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Games and Learning:
Diversifying Opportunity or Standardizing Advantage?

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Introduction

Prominent among new academic technologies is the use of digital games to promote learning (Gee, 2003, Shaffer, 2008, Steinkuehler et al., 2012). From so-called serious games, used to train emergency responders and simulate economic or environmental scenarios, to commercial games that allow learners to participate in organic evolution or historical development, games for learning represent a new technology that can mediate learning by doing.

Does this technology represent a new opportunity to support the learning of a wider range of students, including those who do not respond well to traditional classroom instruction? Or are they another means by which middle-class students can move ahead of less affluent peers? Are games for learning a way to move education beyond chalk-and-talk? Or are they just another vehicle for enforcing a rigid, one-size-fits-all curriculum?

In this paper I will be less concerned with the economics of the digital divide, and focus rather on the design and use of games for learning: how they re-institute established curriculum standards or resist them, how they perpetuate the advantage of middle-class cultural capital or work to level the educational field.

I will describe a two-year project at an urban charter school for grades K-8 where university undergraduates engaged in a mix of play and learning with the school's students, centered around first a particular learning game and later a wider range of games and game-related activities. Data were collected by direct observation and video ethnography.

The first game, *Quest Atlantis*, designed at Indiana University (Barab et al., 2007), was aimed at middle-school age students, but in our project played mostly by kids in grades 2 to 5. It was designed to promote learning outcomes in close alignment with national curriculum standards in science, mathematics, literacy, and social studies, but to do so with a sense of fantasy and a concern for social ethics. In the later stages of the project, the same students were free to explore and play a wider variety of more commercial games, which emphasized fun but still offered significant opportunities for valued learning outcomes. These games included *Animal Jam, World of Goo, Minecraft, Portal,* and *Flight Simulator*.

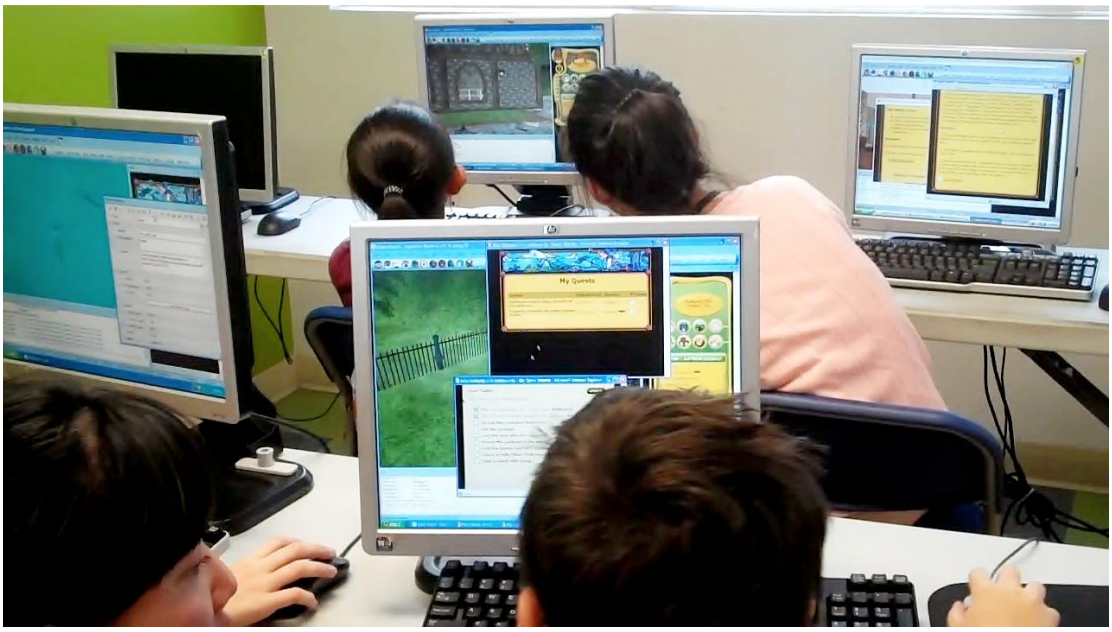
The diversity of learning and play experiences, especially in the more commercial games, appealed to students regardless of age, gender, or social background. More standardized, academic goal-oriented gameplay, however, gave advantage to those who already came with the prior knowledge and academic habitus of school success. Key issues raised by these aspects of the study include the role of emotion in game-based learning, the value of a play orientation for adaptive learning, and the possibilities for over-coming the strong tendency of games for learning to reproduce middle-class academic advantage.

