Teaching as Designing: Creating Game-Inspired Classes

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Abstract: Good teaching is a form of design. Yet, while there has been a significant increase in game-based learning approaches over the last decade, little work has been done to bridge the good pedagogical principles of games with a robust theory of teaching and course design. This paper describes the implementation of two "game-inspired" undergraduate courses which leveraged the conceptual and organizational principles of games to structure each course. While both courses established student roles aligned to content goals, one course emphasized collaboration structures and specialization, while the other iterated roles in the service of supporting a broader dispositional development. We argue that course design is one way of meaningfully orienting learners' engagement with the course content and their own participation.

This paper describes the design and implementation of two "game-inspired" undergraduate courses which leveraged the conceptual and organizational principles of games to structure the courses. Groups like the New Media Consortium (Johnson et al., 2014) and MacArthur's Digital Media and Learning initiative have consistently highlighted the significance—and increasing use—of game-based learning (GBL). There is a growing body of research and practice in which teachers, scholars, policy makers, and game designers have used videogames as a method of augmenting or even replacing instruction. The tremendous variety of these instructional models highlights the unsettled territory of GBL and of the need for rigorous analysis of any game-based instruction.

One core insight of game-based learning—though often neglected—is the potential to conceptualize of teaching *as designing.* In particular, theories of embodied and situated cognition stress that leaning is experiential, so we can think of teaching as a way of designing experiences that are good for learning (Holmes, 2015). Thought of in this way, games have a great deal to tell us about teaching. Games are "designed experiences" (Squire, 2006), where game makers create opportunities for interacting with interesting, well-ordered problems. Players then "enact" these designs and receive copious amounts of just-in-time and on-demand feedback (see especially Gee, 2003) which in turn informs their continued interaction. Games model what *good learning* looks like, as Gee argues, but also ways in which *good learning experiences* (ie teaching) can be designed. Many existing GBL models, however, emphasize the games themselves and the kinds of learning that occurs, with much less attention paid to the teachers or the design of the game intervention (e.g. class set-up, support materials, follow-up lessons and so on) and how those designs are a method of guiding the instruction (and learning).

One method of unpacking the relationship between course design and teaching and learning goals is design research (see especially Cross, 2006) in which the decisions made during the design illuminate the underlying philosophy. Both courses examined here sought to embed meaningful structural elements utilized by good games (such as identity play and collaboration), but in strategically different ways. We discuss the design rationale behind each course, provide a set of design principles which leverage the power of videogames as models for teaching, and suggest implications of using games not just in the class but in *designing* the class to capture the effective pedagogical methods videogames demonstrate.

Theory

For more than a decade, there has been increasing focus in videogames as models of good learning. In particular, as interest in out-of-school learning has increased, scholars, policy makers, and game designers have turned to videogames as one particularly insightful field of study for good learning. One of the most coherent—and influential—works on the nature of game-based learning is Gee's *What Video Games Have to Tell Us About Learning and Literacy* (2003). Much of the research cited below is based, directly or indirectly, on Gee's analysis. Gee lays out a compelling case for games as models for deep learning tied to empirical research into cognitive development, which he develops into 36 learning principles. In particular, Gee describes a series of game design features—such as providing multiple pathways to success and giving copious amounts of just-in-time feedback—that support learning and shows how these mechanisms align with theories of how the mind works. Game design (and even the nature of videogames as *enacted designs*) works in service of good learning. While Gee articulates a clear view of how games demonstrate good learning, he also largely neglects the teaching components which support that learning. Perhaps the most interesting observation about Gee's 36 learning principles is how closely they align to good teaching practice without explicitly connecting the two.

The way game designers build engaging experiences which capture the mind's need to seek patterns, build associations, face (not too difficult) challenges with clear goals, and develop intrinsic motivation from solving those challenges seem to mesh very well with current theories of the way the mind operates and the way learning works best (Holmes, 2015). Although we have not traditionally thought of game designers as teachers, they often demonstrate very effective teaching methods. It is especially telling that many game designers have identified not only the importance of designing experiences (learning opportunities) but also recognizing many of these features of good learning, if not always in those exact terms (see especially Costikyan, 2002; Salen and Zimmerman, 2003; Koster, 2007; Shell, 2008; Fullerton et al., 2008). As Gee (2003) has pointed out, game designers have intuitively developed deep learning goals and teaching methods as part of their design process by necessity, as players must learn how to play the game and understand their performance in order to remain engaged. Game designers have "caught on" to many fundamental principles of good teaching, and the methods that game designers use to promote and sustain engagement, model action, and tell the player how they are doing in their participation can be quite illuminating when considering teaching of all kinds.

Many educators have used games in their classrooms across a range of disciplines (see Tobias and Fletcher's [2011] comprehensive literature review). One trend that has more directly addressed issues of games and teaching is *gamification*, or turning the learning situation *into* a game (see Deterding, et al., 2011; Reeves and Reed, 2009; Dignan, 2011, Zichermann and Cunningham, 2011, Schell, 2010). Much of the literature around gamification focuses on features that make games motivating, engaging, and enjoyable and not *necessarily* because they represent good teaching and learning platforms. Indeed, gamification of classrooms and other domains are somewhat controversial and have been critiqued for this and other reasons (see Duncan, 2012 and Bogost, 2011, for example). Gamification often co-opts features of play in "inauthentic" or meaningless ways. Gamification frequently serves simply as a "re-skinning" of a classroom rather than a real innovation.

