# Towards a Theory of a Games Based Pedagogy

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**Abstract:**

This paper identifies problems encountered with attempts to use commercial games in educational contexts and highlights the need for a theory and illustrated examples of effective game based pedagogies that demonstrate how games might effectively be used for educational ends. A model is presented as one example of what a games based pedagogy might look like. The model grows out of a series of design experiments established in an attempt to use Revolution (a multiplayer role playing game) as a resource to support learning about aspects of social history. The paper proposes that similar pedagogical models, grounded in action research initiatives, are required to push forward the educational games agenda and guide researchers and practitioners interested in exploiting the power of role playing games in real classrooms.

**Introduction**

The development of sophisticated commercially available games has resulted in the development of powerful 3D graphic engines, complex interface designs, the subtle use of artificially intelligent virtual assistants (and opponents), adaptive 'just-in-time and on demand' help systems, mechanisms that provide context specific feedback through multiple modes (textual, graphical, synthetic speech etc) and complex virtual infrastructures (that exploit embedded CMC tools) to support collaborative problem solving.  Indeed, many have noted that commercial games such as *Civilisation III, Sim City, Age of Empires, Roller Coaster Tycoon* and *City Trader* that immerse players in complex 3D interactive virtual environments require participants to experiment with different strategies, perform calculations, manage multiple

resources, budget, plan, and experiment like a scientist testing out emergent hypotheses in order to solve complex problems. As a result these games have become the focus of educational research initiatives (BECTA, 2001; A. McFarlane, Sparrowhawk, & Heald, 2002). More recent publications are beginning to map out the current state and aspirations of this rapidly emerging field (Jenkins & Squires, 2003; Kirriemuir & McFarlane, 2004; A. E. McFarlane, 2005) . There is a growing consensus that educationalists and instructional designers stand to learn a great deal from professional game designers (Gee, 2005; Jenkins & Squires, 2003; Shaffer, 2005; Squire, 2004) .

Jim Gee goes further, based on an analysis of popular games such as *Tomb Raider II*, *Full Spectrum Warrior* and *Rise of Nations,* he argues that games that succeed in a fiercely competitive market are evolving into ideal learning environments that embed many principles of the good learning (Gee, 2003).  In later work he suggests that by taking on a virtual persona young people (or adults) can develop 'embodied empathy' for the complex systems simulated by the game world (Gee, unpublished manuscript). The 'designed experience' afforded by the immersive multimodal environment allows the learner to experience of ways of knowing, doing and being that closely resembles the way people learn in real world situated contexts (A. L. Brown, Collins, & Duguid, 1989; Burton & Brown, 1988; Hutchins, 1995; Lave & Rogoff, 1984; Lave & Wenger, 1991).

However, empirical studies that have actually attempted to use commercial games in educational contexts have thrown up a host of problems. Studies conducted by BECTA and TEEM found that the games were invariably too complex for teaching purposes and did not fit easily into the space of a traditional 1 hour classroom lesson (BECTA, 2001; A. McFarlane et al., 2002). Teachers attempting to use the games frequently ran into technical problems, girls were far less interested than boys and perhaps most importantly many students became so engaged with the activity of gaming that the educational focus of the activity was lost. Egenfeldt-Nilsen's (2005) in depth 'field experiment' that involved Danish students playing *Europa Universalis II* as part of a 2 ½ month history course highlights the fact that learning through a game based experience might be at odds with the imperative of winning the game. Further, high school students, particularly those intent on gaining access to university, failed to see the relevance of games and complained that they were playing not learning. Egenfeldt-Nilsen emphasises that knowledge acquired through experiences in the game world might well remain tacit. Additional activities are required to encourage

reflective observation and the abstraction of scientific principles linked to curriculum objectives. Regrettably, the pedagogy devised for his field experiment did not plan for sufficient additional 'linking' activities that might allow students to reflect upon and abstract historical principles modelled in the game. Furthermore, teachers only played the game for 2 hours prior to using it in the classroom, consequently instruction remained somewhat divorced from the experience of game play. Thus, whilst the study succeeds in producing a powerful theoretical framework and highlighting potential pitfalls for future empirical researchers it fails to provide a vivid illustration of how games based learning might work in practice.