This paper is a preliminary report based on initial analysis of a large corpus of video recordings and fieldnotes made by researchers and participating undergraduate students.

The Study

This study was conducted over a period of two academic years (Fall 2010 to Spring 2012) at an urban charter school where many younger kids needed something to do in the hour or two between school's end and their parents' coming to pick them up.

The school introduced an Extended Day program after school and welcomed UCSD undergraduates and our research team to develop (among other activities) a Computer Club where undergrads and kids could play educational computer games together and become "buddies". The undergraduates were enrolled in a credit-bearing "practicum" course with on-campus seminars, readings, examinations, etc., but also including about 4 hours a week at the charter school.



What makes a computer game, or any activity, "educational"? Is it the game? The experience of playing it? What's learned? Its longer-term impact?

In the Beginning: Quest Atlantis

We first introduced the kids, who were ready for anything different after a day of school, to *Quest Atlantis*, a computer game specifically designed by Sasha Barab and an NSF-supported team at Indiana University to be educational. The game enlisted players in adventure Quests during which they would also be learning things deemed important by the U.S.'s current one-size-fits-all curriculum, in the fields of science, math, and literacy. They were also expected to make moral judgments and choices, a unique and important feature of the game. It was designed for students in grades 6-9, but most of our players were either much younger (grades 2-5) or older (the university undergraduates). From the very beginning we had to adapt and improvise inside and outside the game's design to fit the needs and desires of the kids. And still we were surprised almost every week by what actually happened.

We learned a great deal about issues of game design from the unusual circumstance of having the game be played by those well outside its original design parameters. I recommend this mode of testing to game designers, but an account of this aspect of the project is not included here. One important feature for our story, however, is that because many of the kids did not have the reading skills needed to follow the written dialogue of characters in the game, the undergraduates assisted with this and this mode of help became one basis for the developing relationships between kids and undergraduates.

Avatars of players gathered at the initial point of entry into Quest Atlantis

At first the kids played the game as designed, but it soon became clear that what they really wanted to do was explore the complex and colorful worlds that came with the game. In the time before Halloween interest converged on the game's Plague World, set in an east European village, Ingolstadt, with a plot based on the famous Frankenstein story. While some students became involved with the plot and Quest activities, others wanted to use Ingolstadt as a setting for extending into this virtual world the kind of play with their friends that they were used to, and which they improvised and adapted to the new possibilities and circumstances. *Quest Atlantis* is designed to be used in a classroom under the supervision of a teacher, but our kids had already had a full day of school and wanted to enjoy themselves and play. *Quest Atlantis* is designed to be playful and enjoyable, but its primary aims are very clearly those of academic learning.

The design of Ingolstadt: for play as well as for learning

Although not really designed for cooperative play, Quest Atlantis did support the kids' rendezvous of their in-game avatars, and the subsequent games of chase, hide-and-seek, and martial arts that one particular group of three players devised. In creating their own form of play with the resources of the game, they were also learning how to navigate a virtual world, how to coordinate in-game across multiple computer work-stations, and a lot that was new to them about computer operation in general. These were second-graders.

Kids at play in Ingolstadt. An undergraduate records the event.

