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### Challenges to Games in Education Reaching the Mainstream

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# Challenges to Games in Education Reaching the Mainstream

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by *Todd Bryant*



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Games have received a great deal of public attention over the past 10 years and with good reason. With his book *What Video Games Have to Teach Us About Learning and Literacy*, James Paul Gee laid out sound pedagogical principles used by video game designers that enabled them to create a product that was very engaging and at the same time extremely challenging and complex.[1] The book was extremely influential and organizations focused on games and learning were established shortly thereafter, including “[GamesforChange](#)” in 2004[2] and “[Games + Learning + Society](#)” in 2005.[3] Since then games have remained prominent in education. The number of articles matching the term “game-based learning” in Google Scholar has increased steadily each year from 604 in 2004[4] to 2310 in 2012.[5] Educational uses of games have received major grant funding from the NEH,[6] Catherine T. MacArthur, and Bill & Melinda Gates Foundations.[7] They have also received serious attention from mainstream media including news organizations NPR[8] and CNN,[9] the New York Times best-selling book *Reality is Broken: Why Games Make Us Better and How They Can Change the World*,[10] and as an exhibit in the Smithsonian.[11]

Despite the widespread dissemination of the positive aspects of games and learning, courses that utilize games are still an anomaly. Games have been mentioned in one form or another as an “emerging trend” four times in the NMC Horizon Report since 2004, including the 2011 version.[12] Yet games have never made it past the “two to three years horizon,” let alone reached what the NMC would consider “mainstream” status. This may be in part due to persisting negative stereotypes surrounding games, but I would argue that incorporating games into a classroom also present concrete and unique challenges. Unlike other technologies often implemented into courses such as social software and digital storytelling, games come with content. Finding a game that matches a given course can be quite difficult, especially when considering the disparate locations where one must look, most of which are unknown to non-gamers. The learning curve can also be quite steep. Strategy games can easily take 12 hours to complete a single game, and this time needs to be factored into any course syllabus. This means as well that games may require a large upfront investment in time for instructors to evaluate a game for inclusion in a course. Games also require a fundamental rethinking of a course’s pedagogical approach. With traditional resources, every student is exposed to the same content, whether it be lectures, readings, or multimedia. With games, the content changes depending on the player’s choices. This means the professors must create flexible and open-ended assignments and be willing to engage in discussions with students in areas in which they may be unfamiliar or unprepared. This also increases the responsibility of the student by requiring them to reflect on their own individual experience, compare it to the class as a whole, and seek guidance when necessary.

Fortunately, with the growth in the number and types of games, the options for educators to find a solution to these obstacles while also taking advantage of a game’s unique characteristics has also increased. Complex strategy games, once the

exclusive domain of private companies, are now being created by organizations and educational institutions as well. Commercial games have improved by encouraging modifications (or “mods”) of their games in an attempt to extend their shelf-life. Browser-based games have multiplied, especially in the STEM fields as more educators look for new ways to interest students in math and the sciences. Alternate reality games have entered the mainstream and have been used to introduce students to life in a different time period or a possible future profession. Finally, board games and card games with their extremely short development time offer the possibility of engaging students as players in a simulation of current events on topics ranging from global warming, terrorism, or the economic crisis.

## PC Games

One of the benefits of using games is their ability to present a scenario with a large number of interdependent variables in a manner that is accessible to novices. PC strategy games not only come with such a detailed scenario already created, in many cases they also come with a community that has analyzed and debated the system. As a result, students can first seek to understand the principles of the system before entering into a discussion about its merits, weaknesses, and relationship to reality. Since most of these games can be played as both single and multiplayer, students can also benefit from working at their own pace and with their classmates.

