The Higher Education of Gaming

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ABSTRACT New models of schooling are necessary as educational institutions attempt to transition into the digital age. This article is an ethnography of Apolyton University, an informal online university of gamers created to enhance pleasure from the game experience, teach the game, and improve upon the game’s standard rule set. It identifies the life trajectory of the community from formation to completion, and identifies key participant structures that scaffold learning. The article argues that participation results in a trajectory of experience whereby players enter as players but leave as designers, as evidenced by gameplay practices, as well as several participants being hired by game companies as a result of their participation. The authors argue that this sort of participatory ethos is central to learning systems in a digital age.

For decades, educational technologists have lamented that our educational system is built on an industrial model whereby schools are factories that process students into products by filling them with knowledge that can be measured with ‘scientific’ instruments (Reigeluth, 1995; Tyack & Cuban, 1995). The social values, politics, and epistemological assumptions underlying such a design have long been criticized by educators, particularly for the hidden curriculum that it imparts: students’ role in the classroom is to absorb whatever information teachers, committees of ‘experts’, or federal officials decide ought to be learned (Apple, 1995). Students’ experience of the system largely consists of receiving objectives, reading state-sanctioned materials, and completing routinized activities such as the worksheet, story problem, five-paragraph essay, or occasional book report – none of which appear again outside of school. Whether or not such a system ever worked is debatable, but with changes in global communications, media, and economy, critics from progressives to neo-liberals are questioning the viability of such a system for the twenty-first century (Papert, 1980; Reich, 1991; Bánáthy, 1992; Shaffer, 2004; Friedman, 2005; Squire, in press).

Not surprisingly, students’ attitudes toward school are at an all-time low and, for the first time in the history of the United States, a majority of students – even those succeeding in school – perceive it as worthwhile only for its exchange value (Lave, 1993; Baines & Stanley, 2003). The story for those who don’t do well in school is worse. Young males (particularly those from working-class or marginalized backgrounds) are not affiliating with schools (Smith & Wilhelm, 2002). Males now lag behind females in achievement in most academic areas, and are less likely to attend and complete college. Perhaps surprisingly, white males are the only demographic group with increasing drop-out rates (King, 2000; Horn et al, 2002). However, the issue with low-achieving males is most dramatic for African Americans; nearly two-thirds of the African Americans attending college are women. Jacob (2002) describes the problem of boys in secondary and post-secondary education as one of ‘non-cognitive’ skills; students (particularly males) lack the ability to pay attention in class, organize homework, and seek help from others. In short, they are a poor fit for the social organization of contemporary schools.

While formal schools perpetuate an industrial-age educational system, disruptive technologies such as computer and video games, the Internet, and mobile computers make possible new social forms of social organization for learning (Scardamalia & Bereiter, 1994; Lankshear & Knobel, 2003; Gee, 2004; Squire & Steinkuehler, 2005; Lankshear, 2007). Anyone with
an Internet connection can access online references (e.g. Wikipedia), communities of specialists in specific domains such as politics (e.g. Daily Kos), and libraries of scanned print materials (e.g. Google Print) – and increasingly participate in the production, legitimization, and dissemination of information (Squire, 2002; Jenkins, 2006; Lankshear & Knobel, 2006). Computer and video games give players designed experiences where they can lead civilizations, travel to foreign lands, or become international financiers (Squire, 2006). Studies of informal learning communities occurring on the Internet suggest that they function in a radically different way to traditional schools; they function as sites of collective intelligence, affinity spaces, or self-organizing learning systems that embody values of the new capitalist work order (Levin & Arafeh, 2002; Wiley & Edwards, 2002; Gee, 2003; Lankshear & Knobel, 2003; Jenkins, 2006; Steinkuehler, 2006). Is it surprising, given these realities, that our students seem more interested in their games than they are in schools? (Smith & Wilhelm, 2002; Gee, 2004).

Yet, just what an ‘educational system’ for the information age would look like is not clear. If the communities associated with these technologies tend to have distributed rather than centralized knowledge structures, and value expertise over credentialing and open knowledge sharing over closed knowledge structures, how will they be used given the current organization of schools? When classrooms and schools (on the local level) have adopted these technologies and associated curricular innovations, the particular technologies have been subsumed by existing school cultures rather than transforming them (Squire et al, 2003; Leander & Duncan, 2004; Leander & Loworn, 2006). Thus, to understand the future of education, it is critical not just to look at school-based interventions, but also to look at learning systems indigenous to the digital age. To paraphrase Seymour Papert, if you want to design an automobile, there is only so much you can learn from studying the horse and buggy. This article attempts to do just this through an ethnography of Apolyton University (AU), an online college of game players designed to usher players from the novice to expert level, which, along the way, positions them as content producers, something that we contend is a core feature of digital learning environments in the twenty-first century.

We argue that a core intellectual feature of a twenty-first-century educational system should include inroads into participation in cultures of simulation (Starr, 1994; Turkle, 1995). Starr (1994) argues that simulations – the process of setting up scenarios and exploring under what conditions they might work – are at the core of business, government, science, and entertainment, and video games are the public’s primary exposure to this important way of thinking. As the number of new literacy studies (and particularly game studies) grows, it is critical to understand how learning occurs with interactive media in ‘indigenous’ settings. A few studies have examined how learning occurs through gameplay as primarily computer-machine interaction (Gee, 2004; Squire, 2004, in press; Davidson, 2005); from a sociocultural learning theory perspective, studies of gaming cultures are somewhat slower to develop (as an example, see Steinkuehler, 2006).

This study seeks to understand how self-organizing online communities for learning function through a cognitive ethnography of AU. AU is an online learning community of game players dedicated to improving their understanding of the computer game Civilization III. Civilization III is a world history simulation game (played on realistic or fictitious maps) where players lead a civilization from 4000bc to 2000ad. Although players receive no credits for participating in AU, they create and participate in dozens of courses with the intended purpose of teaching new strategies, countering for inadequacies in the game’s artificial intelligence (AI), and expanding their understanding of the game. This study investigates three interrelated research questions: (a) What are the participant structures that emerge at AU? (b) What are the consequences of participation, or what learning occurs through participation in AU? and (c) What is the life cycle of such self-organizing learning systems? Understanding how game-based learning communities function might not only contribute to our understandings of educational systems, but also to theoretical issues central to game studies, including what constitutes highly developed game literacy.
Interactive Learning: education in a knowledge-based information-communication age

Immersive interactive technologies – or ‘video games’ – have emerged as a powerful social, technological, and cultural force (Squire, 2002). Not only do games push the boundaries of interactivity, consumer-grade simulation, AI, and virtual-world design, but they also initiate students into practices, literacies, and cultures central to the information age (Gee, 2003). And, as surveys by Beck & Wade (2004) show, participation in games cultures is promulgating cultural values such as an increased appetite for risk, a valuing of expertise over formal credentialing, and entrepreneurialship; values and dispositions that align closely with those of the new capitalist work order but are at odds with those of formal schooling (Gee et al, 1996; Beck & Wade, 2004).

It is ironic that games have had little impact on education as they embody powerful principles of learning (Gee, 2003). Games ‘teach’ concepts by immersing players in experiences where knowledge is useful, modeling expert problem solving, calling attention to key features of the problem through cues, and structuring problems so that the player builds on previous understandings, which are all features of powerful learning environments (Bransford et al, 2000; Gee, 2003). Crucially, games do not let players do whatever they want, but recruit a particular way of thinking through the careful construction of tutorials, scenarios, and rules (Gee, 2004). After 40 hours, game players learn not only new vocabulary and concepts, but also to adopt a particular set of values; to see the game world in a particular way. Already the United States Army and corporations such as Chrysler use the medium for communicating ideologies. However, mainstream educators have been slower to respond (Squire, in press).

Interactive Learning Systems

Lemke (1998) develops the notion of the interactive learning paradigm to describe the framework for learning in the information-age society. Contrasted with the curricular paradigm, where learning objectives are determined by specialists and curricula implemented by teachers, the interactive learning paradigm assumes that people determine what they need to know based on their participation in activities in which such needs arise, and in consultation with knowledgeable specialists; that they learn in the order that suits them, and a comfortable pace, and just in time to make use of what they learn. This is the learning paradigm of the people who created the Internet and cyberspace. It is the paradigm of access to information, rather than imposition of learning. It is the paradigm of how people with power and resources choose to learn. Its end results are generally satisfying to the learner, and usually for business or scholarship. It is perhaps also the paradigm of fast capitalism. (Lemke, 1998, p. 294)

A core feature of this information age – and an important location where technology, learning, and contemporary culture intersect – is video games (Gee, 2003; Squire, in press). Digital gaming, the entertainment medium and subcultures indigenous to the computer may be quintessential sites for studying how such a paradigm emerges and functions, particularly because of the centrality they place on digital tools such as (1) simulations to think within, (2) tools to think with, (3) cultural spaces to create and inhabit, and (4) media for personal expression (Gee, 2003; Squire, 2003; Jenkins, 2006; Shaffer & Clinton, 2006; Steinkuehler, 2006).