Even in the early BECTA study, it appears that the most promising findings occur as a result of the spin-off activities inspired by the experience of game play. Interestingly, ethnographic studies of gaming culture in the home have long since highlighted the rich and creative production activities that appear to be stimulated by video games rather than the experience of playing the games themselves (Torbin, 1998; Turkle, 1997). For example Tobin (1998) provides a compelling ethnographic study of his son engaged in managing a fan site, writing reviews, producing art work, collaborating with peers, and providing help and advice to fellow players.  It appears that it might not be the experience of playing a game itself, rather than the collaboration, creative production and comparative discussion that occurs between members of subcultural affinity groups that grow up around popular game titles that might prove most valuable from an educational perspective.

**Revolution: Learning about history through situated role play in a virtual environment**

My own experience of using games in a classroom context made use of *Revolution*: a sophisticated multiplayer role playing game developed as part of the Education Arcade initiative at MIT's Comparative Media Studies Lab. The game was purposefully designed as a platform for assisting teaching and learning about aspects of social history. The multiplayer game situates players in the virtual shoes of ordinary people (carpenters, seamstresses, lawyers, blacksmiths, and field slaves) who play out a role in a loosely structured 'controlled emergent narrative' within a virtual reconstruction of 18th century Colonial Williamsburg. The seven player characters can interact with each other as they attempt to achieve their personalised goals for the day and must engage in dozens of interactions with other players and

artificially intelligent computer controlled characters. Variables defining race, class and political affiliation constrain the interactional possibilities between any two characters. In effect, Revolution constitutes an ambitious attempt to model a complex social system that helps students imagine what it may have been like to live in Colonial Williamsburg prior to the outbreak of the American War of Independence.



The virtual inhabitants of colonial Williamsburg meet to discuss what should be done following allegations that the Governor confiscated gun powder.

The game was modified from the commercially available online role playing game *Neverwinter Nights*. This dramatically reduced production costs and allowed for rapid prototyping of an educational game that exhibited the graphical richness, interactive complexity and multiplayer support afforded by state of the art commercially available role playing games. However, in the modified version, neither the accumulation of experience points nor victory in combat is important, rather players follow individualised goals such as collecting signatures for a petition or making rifle buts for the militia. This requires players to meet and talk to dozens of non player characters. In short, players learn through the experience of participating in an immersive 'cyberdrama' (Murray, 1997). In this respect, Revolution is more like a simulation and might more accurately be described as a 'gamesim' (de Freitas, 2005, forthcoming; de Freitas & Levene, 2004).

The game was set up to run on networked computers in MIT's Teacher Education Lab and was used in five 3 ½ hour workshops with four groups from the Massachusetts home school community and one group from a local high school. I was chiefly interested in the potential to use virtual role play, as part of a scheme of work, to explore social-historical issues. The task was approached according to the logic of a 'Design Experiment' (A. Brown, 1992; Cobb, Confrey, DiSessa, Lehrer, & Schauble, 2003; Collins, Joseph, & Bielaczyc, 2004; diSessa & Cobb, 2004; Barab & Squire, 2004).

**Developing a games based pedagogy based on the experience of virtual role play**

Learning the numerous controls required to play the game did not present a major problem for any students. Indeed many students mastered the complex interface effortlessly following an initial 35 minute training sequence accompanied by a 'learning the controls' photocopied handout. However, a major problem concerned how to make students critically reflect on the knowledge acquired through situated role play in a virtual environment that might otherwise remain tacit.