In the course of this group's explorations and play in the Ingolstadt virtual world, there was a lot of noise, excitement, and emotional expression as the kids called out to another across their individual workstations. This contrasted with the quieter, puzzled, serious emotional engagement with the game's educational quests by some of their peers. They discovered dead bodies hidden beneath the waters of the mill pond and excitedly invited each other and then other friends and the undergrads to come and see them, not just pointing to them on their own screens, but navigating others' avatars to the correct spots. They also discovered that they could swim in and under the water, dance, and do martial arts' moves. The undergraduates were entirely fascinated by these opportunities to see a mix of play and learning that is not often otherwise visible to adults, or to research cameras.

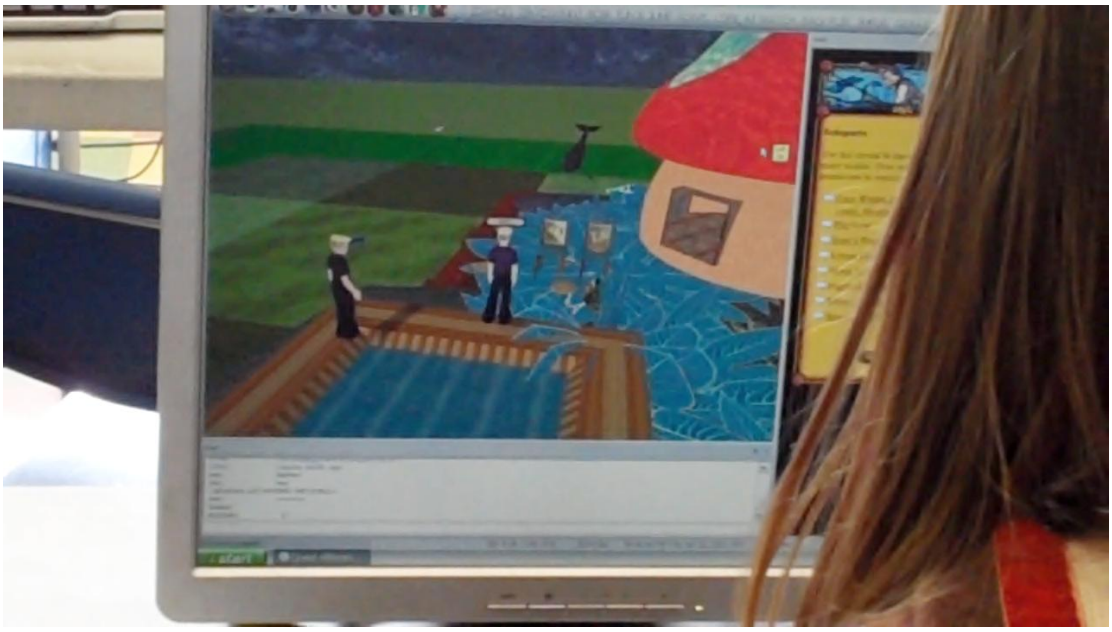
I will return later to some of the implications of taking play as a model for learning, rather than as just a motivational add-on.

Creativity Unleashed: The Build World

About this time another group of young players, ranging from 3rd to 5th grade were shown one of our innovations in the game: the programmers in Indiana created at our request an empty world, a large expanse of grass broken only by a few real-estate lot number signs, and ringed by inaccessible mountains. We extended to all our players a privilege normally reserved in the game for those who had completed many Quests: the ability to build your own house, village, compound, etc., furnish it with whatever you liked, and have your avatars live in it, fly around, and play in it.