Cultures of Simulation

The growth of gaming in government, business, and now education is part of a broader phenomenon, which Starr (1994) and Turkle (1995) (drawing from Baudrillard) call a culture of simulation. In science, many fields operate less like the classic high-school textbook process of hypothesis testing and more by a process of gathering data, using digital tools to build models and simulations, and then refining scientific theories (Casti, 1997; Feurzeig & Roberts, 1999; Wolfram, 2002). In public policy, issues such as social security are debated not through hypothesis testing and experiments, but through building sophisticated models and simulations of economic systems, so that literacy requires an understanding of how such models are developed and how they can be
The Higher Education of Gaming

manipulated by changing initial conditions or the parameters of the simulation. Models and simulations are equally central to business, where spreadsheets are used to forecast scenarios and test ideas in virtual worlds before they are tried in the real one.

In examining SimCity from a policy standpoint, Paul Starr (1994) argues that the real importance of games in education is not their ability to teach facts or improve learning according to a fixed set of objectives, but rather their ability to help develop new digital literacies. Starr writes:

Moreover, as computer games become more elaborate and widely used, their sheer multiplication and increasing plasticity may promote a healthy skepticism about their predictive power. Playing with simulation is one way to see its limits as well as its possibilities. ... For better or worse, simulation is no mere fad. Indeed, to think of simulation games as mere entertainment or even as teaching tools is to underestimate them. They represent a major addition to the intellectual repertoire that will increasingly shape how we communicate ideas and think through problems ... We shall be working and thinking in SimCity for a long time.

It is not yet well specified just what this *culture of simulation* is. Perhaps due to the rise of the Internet and the concurrent shift to sociocultural models of learning (cf. Kim, 2000; Turkle, 2003; Barab & Roth, 2006), notions of simulation briefly took a back seat to theories of virtual communities for learning in educational technology in the late 1990s. The popularization of video games in academia and popular culture, combined with the capacity of games for placing learners in collaborative problem-solving spaces, has recently pushed them back to the forefront as spaces to be investigated for the future of online learning environments (Steinkuehler, 2006, 2008).

The distinction between video games and simulations is increasingly blurred. Games such as *Flight Simulator*, *Full Spectrum Warrior*, or *America’s Army* are simulations of real-world practices and are routinely treated as such for the purposes of training. Indeed, the classic textbook definition of simulations and games – simulations are symbolic representations of a system, whereas games are playing by a set of rules for the purposes of entertainment – are not mutually exclusive in any way. One can take a game such as *Doom*, which on the surface is not a simulation of anything in particular, and use it as a metaphor for corporate life – perhaps as part of a training session where office managers play through a level and compare the basic game mechanics with their corporate rule structure.

These examples suggest how simulations can be considered by their levels of fidelity to the systems that they represent. Thiagarajan (1998) distinguishes between high- and low-fidelity simulations; low-fidelity simulations, which are commonly called idea simulations, seek to illustrate a few relationships by simplifying complex situations to a few key variables. The most common example of an idea simulation might be a very simple predator–prey simulation, such as one that models how an increased number of predators (such as foxes) would affect a population of prey (such as rabbits). Such simulations are used to show counter-intuitive properties of systems, such as how an increase in predators will eventually set the system out of balance, causing wild fluctuations in populations, if not extinction of both the predator and the prey.

High-fidelity simulations are those that attempt to model the real world to a point where they have predictive power over how the world behaves. The classic example might be a flight simulator, where one assumes that adjusting the pitch of the aircraft will have the same results in the simulation as one would find in an actual airplane. In complex conceptual domains, such as the understanding of world history, predictive simulations are not only impossible to create, but may not be educationally valuable if they did exist; the problem, which has been called the 1:1 mapping problem is this: a perfectly detailed map where one mile equals one mile does not serve to make any relationships clearer. A perfect representation of history would include so many variables that it would do little to help discern key relationships.

Within the simulation literature, it is believed that explanatory models and simulations that fall in-between these two levels of fidelity are the most desirable for educational purposes. Explanatory models are strategically designed to capture the key necessary variables to understand a particular phenomenon, yet not completely predict future behaviors (Brown, 1994). In the case of *Civilization III*, it contains enough data and simulated systems to explain the processes by which civilizations flourish and fade over thousands of years, but would not necessarily predict what would happen to the United States in the year 2050 given current conditions. Educators using models and simulations also stress the importance of detailing the *purposes* behind a model. As
simplifications of reality, models leave out key data; in the case of Civilization III, it is a poor simulation for investigating cultural processes, and does relatively little to explain the particulars of any civilization (such as Egypt or Rome).

Educators have drawn important distinctions between students learning with a pre-made model and students learning through the modeling process. Researchers have argued that engaging students in the modeling process, which involves asking questions, gathering data, building representations (models), interrogating those models, collecting more data, and then reflecting and building arguments based on those models, is the goal of modeling, not necessarily simply using a model to build more robust understandings (Resnick et al, 1996; Feurzeig & Roberts, 1999; Barab et al, 2000). Certainly there is value in these approaches, not just for the robust conceptual understandings they produce, but also because using the modeling process as the core classroom activity is to do science; thus, there is an inherent value to having students learn through modeling (Colella et al, 2001). At the same time, even proponents of modeling-based curricula have noted that learning through most modeling curricula involves learning complex software programming techniques, which frequently requires so much energy learning to use the tool that students have little opportunity to do much with it.

Digital games offer an intriguing hybrid space between learning with a model and learning through modeling. As interactive systems, games provide worlds that players can explore and inhabit, creating an interesting hybrid space that is not merely ‘learning with a simulation’ and not entirely designing a simulation. Crucially, games do not set a fixed path of activities that players must accomplish, but rather set up possibility spaces whereby players can create goals and devise creative solutions to those goals (Wright, 2001; LeBlanc, 2005; Squire, 2006). As such, when we play a game such as Civilization III, a primary pleasure is being a part of the game system (Friedman, 1999). As a result, we develop what Gee (2004) calls an ‘embodied empathy’ for the game system; a pathos for what it is like to participate in that system and a sense of how the system operates. In other words, games are as complex (or more so) as many explanatory models, and they tend to produce sophisticated understandings of the game as a model. However, a question for educators is how to usher students from being casual players of games to sophisticated experts who display a design-level understanding of the simulation. Previous studies have suggested that simulation games can be a powerful medium for learning, but a significant investment of intellectual resources is required to learn to play them (although certainly less than most programming languages). The social values of contemporary curricula, which Lemke criticizes as being organized around a metaphor of social control as opposed to personal exploration, further challenge game-based educators as game-based curricula frequently result in divergent learning outcomes.

Education within an Interactive Age

A key question for educators is how to design interactive learning systems that are appropriate to the information age and contain the kinds of learning (self-directed, personally meaningful, and full of deep conceptual understandings) that Lemke advocates. The goal of such an interactive learning system might be a highly motivated learner who can ask good questions, marshal resources to answer them, and use media to express these understandings (New London Group, 2000). One avenue for educators interested in designing such systems might be to examine naturally occurring ones. Indeed, Internet researchers are beginning to identify examples of such spaces for learning spontaneously forming online (cf. Black, 2005; Lam, 2006; Steinkuehler, 2008). Yet, we are only beginning to understand how they form, flourish, evolve, and expire (or mutate).

Examining the web resources around Age of Empires, a popular historical strategy game, Gee (2004) developed the term affinity spaces to capture how learning in the interactive age is frequently organized around attracting activities (such as gaming) as opposed to geographical proximity, social status, race, or class. Certainly, race, gender, and class are mobilized and enacted through such communities; however, in the affinity spaces examined to date, the primary entrance requirements are knowledge, skill, and curiosity about the affinity space. Gee intentionally avoids the term community of practice, arguing that many online spaces, such as the ones occurring around gaming, have less intense social interactions, a higher number of lurkers, and generally less formally
expressed rules and hierarchies than the canonical examples of communities of practice described in the research literature (cf. Lave & Wenger, 1991). In comparison to communities of practice, affinity spaces have much more relaxed requirements for participation, less codified roles, and more permeable boundaries between participants and non-participants.

A key element of such affinity spaces is that they are created and sustained by learners themselves, affording opportunities for learners to design their own contexts for learning. Any motivated, curious user can set up a blog, wiki, or podcast around a topic, and endeavor to create a learning community around an area of interest. As Lemke (1998) notes, the Internet itself was created through such distributed communities as groups of researchers gathered to pursue questions of intellectual interest. Digital literacy, then, from this perspective, involves not just learning to make meaning with digital media, but also knowing how to leverage and even create social networks to further one’s learning. In many respects, education in an interactive age might be thought of as realizing the goal of progressives, in that education is no longer preparation for life, but is life.

