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From Age of Empires to Zork: Using Games in the Classroom

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With the remarkable growth in the gaming industry in recent years, educators have begun looking at games as a way of reaching students in this new digital world. While games have certainly been the target of criticism and even vilification in the popular media, many do possess qualities beneficial to education, such as the presentation of scenarios, problem solving, collaboration, and metrics. Among the early researchers of game pedagogy is James Paul Gee, professor of reading at the University of Wisconsin. Gee sees games as models for sound pedagogical practice. To convince consumers to pay for the privilege of learning the often complex rules, scenarios, and interactions within their games, Gee argues, game manufacturers have had to become expert teachers. In the game Rise of Nations for example, where players learn how to govern an empire through a combination of tutorials and game design, Gee sees valuable devices at work, including:

- Just in time learning--the player is introduced to rules and concepts as needed

- Self-paced learning

- Motivation of players to push the boundaries of their own knowledge and skills

- Use of different forms (visual, oral, and text) for redundant information[1]

Henry Jenkins and Constance Steinkuehler also see games as teaching skills students will need in the modern world. For Jenkins, games form a part of a new generation of media that is distinguished by the active participation of its consumers. Average users don't just watch the screen; they now create video, write to the Web, and publish digital photos. This new media demands a media literacy that everyone will have to master in order to succeed in the years to come. Games--even single player games--encourage, if not require, participation within a community. The collaborative problem solving, research, critical analysis, and diplomatic skills are fundamental in today's society and will become increasingly integral in the future.[2]

Steinkuehler focuses her research on the use of scientific analysis and writing in the most popular massive multiplayer online game, World of Warcraft. Like any game, World of Warcraft, uses a series of algorithms to determine the outcome of various player choices and actions. Deconstructing these algorithms is a key to succeeding at the game. As a result, players spend a great deal of time in forums and other resources comparing research and solutions to different situations. In addition, Steinkuehler also sees evidence of literary practices at work in the creation of fan fiction surrounding MMOG (Massively Multiplayer Online Gaming).[3]

As a result of this research, a larger number of faculty members are open to the idea of introducing games into their courses. But then the challenge: how to find a suitable game and integrate it in a way that matches the learning objectives of the course? Unfortunately, these tasks are still difficult. Many games are potentially suitable for use in a college or university classroom; however, finding these games can be a formidable task. There has been an effort to make this easier by distinguishing between "serious games" and other commercial games, but this distinction can be arbitrary and excludes a large number of games that are potentially useful. Finally, once a game is selected, there are few practical examples available to use as a template for integrating the game into the course.

To help with this process, I have organized games into three categories based on the complexity of integrating them into a course. Games in category one require very little change in the course as a whole. These games contain content or principles matching many commonly taught courses. They are also simple, allowing someone to begin playing the game without any instruction or after a short demo of no more than fifteen minutes. Instructors can assign the game to their students as homework then have them compare their experience of the game with the assigned readings on the same topic, for example. Even games in this simplest category offer some of the

advantages discussed by Gee: Students will have different experiences depending on how they play the game; they will work at their own pace; and develop a unique understanding of the scenario by working through different possible outcomes and the factors involved in producing these outcomes, challenging their own logic as they progress.

The second category features games that require some restructuring of the course as a whole. These games have appropriate content or principles, but they are more complicated and take longer to play. Most require an hour or two for beginners to learn and may take an equal amount of time each night for one to several weeks to finish. It is important to recognize that this complexity has a benefit as well, allowing students to become immersed in a much more sophisticated environment as well as giving them the opportunity to explore possibilities they may otherwise not encounter during the semester. Critiquing the game will also require greater mastery of the topic in order to understand the rules and variables governing the simulation and recognize bias, missing factors, or other inaccuracies. The complexity of tasks assigned to the students also lend themselves well to group work and involve more of the skills discussed by Jenkins including diplomacy, collaboration and interaction with peers via the internet.