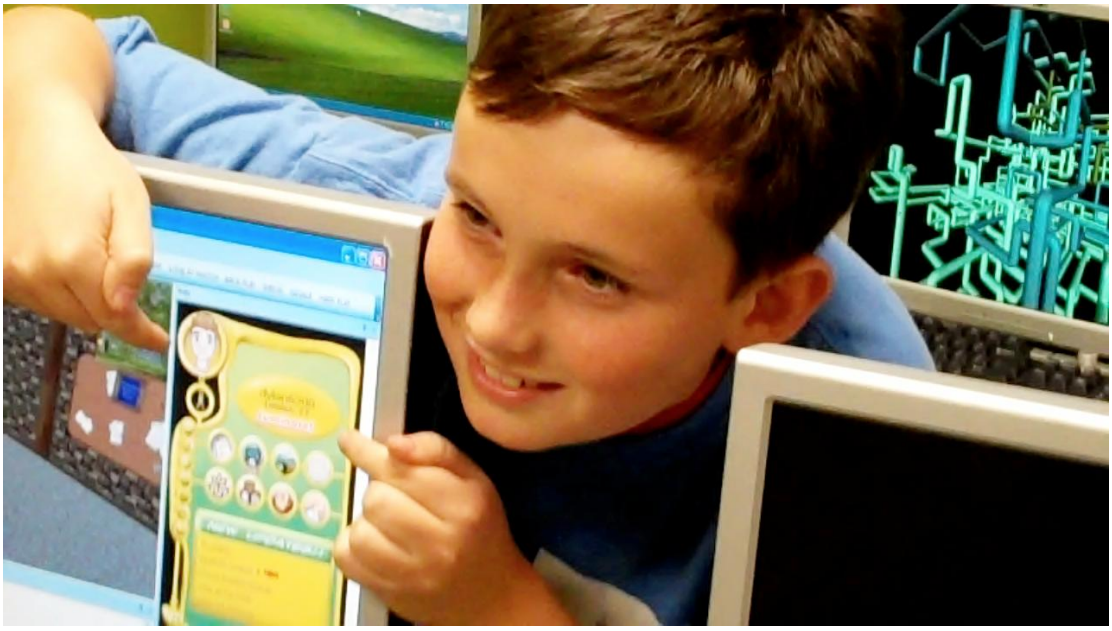
We called this the Build World. It was successful far beyond our expectations, in part because one of the outlets the kids were looking for in their play was enhanced agency: the power to do things kids normally can't do in our society. After a day of schooling, in which goals were set for them by adults, and any creative opportunities they were allowed were always in service to others' goals, not their own, the kids who built the Build World could do what they wanted, when and where and how they wanted. And do it together.

One young woman discovered a fascination with and talent for architecture and design and spent nearly all her time building in this new world. She built for herself, taught others how to build, built for her friends, and invited others to join her and one another in imaginative play in the Build World. The core aficionados of Build World also made many original discoveries about walking through walls, sinking below the ground and discovering water there and alternate passageways to other places. They made impossible architecture in the sky and redefined the conventions of normal houses (e.g. with a Litchen, a combination living room and kitchen). Whales sat on giant domes, a treehouse had a swimming pool, and when one undergrad had his birthday while we were in the Computer Club, they organized an impromptu birthday party at the treehouse pool, complete with pies for refreshments.



The impromptu birthday pool-party in the Build World

As in Ingolstadt, but over a much longer period of time and with many more activities for us to record, we again saw the high levels of engagement, excitement, and playfulness that accompanied (and took precedence over) learning. This was learning that lasts. More than a year later these same kids were still fascinated with the Build World, and a few even got accounts they could use at home to continue their involvement. Some learned substantial skills of VRML design and learned to see beneath the surface of a virtual world to its wireframe structure. But above all, they were having fun. Learning was a side effect of engaged play with novel resources and technologies, with symbolically laden mediating artifacts in service to their primary activity: having fun with each other and bring their imaginative creations into a kind of real existence.



Posing with his achievement in the game. Feelings of Pride.