To date, most projects seeking to build communities in the service of virtual learning (particularly around digital games or game activities) have employed design-based research methodologies to explore new pedagogies with digital media with little sustained examination of existing online communities (or affinity spaces). Recently, Internet researchers have begun to examine how such affinity spaces operate as spaces for learning. Rebecca Black (2005) has begun to investigate the function of fanfiction communities as spaces to further writers’ identities as authors of fanfiction, focusing particularly on the literacy practices that participants engage in which further their development as authors. Black notes that fanfiction sites (perhaps necessarily) exist outside of the confines of school, drawing on their fans’ cultural resources, personal identities, and interests, and serving as sites where participants can develop identities as competent fanfiction writers within a supportive, yet critical, community.

Steinkuehler’s (2006) ethnography of Lineage II players suggests the many functions that massively multiplayer online games play. They are worlds that players create for one another as sites for retribalization; they are third spaces where players socialize in spaces that are neither work nor home; and they allow players to explore identities less organized by their geographical location, social class, or ethnicity. Online games as cultural spaces certainly have their ideologies; as Steinkuehler argues, the cultural space of Lineage II (as one example) is organized around meritocratic principles. Steinkuehler shows how, through joint collaborative activities, players mentor one another not just in how to play the game, but also in how to become particular kinds of players who adopt particular values and stances toward the (game) world. As players form guilds, they create lasting social structures with deeper trajectories for participation. Steinkuehler argues that these function as new kinds of literacy spaces where text is used (often but a few lines of text at a time) to forge new identities and social relationships hitherto unavailable.

Research Context: Apolyton University

This study seeks to add to the growing work on games and game cultures by providing an ethnographic account of an online community of high-performing game players around the turn-based simulation/strategy game Civilization III. The particular community studied here, Apolyton University, is a self-organizing group of players developing their own courses, curricula, and instructional activities to better understand the game Civilization III. This study seeks to document how such communities form and function, as well as use players’ experiences to theorize the nature of expert gaming expertise, particularly how players draw upon it to think about history and current events. Specifically, we are investigating the following questions:

(1) How do such communities form, evolve, and expire?
(2) What participant structures evolve, and how do they contribute to learning?
(3) What kinds of learning occur through participation in such communities?
(4) How do participants think of the game as a world history simulation?

Understanding how AU functions and what understandings develop through participation in it might help us design better learning environments.
Civilization III as Historical Simulation

Civilization III is the third installment of the Civilization series, designed by legendary game designer Sid Meier and heralded as perhaps the most important strategy series in computer gaming. Players lead their band of people from the dawn of civilizations (4000bc) to the present day (roughly 2050ad). The gameplay consists of examining geographical resources to determine where to locate cities, prioritizing technology research, deciding what types of improvements to build in cities, and negotiating with other civilizations. As a result, players wrestle with choices such as emphasizing military technology over domestic services (guns vs. butter), whether to participate in alliances or remain isolated, and how best to manage their resources. The gameplay is notoriously complex. The game model contains thousands of variables, the interface contains several strands of complex information, and mastery over the game takes hundreds of hours of play.

Although Civilization III was not designed for educational purposes, many educators have discussed its pedagogical potentials. On the surface level, Civilization III contains hundreds of concepts, names, and figures that students must become familiar with simply to play the game. The 256-page Civlopedia embedded within the game reads as a glossary for a high school or college textbook, introducing the player to concepts such as monarchy, monotheism, or Leonardo da Vinci. The custom maps included in the game not only represent the Earth’s physical geography, but also an embedded argument for how physical and cultural features co-evolve. As players make choices, they are forced to ‘deal’ with the realities of the simulation: cities grow more quickly in river valleys, civilizations with complex trade networks grow richer and develop technology more quickly, and focusing on military production to the exclusion of social services leads to a decline in civic happiness, cultural growth, expansion, and technological development. As players wrestle with choices within the game, they develop narratives of their play that can be the basis for understanding historical and global events. Perhaps most importantly, the tacit message behind Civilization III (the message behind the medium) is that of historical malleability. Our current global conditions are not the result of an inevitable unfolding of events, but the result of human actions within guiding rules and constraints; rules that can be modeled and understood.

Thus, Civilization III makes an intriguing site for study because it is taking a common phenomenon (world history) that we typically understand through narratives but dealing with it as a simulation. Indeed, although historical modeling and simulation is a young field at the cutting edge of historical research (cf. Staley, 2003), it is an experience that millions of children and adults are being exposed to via Civilization. Much as Paul Starr (1994) mused about the consequences of millions of children growing up playing SimCity, we might wonder what the long-term consequences are for the study of history when millions of children are exposed to world history primarily through simulation. To date, there have been no studies of this phenomenon. Scholars such as Sherry Turkle (2003) have interviewed children playing SimCity, expressing concern that they develop simplistic causal models for how cities operate. What has not been studied is how developed (or expert) gamers conceptualize the game system, particularly within interpretive communities in which their understandings are negotiated. From a sociocultural perspective, we might anticipate that it is within these communities that norms are developed and realized, meanings negotiated, and perspectives legitimimized.

Apolyton University as Self-organizing Learning Community

In the spring of 2004, while working on research using Civilization III in after-school programs, we were introduced to Apolyton University, an online community of game players dedicated to improving their collective Civilization playing skills.[1] AU is a subset of http://Apolyton.net, one of the largest online affinity spaces for Civilization players. As one founding member describes it:

Apolyton University is a school of strategy, where students sharpen their Civ3 [Civilization III] skills and share their experiences in a series of thematic games. When playing an Apolyton University game, gaining and sharing knowledge is more important than getting a high score, or even winning the game. Participants are encouraged to share their strategy after the game, and even to try several attempts. (http://apolyton.net/dir/index.php?cat=5&t=sub_pages)
This description captures several key features of AU that both characterize it as a learning community and set it apart from traditional schooling. First, the core activities are defined as **sharpening skills** and **sharing experiences**, as opposed to mastering a particular body of content or fulfilling a set of requirements. Second, **gaining and sharing knowledge** is more important than high scores. Not only are high scores (e.g. grades) less important than learning, but sharing knowledge is privileged. Participants are assumed to be valued producers of knowledge, and opportunities to share what one has learned are seen as a vital, integral part of learning. Last, experimentation and mastery are valued over getting it right the first time. No one here cares how long or how many attempts it takes to solve a problem. Learning, not regulation, is the goal.

AU, as of this writing, consisted of six initial ‘group mini games’, which are introductions to the community, and 23 ‘courses’, designed, developed, and posted by members (see Figure 1). In each course, players download a custom game file, which they play through at their own pace. Players then take notes and post their strategies throughout the game, which range from a paragraph to a few pages in length, with screenshots (see Figure 2). These notes become the basis for discussion, with players analyzing one another’s games and commenting on themes cutting across games. This practice of taking and posting notes evolved into what the community calls ‘during action reports’ (DARs) – reports that players post every 40 turns so as to break the game into more manageable chunks. In sum, the community consisted of 19,302 posts by 74 registered members with perhaps another 100 lurkers (estimated through analyses of ‘reads’ per post). Participants monitored the forums fairly closely; we calculated the median response time for feedback on a post to be between two and five hours.

![Figure 1. List of Apolyton University courses.](image)
Methodology

This study uses cognitive ethnographic and historical methods to understand the processes by which AU functions. Two participant observers enrolled in a minimum of 10 courses each (with each course taking approximately 10 hours to complete). At the time of this research, participation in AU had stopped growing. There were no new courses during the research, and we were unable to identify more than seven new members, although some existing members were enrolling in new courses or commenting on the work of other students.

Data Sources

Observations. A primary source of data were field notes and reflections made by each participant while enrolled in the courses (some of which were posted as comments within the community). Together, the researchers read roughly half of the 19,302 forum posts. We identified: (1) the formal and informal participant structures that had evolved in AU (which included founders, deans, course developers, students, ‘graduates’, and lurkers); (2) what tools, resources, and outside sources the community used; (3) the development of new technical terms in the community (i.e. ‘REXing’); (4) emergent formal and informal community norms and beliefs; (5) occasions where the normal functioning of the community broke down; and (6) examples where understandings of history, geography, and current events were used to inform gameplay and where gameplay remediated players’ understandings of history, geography, and current events. Consistent with Hutchins (1996), we were particularly interested in examining how cognitive functions were stretched across roles, practices, and resources in the community.