There are difficulties in implementing strategy games. Each student will need access to a computer, and most of these games are not free, though used copies of games older than six months can often be found very cheaply for around \$10-\$20. The learning curve for many of these games can also be significant. The instructor will most likely need to spend several days playing and evaluating the game before deciding if it is appropriate. If so, students would then need at least a couple of weeks of playing the game before understanding the relationships between the variables and the basic strategies. Because classes are likely to have students who have already played similar games, dividing the class into groups with at least one experienced gamer can shorten the learning curve and improve the students' experience.[13]

Probably the most significant challenge with strategy games is finding a game that matches the content of the course. When doing so, keep in mind that the game does not have to be a perfect match to reality, since the students will be deconstructing the game based on their class readings, discussions, and research. It does, however, need to make a reasoned representation of the content or present an argument that is worthy of such an analysis. For example, at Dickinson College, Professor Michael J. Fratantuono's first-year seminar course focused on two books, *Guns, Germs, and Steel* [14] by Jared Diamond and *Hot Flat and Crowded*[15] by Thomas Friedman along with the game *Civilization IV*. One of the goals of the course was to understand the world as a complex system. The game gave students the ability to see the importance of various factors on a civilization's environment, economy, and military survival. They were then required to compare how these same factors were described in their readings.

Educators in the area of history and political science have the greatest number of options when looking for PC strategy games. The *Civilization* series is among the most popular. It is a very sophisticated game that can be used in almost any course that discusses the importance of diplomacy, geography, limited resources, and conflict. It's also very flexible and has official and unofficial mods that attempt to recreate historical scenarios. Official mods are bundled with the game or sold as expansion packs while unofficial mods created by the community can be found on the [CivFanatics website](#). If you're interested in using a historical scenario or looking for an example to build your own, the Rhye's and Fall mod deserves a special mention for their world history scenario with custom maps, game elements, and logic. Players can download and help contribute to the mod on their [wiki](#).

The “Total War” series by [CreativeAssembly](#) is very popular with an active modding community as well. Mods can be found at [twcenter.net](#), and [PCGamer](#) also did a top 10 list of Total War mods in 2010. Another game studio with a good reputation for creating sophisticated history strategy games along with modding tools is [ParadoxInteractive](#). Expansion packs are sold separately and unofficial mods are published in the Paradox forums.

While large commercial studios develop most of the PC games in which educators are interested, there are some outstanding exceptions. [Peacemaker](#) is an award-winning game that allows you to become leader of either the Palestinians or Israelis with the goal of establishing peace. It does an excellent job of highlighting the numerous domestic and international interests that need to be balanced on each side in order to reach a peace agreement. Its only drawback is its use of what were once current events, which now seem dated in a game eight years old. [PeoplePower](#), the sequel to [AForceMorePowerful](#), is another game that focuses on conflict in current events, though it is intended to be a training simulator for non-violent protests. One of the principal improvements over its predecessor is the ability for educators or their students to create scenarios that can then be shared with the community. Finally, for those interested in socio-political simulations, [FateoftheWorld](#) is a very sophisticated and difficult game that focuses on the challenges facing those attempting to address global environmental issues. [Statecraft](#) is equally complex with a more general focus on international relations.

## Browser-based games

Relatively quick development cycles have made browser-based games the platform of choice among governments and non-profits hoping to educate and influence a wide audience. Many of these games can be used to introduce a problem or begin a discussion in courses that cover social issues, current events, and activism. Though usually not as sophisticated as PC-based games, they are almost always free and very easy to learn. Technology specifications are likewise minimal, requiring only a fairly modern browser, though usually with Flash installed. Finally, browser-based games are usually relatively easy to find since they're already posted on the web and are publicized in a few well-known locations.

For those in the social sciences, a good place to begin looking is [GamesforChange](#), which functions as a forum and distributor of games for non-profit organizations. As one might expect from games created by NGOs and governments, the focus is primarily on poverty, conflicts not covered by mainstream media, health, disasters, and the environment. It is important to remember that most of these games are intentionally subjective, having been created with the express goal of calling attention to a given issue. [DarfurisDying](#), for example, is not meant to teach players how to actually survive in Darfur, rather it calls attention to the tragic situation of many of the refugees.

Many browser-based games attempt to demonstrate the complexity of an issue that may be viewed simplistically by the public or media. For example, [Tell Me How This Ends](#) attempts to demonstrate the complexities and possible consequences of a war with Iran, while [End Game Syria](#) presents the player with the difficult choices facing the Syrian rebels. [Guerras Electorales](#), designed to inform players in Mexico of the specific types of electoral fraud, is similar in many ways to [The Redistricting Game](#) in that they both attempt to educate citizens on the corruption within their electoral systems. While the logic behind most of these games remains hidden, many credit the experts they used in creating the game on their websites, while others such as [ClimateChallenge](#) even publish the scientific reasoning and data underpinning game's logic.