Recordings of the whole group teacher led discussion provided a primary data source that provided insights into the learning that had occurred through virtual role play. The game appeared to support an inclusive discussion grounded in the immediate 'designed experience' of virtual role play. Moreover, a student's ability to participate in discussion did not depend upon their ability to read and comprehend printed information in text books. Furthermore, as the pedagogy was not hard coded into the game world, as occurs in primitive play and test 'edutainment' products, the level of questioning could be adjusted flexibly to suit the needs and dynamics of particular groups. Since each student played a different character, each acquired a unique perspective on the days events. However, the teacher/researcher leading discussion needed to work hard to draw out the tacit knowledge and encourage students to reflect on the experience and guide them in a collaborative process of knowledge co-construction directed towards specific learning objectives. At times a rich and complex discussion emerged as successive students responded to a teacher led discussion about various topics such as class divisions, strategies of resistance and the predicament of the slaves in eighteenth century society. Nevertheless, several problems were also encountered.

At times the diversity of experiences afforded by the multiplayer game failed to provide a common frame of reference that would allow all to relate to a particular topic under discussion. It was clear that additional activities were required that might allow students to gain an insight into the experience of others participating in the same game. An activity was required that encouraged children to retell their personalised story, something that could be recorded and shared with the rest of the group to provide a common frame of reference. Initially, this took the form of a diary writing exercise. Later students used Windows Movie Maker to make machinima diaries. This involved students reworking screen shots captured from the game into a visual narrative and recording an audio voice-over that retold their personalised interpretation of the day's events from their character's point of view.
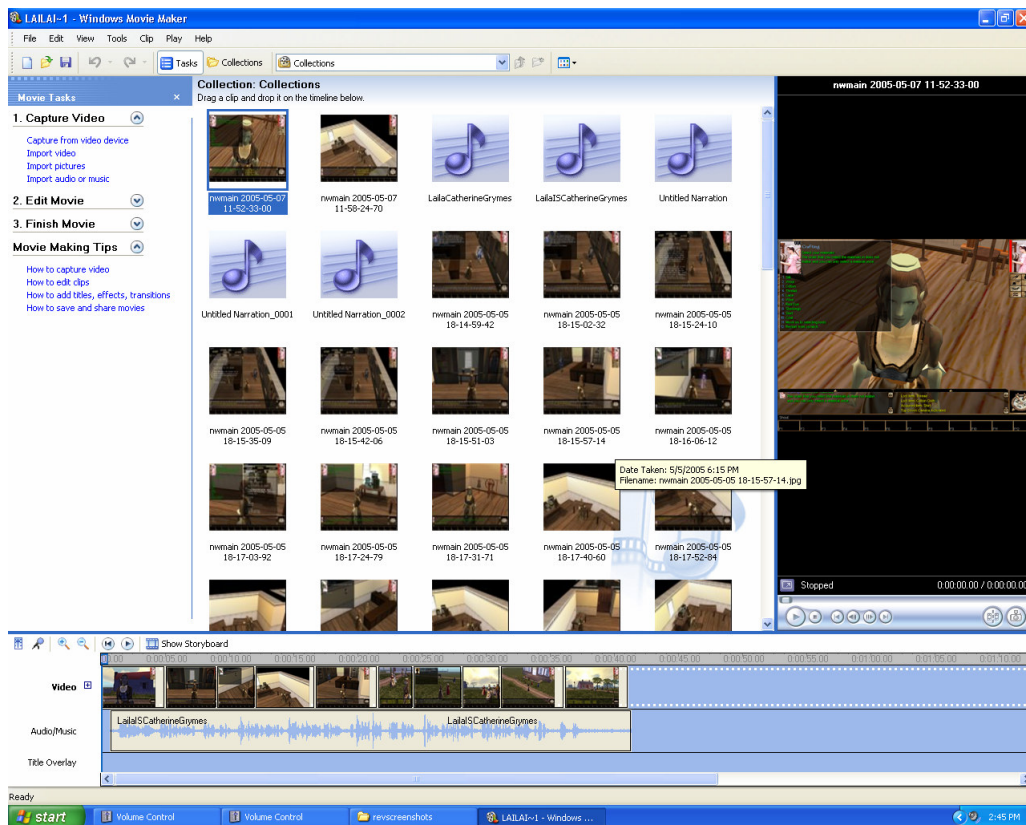


Screen shot of a machinima movie using digital data captured from Revolution in production (Sadia, 15 years)

These machinima diaries could be played back (in theory they could be broadcast over the web) to the whole group providing the basis for further comparative and reflective discussion. Four of these machinima diaries can be viewed at the education arcade website (www.educationarcade.org).