Interviews. We posted a request for interview participants to the website, and interviewed eight participants via email and Instant Messenger. Questions ranged from queries about participants’ reasons for playing (and enjoying) Civilization (When did you start playing Civilization? How did you get started?) to their participation in AU (How did you get started with Apolyton University?), to their gaming practices (Have you ever built a mod for Civilization III?), to questions about their enjoyment of history and political orientation (Do you enjoy reading about history? What do you think about the United States’ war in Iraq?). These interviews also included open-ended questions designed to elicit whether there were any aspects of the community life or particular forum threads that the participants believed the researchers should attend to. The purposive sampling of participants was designed to illuminate the research questions, and was selected to represent both the diversity of participants in AU (by age, gender, nationality, and orientation toward the game) and the central participants in the community. Further in-depth interviews were conducted with two key informants.

Document analysis. The researchers examined key documents in the community, particularly threaded discussions on the history of the community and its purpose or future activities. The most popular threads were also analyzed, as well as a representative sampling of course threads. The researchers examined both series of courses (e.g. the glory of culture) and unique courses (e.g. the one-city challenge). Using discourse analysis techniques (cf. Gee, 1996), the researchers investigated how knowledge was built and consensus developed, and how power and status were conferred and participants’ identities constructed. The researchers analyzed the data, looking for emerging themes. Using the constant comparative method (Glaser & Strauss, 1967), the researchers developed themes, sought supporting or contradicting data, and refined the findings in response to these data. These themes included: (1) the self-organizing emergence of the community in response to players’ goals; (2) DARs as cognitive apprenticeships; (3) Civilization III as a historical playspace; (4) Civilization III as a global historical gaming community, including themes of global and military conflict; (5) the transition from user to designer; and (6) fuzzy community boundaries and trajectories of participation outside the community.

As a part of this analysis, the researchers developed a narrative history of the life of the community. We synthesized participants’ posts, interview responses, and quantitative analyses of posts to build a historical narrative account (described here) of the general formation and evolution of community life.

Quantitative analysis. The number of posts for the entire Apolyton community was calculated by summing the number of posts from each discussion thread from the beginning of Apolyton’s Civilization III site in the fall of 2002 to the spring of 2005 (posts) (see Table I).

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</table>

Table I. Average posts, views, and views per post.

The number of viewings per post was calculated for each discussion thread (views). The number of posts per view was then calculated. To chart the number of posts and views over time, posts and views were totaled for discussion threads in each six-month time period (fall 2002, spring 2003, fall 2003, etc.). The Apolyton site lists each discussion thread by the time of the latest post, meaning that the threads with the most recent postings are listed first. As a result, summing posts, views, and views per post tended to underestimate the number of posts early on and overestimate posts.
later on. For any large discussion threads (200 or more messages), posts were separated into the appropriate period. To adjust for the remaining discussion threads, 10% of posts were subtracted from each six-month period and added to the previous period. The same adjustment was done for the number of views. The number of views per post was calculated by dividing the adjusted posts by the adjusted views.

Three of the Apolyton classes were chosen with a purposive sampling technique, selecting one early course, one middle course, and one later course. Each course consisted of several DAR discussion threads. Within each DAR, the number of posts was tallied and the posts were categorized as ‘during action reports’, ‘responses’, ‘questions’, ‘answers’, and ‘others’. The amount of time between a post and the first response/comment directly to it was tallied for each response within six of these DAR discussion threads. Median response times (RT) were calculated in hours for each type of response within each category. A weighted average of these medians was then taken to calculate an ‘overall median response time’ for each category (see Table II).

<table>
<thead>
<tr>
<th>Median response times</th>
<th>All</th>
<th>DARs</th>
<th>Questions</th>
<th>Answers</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2.42</td>
<td>6.07</td>
<td>2.48</td>
<td>1.58</td>
<td>2.55</td>
</tr>
<tr>
<td>Percentage of posts with a response</td>
<td>44%</td>
<td>36%</td>
<td>95%</td>
<td>33%</td>
<td>44%</td>
</tr>
</tbody>
</table>

Table II. Categories of posts and response rates.

Approximately half of the posts did not receive a direct response, but 95% of direct questions did in about two and a half hours. In short, if a participant posted a DAR, he or she could expect a response about one-third of the time, and usually within six hours.

**Results: a self-organizing community developing players into designers**

For educators, many of whom struggle to get meaningful interaction online and even question if ‘real’ learning can happen online, the idea of a self-organizing university replete with its own deans, courses, and formal procedures may seem curious. However, this study suggests that such learning is not only possible, but is also perhaps facilitated through the affordances of the Internet. AU started as a group of players who enjoyed playing mini games together (where each player played the same saved game file) and had an interest in simultaneously sharpening their skills while improving the ‘standard’ game file. Experienced Civilization players had identified several exploitable loopholes in the game system and ‘weaknesses’ in the AI, and sought collectively to improve the standard game. The following forum post (taken from the thread initiating AU) illuminates the thinking of one key founder:

I would like to propose a new group effort.

For several reasons I want to get a lot sharper at CivIII. First, I just enjoy it. Second, I’ve really liked some of the tourney and tournament discussions, have learned a bunch, and have been waay impressed by some of the strategies and tactics employed. Third, MP [multiplayer gaming, or the ability to play against real-life, non-computer opponents] is coming and while I never participate in MP that way, I intend to this time around.

Also, although I still enjoy playing the stock game, it definitely could be more of a challenge.

So what I want is a combination boot camp and war college leveraging a varied group of players and a variety of techniques, to polish collective skills.

…

We should do experiments, like Aeson’s iceberg, Arrian’s UP™, Sir Ralph’s effort to create WWIII, etc…

…
I also think it will be useful to start developing a more advanced lexicon for strategies, tactics, and exploits. We've been doing that informally, but it will make life a lot easier for new players.

Several key themes common across most participants are illustrated here. First, the community is being formed out of a desire to learn (sharpen skills). While this fact may seem trivial, it is critical to note that from its inception, AU was driven by a desire for learning, and throughout its life (and death) was fueled by participants’ desire to learn. For AU participants, this desire to learn is enjoyable, relates to particular goals (e.g. becoming better at the multiplayer game), stems from a desire for challenge, and, critically, requires a community for both enculturation into specific practices and engaging in new forms of inquiry.

There are obvious contrasts between the motivations behind AU and those found in most formal learning environments. First, learning is assumed here to be enjoyable (as opposed to being something students are coerced to do), and specific structures (courses, groupings of people) exist to support this learning. Second, learning activities flow directly from users’ goals. In very few schools do we ask children what they want to learn; rather, curricular objectives are the role of outside experts (or, increasingly, the federal government or corporate test makers and curriculum publishers). There is a stated need for experimentation, suggesting that learning systems ought to occur to push collective understandings. The poster identifies a lack of advanced terminology and concepts which serve not only as concepts and tools, but also as a way of sharing thoughts with newcomers to the community. Most of these concepts are rooted in specific practice and, even within the community, still tied to the person or events from which they sprung (such as Ralph’s WWIII efforts). A more formalized learning group serves to enhance the production of these formalized tools for the community and newcomers.

Last, unlike much progressive pedagogy, there is a recognition that challenge is critical to learning, and communities of experts are needed for the dual roles of enculturation and new discovery. Few progressives have described ideal educational systems as boot-camp-like experiences, which, if we can temporarily place the war metaphor aside, suggests an intense enculturation into a specific way of seeing and doing things which, when combined with a war-college-type research focus, produces deep understandings. Critically, the poster seems to recognize that his own knowledge and skill is dependent upon having a community in which they can be developed, commenting that the goal is to polish collective skills. As such, the poster is expressing a desire for what Lévy (2001) might call a site of collective intelligence; a community in which no one gamer is expert, but rather, as a whole, the community develops a sense of expertise. As educators, what might be most interesting about this goal is the poster’s recognition that for his own skills (and expertise as part of a distributed system) to improve, he needs to seek out (and even create) sites where this intelligence can exist.

**Forming Apolyton University**

The first formal discussions about creating AU began in the summer of 2002, about a year after the game’s release. A few months later, the mini games began. Theseus suggested the ‘group effort’ to build a site of collective intelligence, which within about a week generated enough collective interest and began to take shape, enough that Theseus proposed an organized system of courses which would be called Apolyton University. Midway through the threaded discussion, Civilization III’s AI programmer Soren Johnson posted to clarify a misunderstanding of terminology in how the game’s AI functions, tacitly showing his support for the effort. He then ‘threadjacked’ the discussion by challenging the community to decipher the algorithm determining a triggered event in the game (barbarian uprisings). About 75 posts followed within the next week, with players running experiments in game scrambling to determine what combination of events triggered the uprisings. Several side topics spun off – including the origin of the word ‘barbarian’, with Cyberhune (who is German) and Hagen (who is Hungarian) explaining the historical roots of the term. Finally, after a week of activity, Soren declared DeepO, a German Ph.D. student and former AI programmer, the victor, as he had most closely deciphered the pattern.[2]

Over the next two years, AU formed, evolved, and eventually died out. Figure 3 shows a general historical timeline of events in AU, beginning with the release of Civilization III (although one could trace back AU further to the inception of the Apolyton forums in 1998). Participants
began by posting potential topics, courses, and ideas, which quickly became fleshed out into a curriculum. The central practice of developing a scenario to illustrate particular concepts emerged as a key practice in each course. After the first few courses, curriculum designers identified the need for course introduction threads – where the purposes, challenges, and notes on a game concept were described – and ‘spoiler’ threads – where players could debate and discuss strategies without worrying about ‘spoiling’ learning for other players.

