problem-solving to creativity to quantitative skills. Games like *The Incredible Machine*, which challenged players to create various Rube Goldberg-esque contraptions, stand out in this category. In many ways these games represented the best of what the edutainment era had to offer, games that were simultaneously fun and intellectually challenging, and in fact they were fun *because* they were intellectually challenging. These games had a hard time neither being entirely at home in the educational or entertainment aisles.

What once had been a diverse range of products was rather quickly reduced to one very limited model. At the height of the CD boom, all children's software products—whether designed for pure entertainment or with learning goals in mind—occupied shelf space in Toys R Us right next to the flashy entertainments designed for video-game consoles. By the end of the decade, Toys R Us had moved the video-games to the very front of the store (with increased security to protect from theft) while 'edutainment' products were relegated to ever smaller shelves at the back of the store, and from all appearances the store was not particularly worried about customers wanting to steal the products. The ever-shrinking edutainment space was eventually replaced a decade later with the "green aisle" at big box toy stores, which was dominated by the early childhood Leapfrog gaming systems. In some ways Leapfrog redefined the learning games space, putting it back on the map in 21st century. And while innovative titles could be found, it quickly fell into the shelf-appeal licensing debacle that the CD ROMs had faced previously, and the new generation of learning game systems became yet another method for delivering recycled content with a fresh coat of licensed characters.

Why it Will be Different this Time

Others have offered perspectives on the downfall of the edutainment error, including Mizuko Ito (2008), who chronicles not only the economic factors that contributed to this decline in children's software, but also brings an anthropologists

eye to the subject, observing the ways different products fit within long-existing approaches to children's play and learning. A major contribution of Ito's article is her categorization of three different genres of games targeted for children. She describes *Educational* games that are largely drill-and-practice exercises tied to the narrow curricular goals of the traditional classroom. In her formulation, *Entertainment* games are more exploratory, narrative based games that privilege play, and that stand decidedly apart from the institution of education. The third category, *Construction* includes simulation games like SimCity and Zoo Tycoon.

As solid a foundation as Ito provides, there are two respects in which her article may not be as helpful in looking forward to new approaches to Learning Games, and understanding why the new era of games represents a different model and a new opportunity. The first is the degree to which her categorization may mask other possibilities for games that break genre. Ito is clear in suggesting that such genre-bending is possible, but she largely dwells on games that define rather than violate categories. We believe there is tremendous power in blending forms, and are particularly interested in the ways in which games might follow the form of Entertainment titles but nevertheless offer intellectual challenges that contribute to academic accomplishment (much the way *Macbeth*, or *Pride and Prejudice* can be tools for fostering intellectual growth while remaining "entertainment" properties).

Ito's article also treats the games industry as "mature" and suggests that there was something inevitable about the industry consolidation that stifled earlier innovations and led to the separation of her three genres into different market segments. While we would agree that there were powerful market forces that brought us to the present moment, we don't necessarily see the current situation as mature. The still-growing reach of the Internet and the proliferation of new game platforms (handhelds, web-enabled videogame consoles, cell phones) all suggest a market still ripe for innovation and creative destruction. There are new ways of finding, sampling, and buying games, and we believe over time negative factors such as big-box stores, and a limited number of dominant publishers will have a diminishing impact on the evolution of new games.

Despite the downfall of the edutainment era there is new energy and perspective behind the idea of learning games. While edutainment of the 1990s style has gone, there is a new take on what learning games can be. This perspective is primarily fueled by two ideas:

- 1) *Video Games are not Mindless* – There is a new field of researchers who have shown a good deal of evidence that, despite their image in the media, commercial entertainment video games are not mindless. In fact players show a great deal of thought and learning in playing video games. This includes not only the obvious titles like *SimCity* and *Civilization*, but massively multiplayer online roleplaying games like *World of Warcraft* and even first person shooters. This notion was most notably popularized by Jim Gee's *What Video Games Have to Teach us About Learning and Literacy* (2003).
- 2) *Games Got Serious* – While the notion of kids learning through games fell somewhat by the wayside, other industries and interests began to capitalize on the video game model. Recognizing that video games provide an environment in which people engage in sustained challenges and enjoy it, other uses for video games have been sought by many. The Serious Games Movement, founded by Ben Sawyer and Dave Rijeski, crystallized this idea and served to advance the field. While much of the original focus was on the use of video games by the military, the uses have evolved far beyond that, encompassing many forms of training and learning. These uses have in turn spawned many offspring including Games for Health, and Games for Change.

Together, these ideas show that there is a lot of value in game play that can be meaningfully tied to learning in ways much deeper than most of the edutainment era provided. And this learning can combine both important process skills along with content learning.