In the third category, games become a means of creation. The playing of the game is a mere subset of the overall activity. The fundamental learning stems from creativity with new media, interaction in small to very large groups, and the construction of new media using the games as a platform--areas researched and endorsed by Steinkuehler and Jenkins. This adds to the time required to integrate the game into the course, but students benefit from the opportunity to apply principles learned in the course, that is, putting theory into practice. Some of these activities may require help from a technologist if the professor is not especially computer savvy; however, none of the scenarios provided are limited to an especially technology literate class.

Category I
Games included here are simple simulations designed to give the player an introduction to a topic. Some of these games take advantage of their immersive characteristics in order to present a certain view of a given reality. These games are easy to play, often web-based, and frequently focus on current events. While I would not recommend these games as primary content sources for courses, they do provide students with means for reflection and as material for class discussion.

Oil God, designed by the independent games studio Persuasive Games, allows you to wreak havoc on the world through war and disasters in order to double the cost of gasoline and boost profits for your company. By targeting political insurrection, war, and disasters on nations that are key suppliers or distributors, the player can double gasoline prices in a very short period of time. The game should certainly not be used as an accurate economic model for predicting gas prices based on turmoil; however, it does make a clear and compelling argument about the motivations behind much of the conflict in the Middle East.

Global Warming Interactive revolves around Brazil's development of alternative fuels over the past decades. [4] Players control three advisors in the government of Brazil beginning in 1960. Each advisor has their own agenda and specialization: economics, policy, and science. The budget must be structured as a compromise between all three to allow Brazil to develop and find alternative energy sources before its supply of fossil fuels is exhausted. By taking on the role of an advisor, students learn first-hand how negotiation, politics, and diplomacy inform strategy.

A game for the sciences is Foldit, a puzzle game for folding proteins. Foldit brings together several interesting qualities. First, students need to understand the basics of proteins to solve the puzzles (addressed through the game's tutorial). Second, the online component to the game allows teams to compete by creating better proteins. Finally, the game is an example of crowdsourcing, the process of outsourcing a task to the public at large. Crowdsourcing is one of the cornerstones of Web 2.0 and Jenkins' idea of new media. The game functions as a framework for collaborative problem solving. In this case, scientists are examining the possibility that the crowd can do a better job than computers alone at constructing proteins for specific medical and scientific purposes.

Because games are a form of storytelling, it should not be surprising to find examples of literary games or interactive

fiction in the mix. Some of these games create literature; others use famous works as a basis for the story. Kafkamesto is one example of the latter. By incorporating aspects of Kafka's novels, the game could function as an introduction to the themes in his writing, or as a means for students to synthesize their understanding of Kafka by offering a critique of the game. The creation of a game based on literature provides and array of challenges, including the transition from text only to inclusion of audio and visual materials. To critique the game, students will not only have to understand the work of Kafka, but the expression of themes through different media as well.

The traditional commercial games in this category are more complex, but still very easy for beginners to play. Games like A Force More Powerful and Peacemaker are turn-based games reflecting current events. A Force More Powerful is designed as resource for groups seeking political change through non-violent means. The game uses scenarios based on oppressive regimes and resistance movements around the world. Players can specify goals including the involvement of minorities in the political process, free elections, and removal of the current regime from power. The game is an effective tool in exploring the sources of power and instability in a given regime.

Peacemaker explores the Israeli-Palestinian conflict and allows players to lead either side toward peace. Players react to actual events that have occurred in the Middle East with diplomatic, economic, and military actions in an attempt to balance the demands of disparate factions within their community while moving towards a permanent peace. The game is simple to understand but manages to convey the political realities facing each side. Video clips of actual events lend realism to the game.[5]

Games for foreign languages have distinct advantages and disadvantages. On the plus side, students need to understand a large amount of content in the target language to succeed in the game, and the games themselves offer redundant information in multiple forms. Single player games, having peaked to a certain degree in the area of graphics, have focused more on creating a compelling storyline with large amounts of audio and or text in a given language. The overall experience has become more cinematic with the student becoming more deeply involved in content created in the target language. With multiplayer games (MMORGs) like World of Warcraft, students can interact and collaborate with native speakers in the target language bringing a whole new level to the idea of an "immersive classroom." A few adjustments need to be made to connect to a "world" outside of one's actual geographic location, but these are far from insurmountable.[6]