This tension between ‘sharing information’ and ‘spoiling’ learning for others is key to AU and self-organizing learning systems in general. As designers of learning systems, players realize that to give away key pieces of information can spoil the experimentation and wrestling with ideas and strategies that is learning. At the same time, there is a need for experienced players to develop knowledge collaboratively. In contrast to most educational systems, no one here worried that making the ‘answers’ available would inherently spoil learning; rather, the belief was that this discussion should be constantly available, and should not impede learning. Participants believed that other learners could decide for themselves when they ought to consult the spoilers. It is critical for educators to note the different model of learning going on here (much like games in general). Cheats, walk-throughs, spoilers, and, in general, the ‘answers’ are omnipresent for gamers, and, indeed, anyone able to search the Internet. Players – and here learners – realize that the ‘answers’ are resources used to facilitate understanding, rather than the ‘point’ of learning in the first place.

As courses and posts quickly piled up, the community decided to form a committee (much like a curriculum committee) to oversee courses. The committee’s role was to review submissions for courses (after all, any random person could post to the forums and create a course), identify areas where more courses were needed, build community metaknowledge about the practice of developing courses, and, most importantly, review which changes ought to go into the ‘official’ game mod. As the community designed experiments and learned from one another’s play, they continuously developed and refined their mod to include revisions suggested by the community, which ranged from minor tweaks to the ‘cost’ of technological improvements (such as gunpowder), to series of implementations designed to make up for weaknesses in the AI (such as

Figure 3. Timeline of Apolyton University.
the AI’s lack of appreciation for the value of oceanic exploration). Using threaded discussion forums, participants can argue for making changes to the stock file, drawing on collective experiences across courses as evidence for making the proposed changes. Most often, these tweaks were made on the basis of balancing the gameplay and making up for inadequacies in the AI, rather than creating historical fidelity.

We might contrast this process of creating content and maintaining a curriculum to those occurring in most formal learning environments. Whereas in schools we have increasingly centralized curricular decision making, curricular decision making at AU is entirely open – both in terms of who can participate and of reporting how the curriculum is determined. Students/players are encouraged to post courses, ideas for courses, criticisms on courses, and suggestions to the ‘canon’. This is not to say that expertise is devalued; rather, expertise is recognized through direct participation in joint practice. This is also not to say that status is entirely irrelevant; clearly a participant such as Soren Johnson has more status than a first-time poster. However, as the exchange around barbarian AI suggests, different participants gain status through participation and what they know, which can occur along multiple axes (gameplay knowledge, programming knowledge, historical knowledge). In other words, this is not to suggest that this online space is necessarily devoid of status (which may, or may not, be at times constructed through race, gender, or class), rather that there is a stated, enacted, and carefully maintained ideal that the process for legitimizing what is taught and what is not is open to all participants, and that anyone who disagrees with an agreed-upon standard may contribute alternative ideas.

During Action Reports: cognitive artifacts that organize practice

As posting game recaps became more and more a central component of gaming practice, players developed a formalized practice: writing ‘during action reports’. The following post, which is permanently placed at the beginning of the community’s ‘official history’, describes the role of DARs in community life:

There’s something about the process of writing these things down which both makes a game truly memorable and crystallises understanding of things. Documenting mistakes helps prevent repetition, recording success helps recall the best practice, and lets face it, a game of Civ can make a pretty decent story. (Cort Haus after being commended on his AU 101 game recap)

Figure 4 depicts a typical DAR post. It begins with a recap of the player’s goals and initial responses to the challenge, which might be considered an interpretive frame for understanding the player’s thinking during the game. This interpretive frame both situates the player’s following comments and provides a framework for the reader to understand the goals, motivations, and thinking behind the subsequent actions. Next, the player provides a narrative of the game experience, interweaving his actions, future goals, and interpretations of the game model. In effect, the player’s post describes how he is reading the game space. The player ends with descriptive statistics about his civilization, which players use as a reference when examining one another’s files.

Typical exchanges begin with players posting their DARs and examining one another’s, positioning players as learners, teachers, and researchers. As participant observers, one thing we immediately noted was how observing multiple game files – particularly the image files accompanying the texts – allows players to observe the many possibility spaces that the games offered. For example, one researcher (as did several other participants) found that he was building cities further apart from one another than other players. The following post, by Aqualung, captures a typical sentiment:

Wow Dom, I think I’m finally starting to learn this game! My first 8 turns were pretty much the same as yours, except I went for a Warrior before the Granary to help with the happiness!

Later, the same person posted another analysis (Figure 5) of a colleague’s game. The post recognizes things the player is doing well (reasonable early expansion) but then emphasizes that some of the decisions (not building workers or granaries) will have negative long-term consequences (insufficient infrastructure to support future growth). The poster closes by acknowledging which of these strategies are particular to this scenario’s goal (which is to teach players to win through cultural victories) and which are generally good principles.
In some threads, discussions between players contained several exchanges, with participants providing multiple iterations of feedback. The following exchange exemplifies the nature of interactions between newcomers and veterans. It begins with the newcomer asking the community for advice about upgrading a knight to a cavalry unit, a decision that has been made more interesting because the community has chosen to reduce the attack strength of cavalry from ‘6’ to ‘5’. Theseus, a veteran, responds by helping the newcomer reframe the problem in a more nuanced way:

Newcomer: [Should I upgrade knights to cavalry] 5/3/3 versus 4/3/2?
The Higher Education of Gaming

Theseus: I’d upgrade in a New York minute.

I would upgrade, the question is would I want to research the tech. Remember you will soon be in the next age and have the better units. Especially if you are a scientific civ. Largely the AI will not be a big problem for you at this point with the knight type unit. Of course you will have some games that make that strategy wrong, that is what is good about civ, you cannot do the same thing in all cases. Anyway, I am not presenting this as a sure thing, only as a food for thought, a consideration.

Here, Theseus takes what the newcomer sees to be a simple single-variable kind of problem (Is it worth spending the gold to upgrade a military unit?) and reframes the question in terms of whether the player should prioritize researching the technology to develop cavalry, suggesting that the player also consider the larger intersecting game systems (future technologies, characteristics of civilizations, and patterns in the AI). He then acknowledges the ambiguity in the problem situation and reminds the newcomer that Civilization III is an ill-defined problem space where no one correct answer will work in all situations. Stuie then readdresses the initial question, but in terms of the changes the Apolyton community has made to cavalry (weakening its attack power):

Stuie: I think the a-5 [power, as opposed to the standard power of ‘6’] still makes the beeline an option, it just won’t be as attractive an option, thus opening up other possible avenues for approaching the Middle Era tech tree. As is, I always do the beeline to Military Tradition. Reducing the attack by one will force me to consider other options depending on circumstances in my game.

Stuie’s post states that the ‘beeline to Military Tradition’ strategy is still viable, but the idea of the university is to open the complexity of the game space so that it is not the only viable option.

From a cognitive standpoint, these DARs function as distributed cognitive apprenticeships. The context of the enterprise resembles cognitive apprenticeships (cf. Collins et al, 1989) in that it features novices engaging in mutually valued practices with experts. The DARs are like cognitive artifacts (cf. Norman, 1991) in that they make the participants’ thinking visible, require reflection on action, and provide newcomers with access to expert cognition. At the same time, they resemble knowledge-building communities (cf. Scardamalia & Bereiter, 1994) in that they are producing new knowledge rather than recapitulating the old. The next section explores how this knowledge arises and is codified within AU.

Developing Design-Level Expertise

These exchanges function to transition participants from experienced game players to expert game players, and eventually, for some, to game ‘designers’ of a sort (see Figure 6). This process begins by players (such as our newcomer) entering the community having achieved competency with the game (stage 1). This player knows the names of units, their attack power, their defensive strength, and the relative advantages of each. As players seek to identify single best solutions, the community encourages players to not only identify particular exploits (stage 2), but also to see the game as a system, with each choice reflecting and interacting with many other intersecting aspects of the system (stage 3). Through these exchanges, the community proposes, tests and eventually changes the basic rule structures of the game to eliminate ideal solution paths and create more interesting game decisions, the best of which are included in the ‘best of the best’ game (stage 4).