This pedagogical strategy offers a way into understanding history not possible with tradition media such as storybooks and film clips committed (by the physical constrains of the medium) to single linear narrative structure. Indeed, multiplayer role play in a virtual environment affords a way into understanding that for any single historical event there are multiple stories to be told; each of which may be invested with the interests of particular groups. One of the most interesting observations made in the workshops concerned the way students who played slave characters developed alternative perspectives on historical events. Ruth, a 13 year old Caucasian American girl playing Hannah (a virtual house slave), argued that the political dispute over taxation 'didn't really concern us because we wouldn't be getting freedom anyway - whether we fought or not because we were still going to be slaves'. However, she added. 'I've read that Britain would say that if slaves would join them they would give them freedom. And so I could see why they would, that's what concerns them really'.

Screen shot of Hannah over looking her kinsmen at work in the cotton fields of Steadmond Farm

In short, this medium appeared to afford opportunities to allow students, as young as 13 years old, to consider alternative and revisionist histories that challenged the dominant 'white republican' interpretations of the Revolutionary period. There is no reason why the game couldn't be used to stimulate discussion among university students. Indeed a demonstration of the game at Oxford University's Department of Educational Studies has sparked some high level discussions about historiography and the representation of groups whose voices may be marginalised by the unitary narrative structure of storybooks or motion pictures that tend to emphasise the agency of heroic individuals. Learning about history through virtual role play in this manner might also unsettle the assumption that history is made by the decisions of powerful politicians. In this respect, Revolution offers a new kind of medium that can introduce students to the relativistic notion that for any one historical period there may be plural or multiple histories.

**Abstracting the model of a games based pedagogy used in the Revolution workshops**

This brief account is used to suggest one way in which a game might be effectively used in a classroom contexts. To abstract and summarise, this theory of a games based pedagogy proposes a four fold model:

1. **Situated learning in a virtual environment.**

   Through situated role play within the virtual world students develop 'embodied empathy' for their virtual persona and gain a deep, but tacit, understanding of a web of social relationships whilst talking and interacting with dozens of player and non-player characters.

2. **Overt instruction and reflective discussion.**

   The teacher leads discussion or devises activities that encourages systematic analytic reflection of the knowledge acquired through situated role play. This stage enables students to consciously articulate knowledge that might otherwise remain tacit.

### 3. Practical media production.

Students are assigned a production task that requires the re-application of the knowledge they have acquired in steps 1 and 2. Each student designs and produces a video diary, recycling visual material they have captured during the game, in a manner the explores the political conflict from the point of view of a particular character.

### 4. Critical Framing.

Critically framing an interactive game text might require a pupil to question the representations embedded in the game world and consider how the 'bottom up' model of history implied by the game, as medium, might differ fundamentally from that implied by a textbook or by audio or film media that privileged particular perspectives. This is facilitated by the machinima diaries that allow students to recognise that the same events might be represented differently by those who played characters of a different race, gender, social position or political affiliation.