Connecting game content with a language class curriculum, however, remains difficult. Even when the material seems to be a rough match with a topic covered in class, like learning the parts of the house in Sims 2, students will nevertheless encounter a large amount of unfamiliar vocabulary and grammar. And because these games are player-driven and therefore unpredictable, preparing materials for class is virtually impossible. A teacher should be prepared to view the game as general practice in the areas of reading, listening, and speaking without the expectation of reinforcing specific points of grammar or vocabulary. At Dickinson, we have installed a large number of single-player commercial games (including Sims 2, Bioshock, Die Gilde II, Neverwinter Nights II and Oblivion) installed in the language lab for students to play on their own. These are usually European versions with the English language disabled or not installed. It's a heavily-used resource for students, used in much the same way as foreign language TV and DVDs have been in the past.

Category II
Games in this second category are closely related to the more traditional strategy board games. Some, like Civilization, Axis and Allies, and Avalon Hills Diplomacy, are spin offs of the old board games. Most are turn-based and many reflect a historic period with accuracy and attention to detail, making them well-suited to courses in political science and history. By allowing players to see a situation from different points of view and understand the decision processes of the actors involved, students learn about the causes and effects at work in particular periods in history. Of course, with great detail also comes complexity. Instructors should count on at least one class period for students to learn how to play the game itself. Most games require one to two hours of play per day for at least one week to finish a single game.

Rome Total War is a good example. This is a sophisticated game that gives the player the ability to control a power

either within or against Rome, beginning in 107 BC (though it simulates the reforms of Gaius Marius between the years of 240 BC – 180 BC).[7] Barbarian factions include the Gaul, the Greek states, and the Carthaginians, each of which have distinct technologies and military units. The game contains numerous historical inaccuracies for the sake of improved game play; however, as with many games, players have developed modifications to create more realistic scenarios. These modifications--or "mods" as they're commonly known--can be downloaded for free. Two of best known are Europa Barbarorum and Rome: Total War Realism. Both sites have installation instructions and information about the changes made and the reasoning behind each. Students can then examine the documentation while playing the game to provide a critique and suggestions for future modifications.

Civilization IV is a direct descendent of the Civilization board game. The basic game simulates human history from 4000 BC to 2000 AD. The player becomes the leader of a civilization and makes decisions regarding technological innovation, economy, culture and war. A civilization can win the game by diplomatic, military, technological, or cultural means. Of course, the game is simplified in order to remain playable--factors like disease, civil war, and internal strife are excluded, for example. But even with these limitations, the game succeeds in teaching players about the enormous effects of resources, technologies, and religion on particular historical moments. Try surviving the Iron Age in this game without access to iron ore; it's very challenging indeed.

Civilization IV also has many mods available for download. These are usually historic scenarios that create maps, technologies, leaders, and religions of certain time period. Some, such as the Greek world or the unification of China, are included with the purchase of the game or expansion pack. Others are created by players and can be downloaded for free from sites like the Civ Fanatics forum. [8]

Category III
The key difference in this category is the shift in the student's role from player to creator. Most games in this group allow advanced users to use the game as a platform for creation. While this was originally viewed as "cheating" by some, game makers quickly realized the economic rationale: allowing players to create their own content effectively extends the shelf-life of their titles. With mods, players change basic rules and variables within the game without have to understand much of the inner workings or source code of the game. Civilization IV is clearly designed with the potential of modding in mind. For beginners, there is a GUI interface that allows players to create maps, set up diplomatic relations, as well as assign technologies, population, buildings, and military units to the civilizations. By opening a single text file, the player can also set most of the starting variables for the beginning of the game including the year, civilizations, and time elapsed after each turn. By opening other xml files, more advanced users can create new civilizations, government civics, units, technologies, and religions and add them to the game. Very advanced users can even write code in python or C++ to generate events and make fundamental changes to the game logic. Creating mods in this way will require collaboration among the students and most likely their peers via the internet as a matter of necessity.