From these discussions, general strategies – collections of moves – emerged. One prototypical example of a game method was rapid expansion, which became shortened to ‘REXing’ and incorporated specific moves, most notably creating ‘settler pumps’. Settler pumps are cities designed to create a never-ending supply of settlers (which are used to start new cities).[3] They combine specific city improvements (granaries, irrigation) with strategic geographical location, and are designated for creating and sustaining population growth. Players might combine these settler pumps with other strategic moves to employ a higher level strategy of rapid expansion – building a civilization of many cities that can outproduce smaller civilizations later in the game.

A countering strategy that emerged was ‘rushing’ (within AU, a specific variant ‘Alex’s archer rush’ was used frequently). When rushing, the player immediately scouts the geography, determines which types of future military units will likely dominate the area, seeks out nearby
opponents, and then produces an overflow of military units best suited to the region. A list of such strategies was compiled and posted by Trip (who happens to be a designer at Firaxis) on the general Apolyton site. Other more advanced strategies, such as ‘culture flipping’ (creating a strong culture so as to woo other cities into joining your civilizations) also emerged. Collections of moves became blackboxed into strategies that were the basis for community and personal action. Tracing the development of AU, we can see how personal experiences became articulated in DARs, were codified into a particular language (REXing, rushing, culture flipping) and then shaped over time through community discussion.

Figure 6. Typical trajectory of player experience.

The result of this rapid knowledge generation and codification is an internal language common to AU that is downright cryptic to the outsider. Consider the following post, which consists of a highly specialized language. While legible to almost any Civilization III player in this community, it is only perhaps readable to general Civilization players and incomprehensible to most outsiders. This particular post occurred midway through the life of the school, where a player compares his strategy to those employed by others:

Unlike everyone else I didn’t road the silks ... but game/forest to the north, as my playstyle usually means researching hard and prioritising trade roads early on. I wouldn’t need the silk just yet, but I wanted the income asap, and obviously wanted to work the game tile. Nor did I start with barracks and warriors, but with a warrior-warrior-settler, planning on a Ralph-style archer rush from 4 cities.

Simply understanding this passage requires a good deal of background knowledge about the game mechanics. In the first sentence, he uses ‘road’ as a verb meaning to build roads in order to obtain access to silk, a luxury resource. He emphasizes that his particular style of play (research and trade) requires growing early and developing trade routes. As a defense for this ‘trade-heavy’ strategy he built the infrastructure to construct an early archer rush, much like Ralph would have done. Blackboxing these complex moves into the phrase ‘a Ralph-style archer rush’ also suggests how experiences are transformed to knowledge, then packaged, transformed, and taken up in other places in the community.

This exchange exemplifies the situated nature of knowledge in AU. For participants, concepts are living, evolving entities. They have histories and are directly tied to experience. The ‘shared saved game’ mechanism allows players to have situated understandings of others’ experiences; each player has confronted the same initial game conditions and in all likelihood dealt with similar challenges along the way. Concepts, terminology, and ideas become reified for specific purposes. They are reified so that the community remembers what has occurred, so that members can communicate more effectively (saying ‘Ralph’s archer rush’ is shorter than recapping his entire
game), and because they enable future action. Concepts are functional in that they exist to explain ideas that will support and enable future action.

In response to the growing body of terminology and strategies, the Apolyton community developed several resources for newcomers. In introducing the ‘official abbreviation list’ [4], Lemmy observed the community’s fondness for abbreviations (perhaps due to the limitations of space and time in online forums) and acknowledged the need for newcomers to have resources enabling them to participate with community veterans:

GA can also be triggered peacefully now by building GW with the same CSA as your civilization, but since only one Civ can build each GW, a peaceful GA can also be prevented. The peaceful GA trigger could also allow Civ’s with modern UU, to have an early GA, and if a GA can be declined, Civ’s with early CSU can have their GA late, if they can complete the GW with the right CSA.

CR, new in Civ III, will make tactics like ICS a lot more difficult, also BAB is no longer true. GW and SW both contribute to CR making them even more important in the game. CR could make OCC a bit easier, but i have no experience with OCC.

Would a Civ III newbie understand this post, i don’t think so, i know i wouldn’t. i never heard of any of these mentioned until i visited this forum, and it took me a while before i knew them.

As the community developed a specialized language, participants realized that the terminology would be confusing to newcomers. Similarly, the community created a help site for strategies. Both of these resources were created by the general Apolyton community (as opposed to AU), but they were used by university participants extensively. In order to manage the growing number of courses, students, and materials, the community decided to nominate an official ‘dean’.

In both cases, it is instructive to note that the community did not create an AU list of 100 important Civilization terms and concepts’ that was a prerequisite to participating in any courses. To the AU participant, course designer, and perhaps reader, it is obvious how the list of 89 or so abbreviations (cf. Table III) would make little sense without (1) a situated understanding of Civilization III and (2) experiences of and in the discourse. Some of the game-specific terms (e.g. ‘golden ages’) are a direct reflection of the game rules and can be understood by most experienced Civilization players. Others, such as the ‘eternal China syndrome’, are unique concepts that have arisen in response to how Apolyton communities think about the game (in this case, dissatisfaction with how the game models the formation and dissolution of civilizations).[5] Still others refer to particular people and collective experiences that make little sense outside of the Apolyton context. Some of these abbreviations/concepts are common to online affinity spaces in general, and suggest how people experienced in digitally mediated spaces engage in a different sort of learning practice than traditionally offered in school – one where the expected ‘grammar’ is to begin by lurking, then dig in and participate (at which point one is expected to have mastered some of the idiosyncrasies of the community), and then eventually contribute to the intellectual life of the community.

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Full Meaning</th>
</tr>
</thead>
<tbody>
<tr>
<td>GA</td>
<td>Golden Age</td>
</tr>
<tr>
<td>GL</td>
<td>Great Leader</td>
</tr>
<tr>
<td>ICS</td>
<td>Infinite City Sprawl</td>
</tr>
<tr>
<td>UU/CSU/SU</td>
<td>Unique Unit/Civ Specific Unit/Special Unit</td>
</tr>
<tr>
<td>GW</td>
<td>Great Wonder</td>
</tr>
<tr>
<td>MULOTF</td>
<td>Most Untrustworthy Leader OF The Infidels</td>
</tr>
<tr>
<td>ECS</td>
<td>Eternal China Syndrome</td>
</tr>
<tr>
<td>IIRC</td>
<td>If I remember correctly</td>
</tr>
<tr>
<td>YYRC</td>
<td>Yes you remember correctly</td>
</tr>
<tr>
<td>RAF</td>
<td>Rise And Fall</td>
</tr>
<tr>
<td>LOTM</td>
<td>Lord of the Mark</td>
</tr>
<tr>
<td>PH</td>
<td>Provost Harrison</td>
</tr>
</tbody>
</table>

Table III. Listing of community vocabulary and abbreviations (generated by the AU participants).
When comparing students’ experiences in AU with traditional courses (even in graduate school), it is striking to note the extent to which the courses were about producing rather than consuming knowledge. Participation in AU is to participate in the invention of knowledge. The Apolyton community’s strategies, language, and courses were all produced by students – with four students producing a majority of the courses. Even so, to participate in AU in any meaningful way means not just to adopt new vocabulary and strategies, but also to participate in the distributed formation of new knowledge. As a student, even if I am not designing a course, I know that my game ‘results’ and comments contribute to the collective understanding of the community.

As such, AU differs from other forms of social organization (like apprenticeships or schools) in its focus on the production of new knowledge and the continued learning of all of its members, rather than on completing a particular task, such as a tailor shop, which exists to produce garments, or schools, which exist to impart sanctioned knowledge and/or sort students into classes (e.g. Bowles & Gintis, 1976). AU participants themselves stated that they participated in order to advance their collective understandings, to have a community to learn as a part of, and for entertainment. It is notable that the community sustained such participation for over two years given that attendance was entirely voluntary and resulted in no immediate extrinsic rewards (like paychecks).

The Cognitive Impact of Historiographic Play

In order to understand how players made sense of their game experience, we observed comments made in online forums about interrelationships between history, geography, and political science. We also directly asked participants in interviews about how they thought the game reflected or did not reflect history. Previous studies (see Turkle, 2003) have hypothesized that players simply learn ‘surface’ features of games. However, no one has yet investigated how expert players think with a game.

One form of gameplay that emerged for many players is what we call ‘historiographic gaming’ – a form of gaming that uses the game as a site for inquiry, whereby gameplay is an iterative process of observations of game phenomena, trying new game strategies to test particular ideas, and discussing the results (which might include bringing in outside resources, such as texts). For example, in this case Theseus is narrating his game, comparing it to World War II:

A little bit later ... 1485 AD. This is great. Pillaged with Tanks thus cutting off the captured Spanish cities, and created a true Maginot Line protecting Spain from an upcoming onslaught of about 40 Infantry. And my Tanks have free range in the war-torn territories. Feels very WWII-ish.

In another example, Theseus is playing on a realistic map, and uploads a screenshot of his civilization, which is caught in conflict in the Middle East. He writes: ‘It seems like a certain part of the world is just destined for armed conflict’.