Year 2: Many Games, Many Modes of Learning

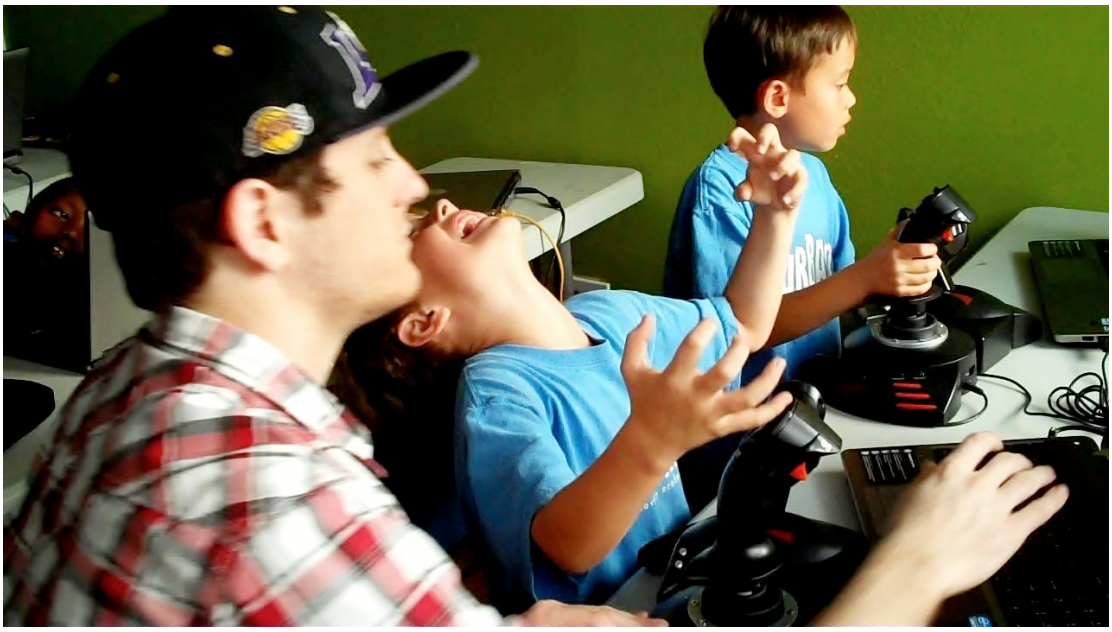
By the end of the first year, interest in the original *Quest Atlantis* game, except for the Build World, was pretty much played out. So in the second year we reversed a previous rule against playing commercial video games and allowed the kids to play a wide range of games provided only that (1) they were not violent, and (2) we could see some possibilities for learning from their playing them. A few games became, for certain periods of time, dominant games among groups of kids. Because playing the games was usually subordinate to playing with each other, a game that one kid invited his friends to watch or play together would spread and become "the game" for a group for a period of time.

The most successful games in this respect were *Animal Jam* (from National Geographic, and popular for our kids mainly among younger players and particularly the younger girls), *World of Goo* (which teaches some principles of structural engineering in a very colorful and creative puzzle game), *Minecraft* (a strategy and construction game somewhat reminiscent of Ingolstadt and the BuildWorld), and *Portal* (a brilliantly designed puzzle game that requires expanding your sense of how to orient in three-dimensions). In particular, *Animal Jam* and *Portal 2*, an expansion of the original game, allow multiple players to cooperate in the same activities at the same time.

Intent concentration is also an emotional mode of engagement

Again, we found a strong emotional component to play-based learning, ranging from intent concentration (an emotional state not always recognized in our culture as being one) to excitement in shared adventure, dramatized frustrations at failures, and elation at successes. Above all, it was clear that this play-first orientation to activity most naturally occurred in joint play, first with peers, and secondarily with the undergraduates, who mostly served as coaches or mentors, though not all players wanted or needed help (they all did like to show off their achievements, however). There was also a pervasive "playfulness" which

encompassed more than just having fun. Playfulness as an orientation to activity also has a mischievous stance, a disposition toward joking, breaking rules, pushing the envelope of normal modes of activity, an alternation between serious intent and non-serious probing of possibilities. The norm of playfulness is to play with norms, to exaggerate the "play" in them, their inherent flexibility and plasticity. All norms try to appear more necessary and inviolable than they really are, and in play-first learning experiences we encounter first-hand not just things-learned, but the spaces of possibility that surround them.