Baking Educational Games

The process of designing and creating educational games can be thought of much like the process of baking. There are many attempts by a growing number of health conscious cooks to make things that are both yummy and healthy. It isn't easy to balance these two qualities. It is relatively easy to bake calorie-laden cakes filled with butter and trans fats that are quite tasty, or one could make piles of oat germ laden sawdust that could reduce your cholesterol if only you could actually eat it. To get both of these factors balanced is hard, and there likely is no universal solution (other than perhaps iterative experimentation). Some recipes work really well for some groups of people, in certain contexts, with particular expectations. Similarly, in creating experiences that are both fun and filled with learning, the success of different recipes (mixes of media, immersion, styles of games, learning goals, mixtures of content, etc.) depends quite a bit on the audience, context, content, goals and facilitation.

There are two recipes that are followed quite a bit today to create a blended balance of what you want and what is good for you. One recipe takes the yummy calorie laden cake and injects beta-carotene, vitamin D and calcium right into the cake. This is no doubt a delicious cake, but its nutritional content is highly suspect. Similarly, designers of educational games that try to inject content learning into a game where it doesn't fit may create experiences that are somewhat entertaining, but their educational value is highly suspect. If your spaceship requires you to answer a math problem before you can use your blasters, chances are you'll hate the game and the math. This is the strategy taken by most of the legacy edutainment games (e.g. Math Blaster), as well as many of the new attempts to create commercially viable learning games today (e.g. the newer immersive 3D math game, Dimension M).

The other recipe simply takes all of the healthy content - wheat germ, oat bran, carrot juice, spinach leaves, etc. and bakes them into something that looks like a cake. It sure is healthy, but just because it looks like a cake, doesn't make it tasty. Many people designing educational games follow this recipe. They take educational

content and do something to make it look like a game (i.e. put algebra problems in a 3D virtual world, or place the periodic table of the elements into a shooting arcade). While there may be educational potential in such an approach, these games often "suck," as Ted Castranova found and documented in a recent article in WIRED (Baker 2008). Just because it looks like a game, doesn't make it a game.

Castranova, a researcher of virtual economies, presents some tips for "Making Games That Don't Suck," which are good starters for anyone thinking about rushing into the game-making business, educational or not. Castranova created a game (a heavily modded version of Never Winter Nights) to attract players to a world in which he could study their behaviors. The world turned out to be a great looking, but primarily unfun experience, that did little to attract players. Castranova in turn advised:

- Don't Be Overly Ambitious
- Go Low Tech
- Think About Your Audience
- Get a Full-Time Staff
- Concede Screwups

These are particularly relevant for the field of educational games, which is currently taking on the appearance of a gold rush, but which frequently operates without the resources of mainstream gaming developers. Throughout academia, industry, government agencies and non-profits, many people are flocking to educational games as the silver bullet to cure our educational woes. While there is clearly power in the medium of games to teach and to learn from, educational games need to be thoughtfully designed and considered from both the educational and entertainment perspectives (as Castranova lays out) so that these games "don't suck".

So what is the magical recipe for a good educational game? While there is no silver bullet, at least the beginning of the answer lies in the framing of the problem.

"Making a game *out of* learning" will most certainly not be the way to approach the development of learning games. However, "finding *the fun in* that learning" and devising ways to focus on and enhance that fun as a core game dynamic is a good strategy. Castranova likely has something similar in mind when he says, "consider your audience." Additionally, choosing the right technology plays into the decision, as Castranova indicates when he advises people to manage their ambitions and go low tech. We might amend that to "go with the right tech." In some cases a game may require an expensive 3D virtual world, but in other cases a text-based game may be perfect, and yet others might be appropriate for mobile devices that you can take with you anywhere. Too much time and effort has been spent on trying to capitalize on the expensive 3D virtual worlds, and not enough on the smaller, less-flashy approaches, but both offer potential for educational games.

Promises for Tomorrow's Games

The world of learning games is currently reaping the benefits, not only of conceptual advances in the way designers and developers are linking learning and game play, but also from the rapid advances in the video games industry. For many years the advances in the video game industry were primarily reserved for higher bits and resolutions. But the last several years have seen great technical and conceptual advances in video game designs. The rise of the Nintendo DS and Wii platforms, as well as casual online and cell phone games, have shown that video games can take many forms and reach diverse audiences. This is critical for the learning games sector, in that it cannot be resigned to serving narrow privileged audiences. Instead they need to be able to reach learners of all types. These next generation ideas are already inspiring educational innovation, and demonstrating that educational games have learned a lot this time around.

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