Typically the most difficult aspect of creating mods is not the technology, but getting the details right. To create a historical scenario in this way, students must do a great deal of research to understand the technology, culture, religion, leaders, economies, and governments of the time. Students can work in small groups with a particular research focus and then combine their information in a single mod, publish it for feedback and play the game themselves. By analyzing the game, they can determine in which ways the scenario reflects historical reality and where other factors were either not considered or given false values. For more information on this kind of project, look at the wiki and tutorials online at http://itech.dickinson.edu/gaming/index.php?n=Main.Worksheet. [9]

It is also possible to create games from scratch with text-based platforms like Inform 7.[10] This free software is proficient at understanding natural language, so it is not necessary to know any coding. An excellent tutorial comes with the software as well, and because everything is text-based, there is no need to create or modify graphics. There

are no limitations set by Inform 7 on the type of environment or story, so players could just as easily set a game in Paris during World War II or in a virus moving through the human body. What students do need to understand, however, is the environment--the object of study--as well as all the possible interactions of people and/or objects within the game. Creating any game from scratch can seem a daunting task; however, it provides a unique opportunity for the class to combine everything they have learned and researched to create something that can be utilized and expanded upon by others.

Games can also serve as a platform for the creation of videos, a process called machinima. Originally a tool for alternative filmmakers and hobbyists, machinima has entered the mainstream.[11] Instead of creating a game, students use the game to create video. This can be as simple as pressing a record button, importing into IMovie, and adding a sound track. Many games come with the ability to record already; others can be recorded using software such as Fraps on Windows or Snapzpro on OSX. Depending on the length and complexity of the story, machinima techniques can be learned through one in-class training and completed as homework. Foreign language classes can create short skits using simple scenes made in Sims 2, for example. History students could add narration to famous battles or scenarios taken from a history-based game. Documentaries can include effects that would not otherwise be possible, or films can be created entirely in these environments. There are also several large machinima communities where students can publish their work.

While the other games discussed in this category require some technical competence, alternate reality games (ARGs) can be created with only the most rudimentary knowledge of common applications like cell phones, web pages or email. Most ARGs are mysteries or puzzles. Players are given clues or tasks in order to progress through the story. A World Without Oil was the first "serious" ARG. It can still be played, though even more importantly, it can function as a template for the creation of other ARGs. The premise of the game is quite simple. Players imagine what their own lives would be like in an oil crisis, share stories, and then change their own real lives. Similar ARGs can be built on this model, using any historic, scientific or literary scenario. To create the ARG, students must identify all of the problems and obstacles in a given situation along with their potential solutions. As with Inform 7, this game can be played by others as well, giving students feedback on their project from a wider audience.

Game Implementation
Once you've used a game in your course, it is useful to take step back and evaluate the game itself as well as its integration. Based on my conversations with professors at Dickinson and elsewhere, the vast majority of faculty who have used games report positive experiences and plan on increasing the amount of time dedicated to the game in subsequent offerings of the course. Faculty note increased student motivation and interest as major benefits, as well as the opportunity for students to utilize knowledge and research in some kind of practical application. Still, games are a radical departure from the tradition classroom tools and it's rare that the first implementation is perfect. For pointers on evaluating your success, start with Clark Aldrich's recent post on evaluating the educational impact of games and simulations.

Games do require some rethinking of traditional homework in the sense that they are all learner driven, offering each student a unique experience. However, by having students connect their experiences with knowledge gained from classroom discussion or readings, instructors can successfully integrate the games into their courses. The examples discussed here are only a small subset of games suitable for college level instruction. Additional resources for finding other games are listed below; however, any list is bound to be incomplete. New games are created every day, and many games can appear radically different after modifications are applied or created.