This model was in fact adapted from a more detailed model outlined in the New London Group's manifesto *A Pedagogy of Multiliteracies: Designs for Social Futures* manifesto (Group, 1996). It suggests how games might provide the 'situated practice' missing from many instructivist pedagogies, as a prequel to an exploration of abstract concepts and thematic concerns through teacher led discussion. It also emphasises the need to allow students to re-apply the knowledge acquired through practice and share their creative productions, drawing on the knowledge acquired through virtual role play with an authentic audience. A model bearing striking parallels has been proposed by Egenfeldt-Neilsen who builds on Kolb's theory of experiential learning (Kolb, 1984) .
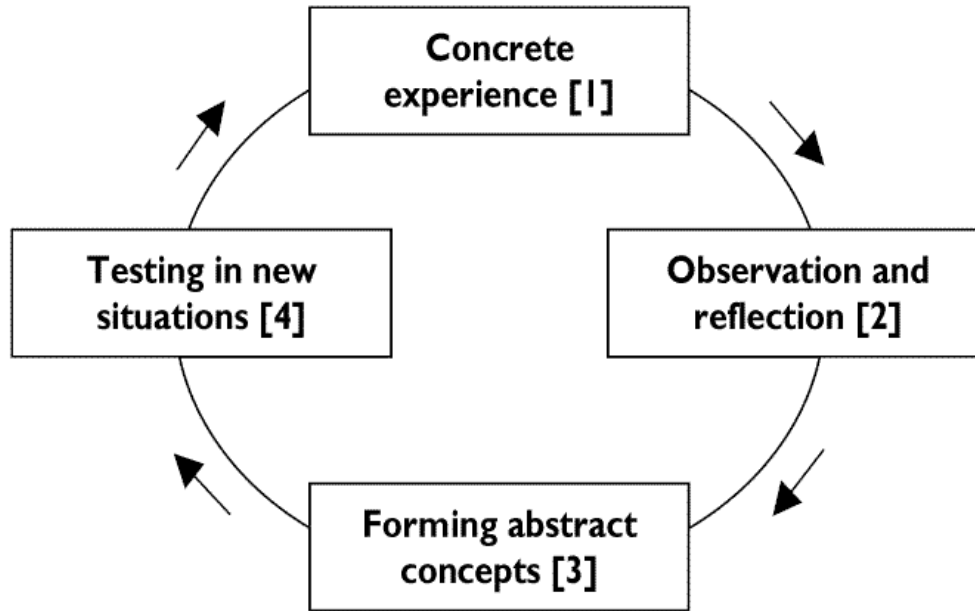
A simplified version of Kolb's experiential learning model.

Although Egenfeld Neilsen does not include 'constructionist' activities that require students to make something like a multimedia diary.

These models remain theoretical building blocks. I am not suggesting that they are the only models that might work to inform effective use of advanced games and simulations in educational settings. However, they can provide valuable conceptual tools for researchers and practitioners interested in using sophisticated open-ended games in educational contexts as part of constructivist pedagogies. My model adapts a more abstract model outlined by the New London Group in the light of an empirically grounded study. Kolb's model has been adapted by Egenfield-Nelsen (2005) to represent how learning mediated by *Europa Universalis II* might occur given an effective games based pedagogy that builds upon lessons learnt from his workshops. More abstract models might prove more transferable to different games and contexts. Less abstract models might prove more useful for practitioners. Both kinds are needed to inform our understanding of how games might most effectively be used in classroom contexts.

**Conclusion**

I would like to conclude by stressing that the design and development of innovative and imaginative learning environments remains important. A number of organisations such as MIT's Education Arcade, Nesta Futurelab, The London Knowledge Lab and The Serious Games movement are actively promoting innovate designs for 'educational' games. We cannot develop a theoretical understanding of the educational potential of video games without suitable designs (Holland, Jenkins, & Squire, 2003). However, I am also suggesting that the very notion of an 'educational game' is not entirely helpful and may in fact be holding back progress in this rapidly emerging field. What matters is the way the game is used as part of a wider sequence of activities. More action research or design experiments are required that push back our understanding of what an effective games based pedagogy might look like. These might involve commercially available games or purposively designed 'educational' games. What matters is whether this curious and still immature new media form can be used in interesting ways to promote ways of knowing not possible with existing media. Furthermore, educational researchers need to find or else help practitioners develop effective games based pedagogies that work in real world educational settings and then, drawing on the available data, attempt to theorise why these pedagogies may (or may not) work. In this way practice can inform theory which in turn might inform practice. Research that remains focussed exclusively on the medium of the game itself, or research that is solely preoccupied with the use of games in informal contexts can tell us nothing more about the potential of video games for education.

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**Links:**

http://www.educationarcade.org/

http://cms.mit.edu/games/education/research-vision.html

http://www.seriousgames.org/

http://www.caspianlearning.com/

http://www.nestafuturelab.org/

http://www.immersiveeducation.com/