In terms of academic disciplines, the sciences have the largest number of browser-based games from which to choose, although most are targeted at k-12. Those in higher education should check out [ERIAinteractive](#) from the University of Wisconsin. ERIA interactive has at least two games of interest. [Trails Forward](#) is a simulation game about wildlife conservation and the competing interests of timber companies, developers, and conservationists. They also plan to create a modding community that will reveal the underlying data of the simulation. The [Anatomy Browser](#) is potentially very useful as well, though even more interesting may be the goal of its creators to use the game to prepare players to look at medical images. Once they've mastered the game, there will be a Facebook group of professionals and amateurs who analyze medical images with the goal of improving accuracy in the professional community. The [MIT Game Lab](#) is another resource for high-quality browser-based games with an educational and creative focus. Popular games have included [Waker](#), which introduces the concepts of displacement and velocity, though in a very abstract manner, and [A Slower Speed of Light](#), which tries to demonstrate what would happen visually if light were to slow.

An emerging type of game for the sciences combines crowdsourcing with puzzle games. Scientific discovery games provide a link between learners and experts by introducing players to a scientific concept and then providing them with a problem. The game collects data from the players' solutions, which the game's creators then use for their research. These puzzles usually have to do with pattern recognition or structures, areas where humans outperform even the fastest supercomputers. [Fold-It](#), a game about protein structures, is the oldest and also the only downloadable game. Other true browser-based games include [Phylo](#) and [EteRNA](#), which center on genetic patterns, and [Quantum](#) for quantum physics. As puzzle games, these have a much shorter learning curve than most historical strategy games, though they usually only focus on a single concept. For educators, this means they'll have to put the games into a larger context in order for students to understand how the concepts of the game relate to the research that they are supporting.

For the humanities, games provide both a dilemma and an opportunity. Games that are either inspired by or attempt to reproduce literature are forced to balance staying true to the original story while still allowing for meaningful choices by the player. Despite the difficulties, there have been successes. [Kafkamesto](#) functions very well as an introduction into Franz Kafka's most common themes, and a team from USC is attempting an ambitious project to recreate the perspective of Thoreau with [Walden, AGame](#). There is even an "artist simulation game," [Avant-Garde](#), which places you in Paris as a contemporary to Cézanne and Manet among others. Of course, the games themselves can be the target of study as well. [Kongregate](#) has an enormous selection of free browser-based games, though if you're looking to narrow your selection to more artistic games, the [IndependentGamesFestival](#), [Gambitgamelab](#), and the [Brainy Gamer](#) are all great places to start.

Professors in the humanities, especially those with a focus on writing, may be better served having students create games. [Inform7](#) is a platform for developing interactive fiction, text-based games that have users type commands following written descriptions. If you are unfamiliar with the term interactive fiction, you may be familiar with Zork. Otherwise, if you have ever read a Choose Your Own Adventure novel, it's a similar premise. Until recently, creators had to download Inform7 as a

program and then compile and publish their finished games. Fortunately, [Playficnow](#) allows this all to be done from within the browser. One example for interactive fiction being used to teach writing comes from [Professors James Brown and Eric Alexander](#) at the University of Wisconsin who used Inform7 in a general education course as a way of teaching writing, computer programming, and the connections between them. Inform7 also requires that the writer think in terms of space: how each area stands in relation to the others forms the initial groundwork of the game. This makes it a good solution for having students research and recreate historical locations, as Professor Christopher Fee has done for his [MedievalStudiescourses](#) at Gettysburg College. While having the advantage of giving students the opportunity to be creators and researchers, it is important not to underestimate the time necessary to create even a simple game. Inform7 claims their code “reads like English,” which is true to a certain extent. It certainly is easier to understand than a computer programming language, but it still comes with its own syntax. Students will need to learn this syntax as well as the underlying logic of connecting the defined areas and logic sequences. Several weeks are needed for the creation of even basic games, and students should be given an example game with the same logic and scope that is expected of them. Doing so will minimize the frustration of trying to locate and fix what are usually fairly simple syntax errors in their game.