Sources for finding games:

http://thenewjew.wordpress.com/2007/11/29/solving-the-worlds-problems-one-video-game-at-a-time-12-real-life-video-games-you-should-know-about/
http://b2e.nitle.org/ (search for keyword "game")
http://www.persuasivegames.com/games/ (persuasive games)
http://www.gamesforchange.org/main/GameList(current events / persuasive games)
http://www.gamesforchange.org/conference/2007/expo.php (current events / persuasive games)
http://www.gamesforchange.org/conference/2006/expo.php (current events / persuasive games)
http://www.persuasivegames.com/games/ (current events)
http://statastic.com/category/video-games/ (war and peace games, both sides of the spectrum)
http://blogs.guardian.co.uk/games/archives/2005/09/12/literary_games.html (literary games)
http://www.poemsthatgo.com/gallery/fall2003/print_article_games.htm (literary games)
http://www.gamespot.com/pages/forums/show_msgs.php?topic_id=24525221 (commercial games, see the strategy, adventure, and simulation sections)
http://www.paradoxplaza.com/ (history strategy games with a good reputation for historical detail)
http://www.muzzylane.com/ml/making_history (WWII game designed for the classroom)

Further reading
Listservs
Serious games http://www.seriousgames.org/maillist2.html

Blogs
Avant Game http://avantgame.blogspot.com/
NITLE http://b2e.nitle.org/index.php
Infocult http://infocult.typepad.com
Educational Games Research http://edugamesblog.wordpress.com/
Serious Games http://www.seriousgames.org/index2.html
Water Cooler Games http://www.watercoolergames.org/
Escapist Magazine http://www.escapistmagazine.com

NOTES
[1] James Paul Gee, *Situated Language and Learning: A Critique of Traditional Schooling* (New York: Routledge, 2004): 74-75.

[2] Henry Jenkins, Ravi Purushotma, Katherine Clinton, Margaret Weigel, and Alice J. Robison, "Confronting the Challenges of Participatory Culture: Media Education for the 21st Century" (occasional paper, John D. and Catherine T. MacArthur Foundation, Digital Media and Learning, October 19,2006), http://www.digitallearning.macfound.org/atf/cf/%7B7E45C7E0-A3E0-4B89-AC9C-E807E1B0AE4E%7D/JENKINS_WHITE_PAPER.PDF (accessed 5/27/08).

[3] See Constance Steinkuehler and Sean Duncan, "Informal scientific reasoning in online virtual worlds," Journal of Science Education & Technology* (forthcoming); Constance Steinkuehler, "Massively multiplayer online gaming as a constellation of literacy practices." eLearning 4, no. 3(2007): 297-318.

[4] Global Warming Interactive uses calculations found in a PhD dissertation by Tom Fiddaman at MIT in 1997, which can be found and read online at http://www.metasd.com/papers/papers.html.

[5] Professors Steven Staub and Edward Webb at Dickinson College have used the game as part of their courses on conflict resolution and Middle Eastern politics, having students compare experiences from the game with assigned readings.

[6] Todd Bryant, "Using World of Warcraft and Other MMORPGs to Foster a Targeted, Social, and Cooperative Approach Toward Language Learning," Academic Commons (September 2006), http://www.academiccommons.org/commons/essay/bryant-MMORPGs-for-SLA (accessed 2/2/08) .

[7] For more information, see http://en.wikipedia.org/wiki/Rome:_Total_War.

[8] Other games that would fit in this category include Paradox Games has released several titles, including "Hearts of Iron II," used by Professor Brian McKenzie in a course on World War II at Dickinson College.

[9] See http://itech.dickinson.edu/gaming/ for information, wikis and tutorials from from the February 2008 NITLE-funded conference on gaming at Dickinson College.

[10] Games such as Zork or the "Choose Your Own Adventure" book series are good examples of these structures. For a project using Inform7, see Richard Liston's course on Data Structures (Ursinas College) at http://itech.dickinson.edu/gaming/index.php?n=Main.Projects.

[11] Case in point is the recent teaming of The History Channel and game developer Creative Assembly to use machinima from "Rome: Total War" in its Decisive Battles" series. See also http://www.stanford.edu/group/htgg/cgi-bin/drupal/?q=node/161.

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