These quotations illustrate the variety of ways in which gamers use the game as a sort of simulation tool for reading ideas off of history, and then drawing interpretations about history based on patterns observed in the game. Here, Theseus notes that the geography/resource basis of the gameplay does lead to particular military conflicts in particular regions over room for expansion of particular resources (such as oil) and cultural conflicts. In some game courses, dozens of players uploaded screenshots of their games, creating a ‘modeling community’ of sorts, which, much like a community of modelers, used the game as a tool for inquiry.

In extended interviews, we interrogated what kinds of inferences players drew about current events from gameplay. The following excerpt from one interview shows how playing Civilization III has remediated one player’s (American male, age 20) experience of history and contemporary world events:

Interviewer: Do you ever draw comparisons between current events and a Civ game?
Steve: Yes. The culture in Civ3, stronger cultures make it harder to occupy other countries. We already saw the Golden Age of America; that’s behind us now ... there is a Civ3 term ‘a Golden Age’.
The Higher Education of Gaming

The situation in Iraq might flip back to the Baathe party, flip back to its original owner. But in some ways our culture is very strong. Go to Europe and see our commercial products. Capitalism – that’s the American culture – that mindset. In Civ3 terms, the American mindset is influencing so much of the world that basically we’ve won a cultural victory already. You know how the Civ3 city screen, they still retain their identity of being Iraqi but they’re a part of our culture? We want to give them an American mindset, an American ideology. Like a cultural outpost, you’re building all the cultural buildings.

Interviewer: How does Civ3 compare to your Western Civ class?
Steve: I actually learned a lot more history and geography through Civ3. I will probably learn more through scenario design and Civ3 than I will in this class because it’s so basic to me.

This excerpt suggests that game experiences can have an impact on players’ understandings of the ‘real’ world. In this exchange, Steve uses several concepts from Civilization III, including golden age, culture flipping, and cultural victory, as tools for explaining current events. For Steve, these concepts are not ‘stuck’ in the game world but flow freely back and forth from his game to history. The rules behind Civilization III as a simulation are largely oriented toward materialist/geographical processes over broad timescales, but Steve, in this conversation at least, is most interested in using the game’s model of cultural influence to talk about contemporary politics.

For Civilization III players, the ‘magic circle’ seems quite permeable indeed. Knowledge, in the form of conceptual tools, flows freely to and fro in the game space. For Steve, playing Civilization III generated a lifelong interest in history, which recursively fed back into his gameplay. Steve is currently using Civilization III to model the fall of ancient Rome, which he hopes to apply toward his academic work and gain credit.

Many game theorists have written about the ‘magic circle’, describing its value for providing a psychosocial moratorium which enables the exploration of new identities (Gee, 2003; Salen & Zimmerman, 2003). These examples suggest that the boundary cross between gameplay, history, ‘real life’, and game player may be the most interesting – and educative – point of games. Here, gameplay naturally feeds into Steve’s academic interests, which then in turn propel him forward in school. The productive identity that Steve takes on as an expert Civilization player and producer of knowledge influences how he approaches academic work, which, by his own reckoning, still has yet to match the complexity of the work he does outside of school with Civilization.

The Decline of AU and the Rise of a Pro-Am Community

In the fall of 2004, participation in AU waned. The number of new courses, posts written, and posts read slowed dramatically (see Table I). In the spring of 2005, we interviewed 12 participants to gather their impressions of what caused this slowdown. The most common response was that players felt that the ‘school had done its job’. Players had become experts on the game, they had created courses on every major topic and exhausted most avenues for learning, and some players had just become bored with the game. As one participant commented in an interview:

My current participation is non-existent, due to the fact that the AU forum is, for all intents and purposes, dead, due to a combination of Civ4 [Civilization IV], and that the topics within CIII [Civilization III] have already been extensively tested, so there is little to do.

From an educational systems perspective (for an overview, see Squire & Reigeluth, 2000), it is particularly interesting that the organization only exists to support participants’ learning goals. Once the ideas have been ‘tested’ and the need for learning is gone, the community naturally fades and ‘dies’. Although participants expressed some remorse over this fading, others seemed at peace with it. As educational researchers, we could not help but derive some pleasure at the idea of other committees, departments, or organizational units having such a natural ‘death’ once their need had passed. However, in an age of knowledge explosion and the rapid formation and disintegration of fields, this pattern may be endemic to the digital age.

The interviewer continued with this line of questioning:

Interviewer: Do you think Apolyton University will jump to Civ4? Will you do so?
Jacko: Yes, certainly, but as so many veteran members of AU are on the beta test team, maybe we
won’t have to do much modding. I will definitely help to test the mod, although I doubt I will be able to help with the modding.

This response tipped us off to a phenomenon that we were unaware of (perhaps due to non-disclosure agreements): several key leaders from the Apolyton community were recruited by Firaxis, the developer of Civilization, to participate in a unique ‘closed beta program’. Lead designer Soren Johnson was so impressed with the quality of discussion, knowledge, and game debugging in the community that he hired them to work in an extensive testing process whereby the players played and replayed the game much as they did with Civilization III, scouring it for loopholes, imbalances, and weak points. This fact was later confirmed with Firaxis. Over 100 gamer-testers were included in the credits of Civilization IV, named by their various gaming handles. Three of the more active modders were actually hired by Firaxis as scenario designers.

This fluid line between users and designers can be seen as an enactment of what social construction of technology theorists call ‘the co-construction of users and technology’. When one looks at how technologies are actually used in the world (over any timeframe), one finds that the line between users and designers is much more blurry than one might guess (Oudshoorn & Pinch, 2003). Technologies from the automobile to the Moog synthesizer are the result of complex interactions between designers and users, and better thought of as co-constructions rather than linear processes of design and implementation. Designers put artifacts out into the world. They are then shaped and reshaped by users, who make and remake artifacts, adapting them to different use scenarios. Markets respond by privileging those artifacts that respond to users’ needs. In the case of some artifacts (such as houses), the resultant structure that is actually used by people quite frequently looks nothing like the structure as it was originally designed after just 10 or 20 years (how buildings learn).

This blurring between game players and designers is interesting from several perspectives. From a media studies perspective, it is interesting that games, across their history, have been open to design and redesign; consider the multiplicity of ways that ‘free parking’ has been implemented via ‘house rules’ in Monopoly (a phrase that suggests the plasticity of games for users). In some respects, this responsiveness to user needs and inclusion of players is acknowledging the role that users always have in design. Gameplay may be always, to some extent, also game creation.

However, on the other hand, the Firaxis team is going a step further here, treating players as designers, who, when viewed as a collective, contain infinitely more game knowledge than one designer working alone. This relationship between knowledge and communities suggests a formal realization of Pierre Lévy’s (2001) notion of collective intelligence; the idea that in modern society, knowledge is most often distributed among organizations. Media theorist Henry Jenkins (2006) argues that participation in such sites of collective intelligence is a core pleasure of participation in contemporary digital media.

This unusual relationship between users and developers was explicated recently by Soren Johnson, who, in a letter to the gaming community, told the story of how sites such as Apolyton taught him about game design. In fact, Soren revealed that he started participating at Apolyton long before he held a job at Firaxis, and only found out about the Firaxis job through a posting at Apolyton. In an extended post made at Apolyton in 2006, Johnson describes the impact that participation in Apolyton had on his professional development:

I moved to Maryland a few weeks later, eager to start my job. My head was full of ideas based on my experience with Civ [Civilization] and Alpha Centauri. I thought I knew all of the ins and outs of Civ. I had logged countless hours playing the game, had always wanted to make historical strategy games, and was full of enthusiasm to make my mark in gaming. [Johnson had worked at Electronic Arts, the world’s largest game developer, and had degrees from Stanford in Computer Science and History.] If anyone was an expert on the Civ series, it must be me.

I was dead wrong.

The world of Civ was far, far bigger than I had ever imagined. As I began to wade through the Apolyton forums, I began to discover just how little I knew about the game itself. Certain acronyms, like ICS [Infinite City Sleaze] and OCC [One-City Challenge], were being thrown around with an assumption that everyone understood them. Massive lists of improvements and fixes were being compiled. Clearly, a culture had grown around Civ that I was just beginning to understand.
At the start of 2000, I had never played a game of Civ in multi-player. I had never played a scenario. I had never opened up the editor. I knew nothing about the events system of Civ II. I had never heard of Democracy, Diplomacy, Succession, or Story games. I was just beginning to discover the wealth of fan-sites available on the web. I had a lot to learn.

From that point on, my most important source of information, my compass, so to speak, was always the online community. Game design, of course, always involves the iterative cycle of internal development and testing and refinement and more testing and so on. However, the topic of Civ was so broad, so all-encompassing, and so flexible that no one person could understand all the ways the game could be played or approached.