## **ARGs**

One of the strengths of alternate reality games is their flexibility. Loosely defined, ARGs are games with a running narrative that take place in the real world. Players are given challenges or puzzles throughout the story until the narrative reaches its conclusion. Since the technology used is often very basic—usually email and web pages that provide information about the narrative to the player—the game designer is also free to change the story as the game develops. For educators, this means that any subject that can be seen as helping to resolve a problem can be turned into an ARG. On the flip side, public ARGs are only played for a limited period of time, meaning in all likelihood the instructor is going to need to modify a previous ARG or create their own.

While creating a game may seem daunting, there are plenty of examples from which to draw ideas, many of which follow a pattern that are fairly easy to imitate. One example, [Nephrotex](#) is a game from the University of Wisconsin where students play the role of interns in a fictitious engineering company. As employees, they are part of a team tasked with determining specifications, conducting experiments, and then defending their design. By using an ARG, the professor has the advantage of covering all of the topics required for the course, while at the same time demonstrating their practical applications in the real world. Another game, [Dog Eat Dog](#), places students in the role of occupier or native and demonstrates the power relationship that leads to subjugation and conflict.

For classes with a historical component, there is a series of games designed for higher education. “[ReactingtothePast](#)” is a set of games where students are given roles to play at a certain point in history, usually preceding a conflict of ideas. The students’ roles determine their interests and philosophies, and they must research their own character as well as the background of others in order to convince other players to join their cause, which may take the form of debates in parliament, Vatican councils, newspaper columns, etc. While the game begins with historical accuracy, the narrative will change based on the actions of the players and the decisions of the instructor running the game. They currently have games published under the Pearson Series, any of which could function as a template for a similar game set at a different point in history, provided that the content of the course focused on competing ideologies.

## **Board Games**

Usually when we see games mentioned in regards to education, we are referring to some sort of digital game. While digital games do offer some advantages, board games continue to thrive. Without any technical requirements and usually quite inexpensive, board games are extremely accessible. The learning curve varies greatly depending on the game, though players are saved from having to learn the numerous action commands of a digital game. [BoardGameGeeks](#) also provides a central location for finding games and reviews for an enormous collection of board games.

Another key advantage of board games is their comparatively short development time. For example, GMT Games, one of the largest strategy game publishers, has a unique model called [Project 500](#) whereby customers effectively vote on a game they would like to see distributed through discounted pre-orders. Once the threshold of pre-orders is reached, the game is published. This makes it possible for board game makers to create complex strategy games that reflect current events. It also makes it easier to modify games for education ([Catan: OilSprings](#)) or to create them ([AfghanProvincialReconstruction](#) and [PeacekeepingtheGame](#)).

## **Consoles**

Academia has until recently largely ignored console games. First person shooters and sports games offer little content for discussion, and their cost discouraged widespread use in the classroom. However, as the game industry in general and the

role-playing games in particular have grown in popularity, we've seen them being discussed as a cultural medium within courses, such as [Scandinavian Fantasy Worlds: Old Norse Sagas and Skyrim](#) from Rice University or [Dystopia, Revolution & Leadership](#) from University of Richmond. We've also seen indie games such as [Flower](#)[16] and [Journey](#)[17] make more creative use of the immersive aspect of console games to challenge the form and raise questions about the definition of art. [Papo & Yo](#) has continued this trend while at the same time confronting the issues of alcoholism and child abuse. Another indie game, [Portal](#), has been used as part of the course [Enduring Questions](#) for freshman at Wabash College, and its sequel, [Portal 2](#), has a [companion website](#) for educators as well.

## Conclusion

While each type of game comes with its own set of advantages and challenges, there are a few guidelines that can help make the introduction of any game into your course successful. It is important from the beginning of the course to be open with students about your reason for choosing the game, expectations for the students, and that, because the course is a pilot effort, you will be learning along with them. In any course that varies from the norm, students often express concern about assessment. This is particularly true in a course with a game where students may feel they must "win" in order to receive a good grade. By making your learning goals clear, you can help students see the failures, which are a part of any well-designed game, as part of the process. Reflection is also a key component in any course with games. Since the content of a game changes based on the players' decisions, students need to hear from their instructor or other players at regular points in order to maintain focus on the larger picture. Finally, when constructing the course assignments, try to do so in a manner that encourages students to cooperate either as a class or within their groups. In addition to reducing the initial learning curves for the games by utilizing experienced players within the class, you will also create a natural forum for the exchanging of ideas and reflection outside of class hours.

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## Notes

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