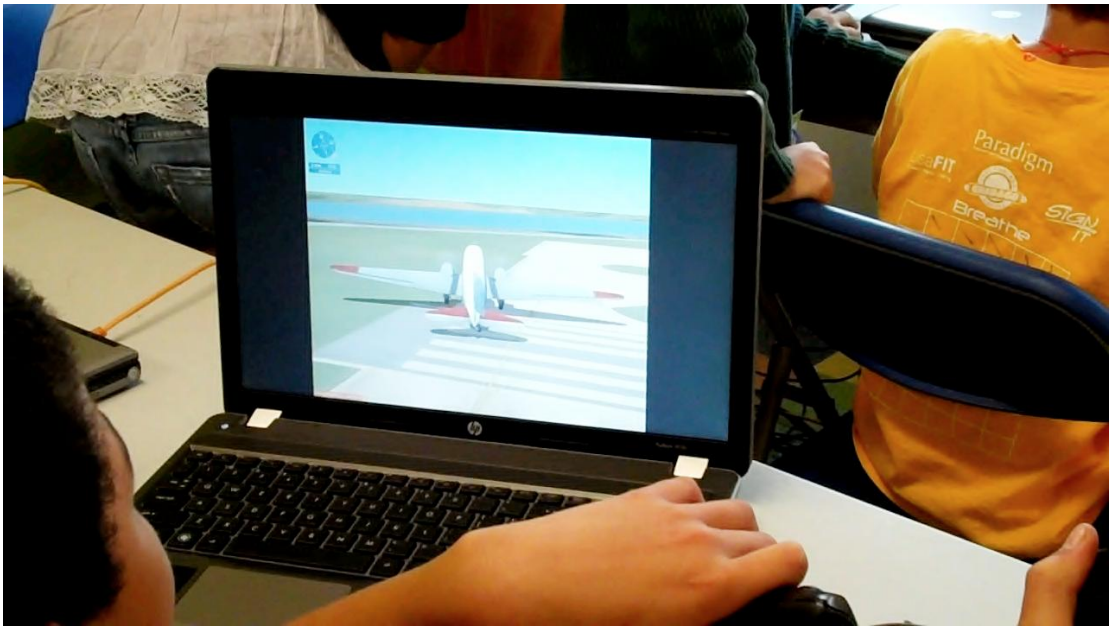


Exaggerated dramatization was a means of play-creating excitement

In this second year, we also introduced another more serious learning game, Microsoft's well-known *Flight Simulator* (version 10, hereafter FSX), largely the special project of one of our undergraduates, a major in aerospace engineering and an amateur pilot. FSX had many immediate attractions, from its large two-handed joystick-controllers to the possibility of realistic take-offs, landings, and flight through and over mountain scenery. For the kids, in play-comes-first mood, it also afforded the joys of flying upside-down and crashing spectacularly.

As with *Quest Atlantis*, the game and our undergraduate's plan entailed a series of educational Missions, which taught the various skills of flying and along the way quite a bit about aeronautical science. The kids did engage with these Missions, because they saw the benefits of learning these skills and the possibilities they opened up for advancement in the game. But once again, what they enjoyed even more was "free fly mode" in which many of the realistic elements of flights are turned off, making it possible to do many impossible stunts, or make just plain mistakes, without crashing. It was fascinating to compare how the same kids, or pairs sitting side by side, behaved when in Mission Mode *vs* Free Fly Mode. For the one: intent concentration, frequent frustration, persistence, and delayed gratification. For the other: excited

engagement, evident fun, and pushing the envelope of norms and appropriateness. Between these two modes there were complementarities and also conflicts, evident in the feelings expressed by the kids both in playing them and in choosing which to play.