As I discovered more and more paths to Civ, I became a better game designer. If Civ IV succeeded in areas where Civ III failed, it is largely because our understanding of the Civ community increased so much over the intervening years. In fact, the 100-person private test group for Civ IV – critical to the game’s development – was culled from our personal interaction with the many different groups and sites that existed on the net.

As such, the example of AU pushes our theories of distributed knowledge construction a step further, revealing how, in digital cultures, the ‘official’ designers may be a ‘step behind’ the collective player community in understanding their game (something that designer Raph Koster has long argued is true in massively multiplayer games). From a digital literacy perspective, the existence of AU suggests that we may need to reconceptualize the role of ‘authors’ as ‘researchers’, who identify sites of collective intelligence and leverage them toward their own ends. Indeed, much as Apolyton participants knew that their game experience would be enhanced through participation in such a distributed community of expertise.

At the same time, from a learner’s perspective, what may be most interesting is how participation in the community ushered players from being users to designers, culminating in many of the most advanced players literally receiving job offers based on their work. For these players, game production was not just a ‘technical’ or academic exercise, but a socially legitimate one whereby through interaction with designers such as Johnson, they were literally entering the socially authentic practice of game design (see Lave & Wenger, 1991). Indeed, the ‘institution’ of AU may have folded (although, as we noted earlier, the knowledge still resides online for anyone interested in learning more), but the social relations developed in that time live on. Dedicated players literally embarked on new professional learning trajectories, taking jobs at the game company, which is, for many, a dream job of sorts.

This sort of informal job apprenticing may be most dramatic in the Apolyton example, but is hardly unique in digital media (particularly gaming). Leading industry veteran Warren Spector has commented on several occasions in *Game Developer Magazine* that young designers are best served not through formal schooling, but through downloading some mod tools and beginning to make mods of their favorite games. Similarly, Doug Church, Chief Technical Officer at Electronic Arts, has remarked in *Rolling Stone* magazine that the primary advantage of universities is that they teach students some basic communication and liberal arts skills. Particular technical skills change so rapidly that anything taught in school is likely to be out of date anyway. Somewhat ironically, Church commented at the 2007 Game Developers Conference that the other ‘best thing’ about universities is that they usually offer one or two courses, and then, due to a lack of advanced courses, students are forced to go and learn advanced techniques on their own. This technique of ‘learning to learn’ is perceived by many game developers to be a critical skill (see Squire, 2005).

**Implications: self-organizing learning systems for an interactive age**

The kinds of learning experiences available to students outside of formal learning contexts call into question many long-held assumptions about learning. This article began with an argument that schools are approaching a crisis: built on a literacy of print, they value constellations of practices that do not align well with the digital age, which has contributed to an increasing disaffiliation from school for many students. The challenges posed by digital technologies to educational systems are real; how to conceptualize learning in a world where students will come to school with a broadband-Internet-enabled cellphone in their pocket is a non-trivial task. Video games have been offered as one model worth examining, as they embody many features of situated learning theory.
Games are built around a logic of simulation, participation, and aesthetics of experience, which may be a useful model for thinking about learning in the digital age (Lemke, 1998; Squire, 2006).

This article has sought to identify what the social organization of a gaming ‘institution for learning’ might look like through an ethnography of one of the more long-standing and carefully organized gaming communities of practice. Although admittedly unique in its fluid relationship with the game designers, Apolyton is not terribly unique in that (1) there is at least one major competing site within the Civilization community (CivFanatics, which also has had players hired by Firaxis), and (2) there is a long history of good players being hired by game companies (for a good look at gaming culture, see King & Borland, 2003).

What emerged from this study was a sophisticated picture of gaming culture from a learning perspective. Participants valued the opportunity for enculturation into a particular expert community with shared knowledge, values, and terminology, clearly illustrating notions of ‘socially constructed knowledge’. Participants valued these as tools that would enable them to better understand the game system, and, critically, to derive even more pleasure from the game. What emerges here is an interrelationship between pleasure and learning, which is explicated elsewhere by Gee (2005). Learning, for these participants, is deeply pleasurable, and other people are valued as ways to further this learning. Compare this relationship to knowledge with that promulgated in schools, which Bransford & Schwartz (1999) describe as a ‘sequestered’ view of problem solving whereby a communication with another person is seen as ‘tainting’ learning and/or assessment.

For these participants, the opportunity to participate in knowledge production was perceived as equally important (and enjoyable). At first mention, this observation is often confusing to educators, although upon further reflection it seems obvious. The act of discovery, of contributing to a body of knowledge and displaying expertise within a community, is a deeply pleasurable experience for many people (particularly academics), but it is one that is almost entirely left out of most formal school-based learning – although there are certain research-driven initiatives in science education (such as Dragonfly or Urban Ecologists) which have sought to place students in the role of knowledge producers, whereby they participate in the authentic production of scientific knowledge. What may be most interesting about games is that whereas educators have often struggled to get such programs off the ground, they thrive in game cultures. Even adolescent boys appear able and interested in producing knowledge when driven by personal interest. Future studies might target such populations to see if they can leverage this type of interest in gaming toward facilitating a productive stance toward academic knowledge creation.

This case contributes to research on sociocultural constructions of technology by suggesting how the co-construction of technology between users and designers might work in digital media. Here, we see a productive relationship between users and designers working in several ways. On the one hand, designers used the community as a font of knowledge about different gaming practices (and, indeed, used the community as a vehicle for professional development). In return, participants gained opportunities to interact with game designers, opportunities to influence the production of the final artifact, and, in some cases, gainful employment. Here, the line between fans and designers was blurry indeed, with participants regularly crossing from one community to the other.

Lead designer Soren Johnson’s description of his participation in Apolyton and subsequent recruitment of participants to enhance his own professional development points to another key aspect of digital culture: the ability to lead, design, or manipulate existing communities for learning. This pattern of soliciting feedback from communities – and using and capturing their knowledge – is not unique to Civilization. Will Wright (2001), for example, describes how fan communities with The Sims are effectively research and development labs, labs that he uses to see what kinds of features are missing in the game. Wright identifies the objects that players create and download, and then includes them in the next version of the game. In massively multiplayer games, guilds often serve a similar function (Steinkuehler, 2006).

These examples – and indeed the existence of Apolyton University – suggest a new form of social literacy indigenous to the digital era that may be critical for success but left out of schools, leading perhaps to a growing equity gap. More important than the particular facts or technical processes may be the practice of negotiating social organizations (including forming them) to further one’s own learning. If such skills are not taught in schools, important equity questions arise as to who is getting access to such experiences and who is not. Emerging research suggests that
active youth participants in guilds and Web forums such as Apolyton are often encouraged by their parents to take up and pursue such hobbies and interests (Games, Learning and Society Group, 2006). If such communities and technologies are locked out of schools, in all likelihood those with access to such social affiliations will develop more sophisticated literacies, while those lacking such access will fall further behind.

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Notes
[1] It was actually Soren Johnson, lead developer of Civilization IV, who introduced us to Apolyton University. He described it as one of the most sophisticated gaming communities online (along with CivFanatics) and suggested that we draw on its community expertise when designing our own historical scenarios.

[2] It turned out that barbarian uprisings – when groups of barbarians suddenly become active, invading other civilizations – were, in the words of Johnson, ‘triggered the second time a civ enters a new age (once for the middle ages, once for the industrial age, once for the modern age ...). The intention was to basically simulate the barbarian hordes that knocked out Rome and (to a lesser degree) the Mongols. This made a little more sense back when barbarians were more destructive, but having half your civ knocked out for seemingly random reasons was deemed not much fun. Instead, we flipped the concept around and gave a temporal bonus (the Golden Age) instead of a temporal penalty’ (posting made by Soren Johnson at Apolyton University Forum. http://apolyton.net/forums/showthread.php?t=54747&page=30&perpage=30&pagenumber=5 [accessed May 5, 2008]). This example illuminates how designers wrestle with historical modeling (how to create barbarian uprisings) and entertainment (no one enjoys random penalties) in a manner that results in a reasonably realistic, yet satisfying, play experience.

[3] Normally, a city loses two population points every time it produces a settler. With a settler pump, the city grows quickly enough that it gains back those population points by the time that it produces the settler, allowing the player to create settlers without the city collapsing due to food shortages.

[4] As of this writing, the list can be found at http://apolyton.net/dir/index.php?t=sub_pages&cat=210

[5] In Civilization games, the ‘playable civilizations’ are basically the civilizations as they existed in 4000bc. There are no game mechanics for civilizations forming mid game, or dissolving via any mechanism other than military defeat. This is a feature that has been much discussed and debated in Civilization communities. The game designers have acknowledged that they have tried to model how civilizations form and fail in the game, but have yet to find a fun, easily understandable, and workable mechanic in the game.

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The Higher Education of Gaming


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