Taking off without regard to runway rules

Across all these games, even the youngest students were well aware of when a game was herding them toward prescribed academic objectives and when they were free to have fun and let learning happen or not. They took very seriously the challenges which games presented and the opportunities for personal creativity. They frequently resisted being asked to stop for the day, even by their own parents, and some continued to work on their game objectives at home, when that was possible.

Learning structural engineering or playing with Goo?

A proud parent watches his first-grader succeed with Flight Simulator

Discussion

It is no surprise that kids after school want to play. What the analysis of their play, with each other, with university undergraduates, and with computer games can tell us is something about the possible relations of play and learning, the role of emotion and feeling in making meaning, and the design of games for learning.

Elsewhere I have begun to argue that our traditional view of learning as primarily cognitive and taking place over relatively short spans of time is not useful for understanding how what happens in minutes does or does not add up to learning that lasts over longer periods of time (Lemke, 2000), and that our traditional separation of affective from cognitive, emotion from reason, and feeling from meaning misunderstands their unity and common origin (Lemke, 2012, Lemke, 2013). While the analysis of the extensive video and fieldnote data from this project is still in early stages, I believe it clearly shows that the role of affect in learning has been too long ignored and too often seen simplistically both in terms of narrow theories of limited sets of core emotions and with culturally-biased views over-emphasizing the supposed conflict between reason and the passions. Both from my own experience in this project, and my initial analysis of data from it, I am becoming convinced that playfulness and irreverence, a contra-normative stance, may in fact be essential to learning that lasts and learning that allows us to think outside the box. We should not learn just to do as others wish. We need to learn how to bend what we know to unpredictable purposes. And that may well require that in our initial learning and further development of every kind of knowledge, we playfully push the boundaries of our currently far too serious culture of learning.

All the learning that is taking place in these play and gameplay activities, both with regard to conventional knowledge and know-how and in the form of social-emotional development, is happening inseparably from the expression of strong

emotional feelings, and in many cases with deliberate exaggeration of those feelings in the spirit of playfulness. Eons of mammalian evolution have promoted play as a mode of learning in the young, and in many species also in adults. What is the adaptive advantage of play, not just as rehearsal or practice for adult behavior, but as joyful, joking, and counter-normative activity? Granted these are anthropomorphic descriptions of play, nonetheless we do share common ancestry and common behavior patterns with at least other primate species in whom we recognize play (as well as for many if not all other mammals). Playful activity explores the domains of possibility, the variations and alternatives both in behavior and in the circumstances that evoke it, around each specific behavioral form or practice. That freedom to push outside conventional adult norms tends to insure that what is learned is learned together with a range of variations and across a range of conditions, which cannot but help make its future instances more flexibly adaptive to each new and unique circumstance in the future. For humans at least, and perhaps in other species as well, playful learning also forms the foundation for innovation, improvisation, and adaptation of learned behaviors. We can also hope, I think, that it provides the foundation for critical questioning of the forms and uses of behaviors.

This suggests that we should take seriously (and playfully) the proposition that play is itself the optimal form of learning. It is not optimal for purposes of adult control of the future of society and culture. It is not optimal for the purposes of those in our society who wish to shape it in their own interests and who arrogate to themselves the right to say what others should learn and not learn. And it is not optimal, I think, for those who wish to preserve their own privilege and unequal share of social resources by insuring that the political and economic system that supports them continues. It is in their interest to label play as frivolous, as a luxury to be indulged after work or serious learning is done. It is not in their interest that we learn not to take so seriously, or as so set in stone, the one right and best way to do things (i.e. their way, not our way). Play and a playful orientation to learning inoculate us against single vision, they license us to break the rules, to do things differently and see what happens. And we inherently enjoy learning in this way, because mammalian and primate evolution has built us that way.

Learning that matters is learning that lasts. It is learning that is flexibly adaptive to new circumstances (and every new circumstance is at least in some degree unique, requiring at least minimal adaptation of past learning). In this view, learning does not happen in minutes. Only the potential beginnings of new behavioral-developmental trajectories of the evolution and application of practices begin over short, identifiable times. It is only retrospectively that we seek backwards from an adaptive performance to find its possible origins in earlier activities and experiences. You cannot know that learning has happened until long after those origins, and it is illusion to count as learned that which does not, in one form or another, continue to be used and applied over much longer times. (An illusion that has captured much if not all of our current academic testing regimes.)

In play, I believe, we see the origins and early development of more flexibly adaptive, more lasting learning. Further analysis of the data in this project will see to what extent this can be borne out on the basis of a two-year time frame. Other forms of research will clearly be needed to establish these proposals more firmly.

Another important issue raised by the experiences of this project is that of the value of games designed more explicitly for pre-selected academic learning goals *vs* those that offer wider scope for player-learners to continuously evolve and set their own goals and ways of using the means which the game provides them. The former type, and those aspects of any educational game which fit that pattern, confer differential advantage on players who already possess the cultural capital, the specific scholastic habitus to understand what the academic goal is and how their performance will be evaluated. Goals determine pathways of learning more than we might wish, given cultural contexts with long histories of associating specific modalities of learning with specific goal domains. We can make learning pathways more multimodal, supporting learning with more visual media and more interactive activities, but if the goal is still the same forms of cultural knowledge, highly canonically determined in fields such as science, mathematics, literacy, history, or sociology, then there is no way that the diversity of pathways to those goals can become as diverse, and therefore as socially equitable, as the range of lives and experiences in our very unequal society.

The mode of playfulness is antithetical to pre-set goals, it is not merely an extension of means. It challenges what we are told to do, what we are told is right and best. In the mode of play, kids (and more rarely adults) become more equally enabled because the direction in which the play will go, as well as the means of getting there, are constantly up for negotiation and revision. Play moves to its own tune, and while cultural patterns of play may make some aspects of its trajectories predictable in the aggregate, every instance of play is unique and no instance can be guaranteed to lead anywhere. Play is the antithesis of control, the counter-weight to order and discipline, the guarantor of adaptive flexibility for the sake of survival under unpredictable future conditions. It is also a potential prime mover for change.

If we wish to make game designs that support learning more equitably across gender, class, and other divisions in society, then we need to weaken the emphasis on predictability and control, on fixed goals and learning outcomes. We need instead to design to support creativity, improvisation, rule-bending and rule-breaking, violations of adult norms and construction and exploration of alternative possible realities. If we do not want to continue, even unwillingly, to re-inscribe the inequalities in learning which originate in unequal power to say what ways of being are valued, and in the unequal experience of those whose lives bring them closer to or further from the ways that others claim value for, then we need to let players learn not just how they wish, but also what they wish.

I do not want to take here the extreme position that all traditional learning and curriculum is socially arbitrary, at least not in the shorter term. A century and more of the dominance of particular groups in our social history has built in to

the material world in which we live -- its production, its commerce, its science, its infrastructure – functional use-value for certain kinds of knowledge and ways of making meaning, and perhaps even ways of feeling. That will not change over night or because one generation is allowed a freer range of play and more say over what and how they learn. In the much longer term, all this could, and eventually will change. For now, for the next generation of learners, the only ones for whom any current policy can be applicable, given the rapid rate of innovation in so many aspects of our society today, I argue only for a degree of change in the design of learning. As large a degree as we can manage in the direction of more playful learning, with the least pre-determination of outcomes consistent with what the next generation needs to know to operate the machinery of our existing society, and the greatest degree of self-determination in play and learning to prepare them to re-make that machinery for their own, not others' purposes.

After-school programs, such as the one that provided the site for this study, are one example of the wider range of informal education projects that are today providing an alternative paradigm for socially supported learning. The documentation and assessment of learning in such programs offers many lessons for the designers of new educational options (Lemke et al., in press).

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