More importantly, gamification suffers from several problematic design flaws. Many gamified courses include terminological or metaphorical tropes from videogames such as guilds (semi-formal groups of players), quests, bosses (difficult enemies roughly akin to a mid-term or final exam), and strong narrative arcs (see Sheldon, 2010 and Hodgson, 2013, for example). While these tropes may serve as organizing elements (indeed, both courses described in this paper use some forms of these metaphors) to help connect students to the structures of the course, many gamification models wrap these metaphors so tightly with gameplay "mechanics" in the course that they simply introduce an additional metaphoric layer on top of what may already be a confusing space such as a classroom. Assigning roles common to videogame tropes such as "mage" (designer), "ranger" (writer), "warrior" (programmer), as Sheldon does, can be arbitrary and opaque; while these are common roles in games they have little relation to the content goals or skills a teacher may want to cultivate. Game metaphors can obscure the concept and hinder the student, especially when they are not already deeply engaged in gaming practices and may not understand these tropes. Judicious use of these metaphoric tropes can help orient students, but often gamified courses rely too strongly on making a game that they become potentially confusing.

Indeed, gamification often focus so heavily on making a class into a game that students may end up "playing" the course game and not engaging with the course material. How students "level up" and earn experience can serve as a meaningful metaphor, but it can also be arbitrary or misaligned with the learning goals at the expense of making a working "game". A game layer can interfere with the student's engagement and lead them to focus on maximizing their game performance rather than engaging in any meaningful learning. Duncan (2011) provides an example of students "gaming" his course in such a way as to get out of doing entire assignments (thus avoiding the actual learning objectives of the course).

Finally, making a game is very much an art form (Schell's influential book is even titled *The Art of Game Design* [2008]). Creating balanced systems of play, engaging mechanics, rules and win states and other game features require a great deal of work. Requiring teachers to master not just instructional design but good game design principles is a tall order indeed, particularly because they are not always aligned. Gamification often suffers simply by asking teachers to take on tasks that they are not necessarily good at and which may or may not actually help their course design (and may even negatively affect it).

For these reasons and more, we propose here that instead of making classes into games, teachers—as designers of good learning experiences—can use insights from GBL research in developing their courses in relatively lightweight ways which avoid some of the problems of gamification. The principles developed here do not require any game mechanics or play elements; they do not even require the coursed to be about games at all. Instead, what we intend to provide are methods of designing good learning experiences using videogames as a model for what good, effective teaching looks like based on more than a decade of GBL research.

Course Examples

The courses we discuss below sought to create a disposition towards learning and participating in class that revealed and strengthened a connection to the course content, not just one which seemed motivating or engaging. We also consciously avoided a pervasive "game" layer to the courses layer to avoid the problems described above (namely adding metaphoric complexity and students "gaming" the class), though we did often include some terminology and orientational metaphors which helped connect the topics and actions as well as explicit videogames play as part of each course.

Course 1: Videogames and Digital Rhetorics: Using Games as a Lens of Study

In this upper-level undergraduate English elective, students explored rhetorical concepts through examples in videogames as well as their collaborative play as a class using *World of Warcraft* (*WoW*); in this way, students had a practically grounded experience "playing" the topics they studied. The course was designed around the *WoW* "party" concept in which students became experts in a specific conceptual area (identity, design, teaching and learning). A cohort of experts in the same conceptual area collaboratively developed a weekly principle that they shared with the rest of the class. Students from the other disciplines did the same, and then utilized the various principles to tackle a weekly challenge. By sharing out their knowledge to the other cohorts, students served as masters/experts and teachers; they provided enough information for the other students in the other cohorts to understand (at least superficially) the particular perspective in order to both incorporate it into their own perspective as well as to synthesize as a class around a weekly problem. The course design resembled Aronson and Patnoe's (1978) concept of the "jigsaw classroom," the most significant difference being that this particular course focused on the learning of the class as a whole rather than as small groups of learners. This design stresses that learning is highly interpersonal (Hattie and Yates, 2013) and the human mind is geared for social collaboration in knowledge building tasks. In modern classrooms, however, students are often simply parallel learners (learning side-by-side) with various instances of shared labor (group work). The design included multiple assumptions: that students learn best by learning as part of social groups; that students could cover more ground as a group than individually; that students collectively co-created knowledge both as experts in a domain and by supplementing their knowledge with that of their peers; and that the "work" of the class required the knowledge and practice of all class members.

Course 2: Designing Courses as a Journey Towards a Critical Disposition

This course design model focused on a game-based course that aimed to help students understand the relationship between technology and society through a series of Quest Lines. In each Quest Line, students took up a role (i.e. critical consumer, ethnographer, game designer, etc.) and progressed through thematic quests to develop the skills that are necessary for them to succeed in the boss battles (project assignments). While this may read simply as a re-skinning of the standard layout of a course, these small design tweaks lead to larger dispositional shifts whereby students came to see their coursework as moments of their own larger professional trajectory beyond the course itself. That realization is the central intent of this design, and critique of the existing paradigm of course design. Drawing on the rhetoric of "life-long learning," and the observation that at the university level curricula are enacted as separable building blocks that *should* assemble into something useful by the end of the student's degree program but is often only addressed tacitly or not at all, this course design is an attempt to provide a trajectory for students to conduct that assembly as part of their participation in the course. This design draws from the work on Transformational Play (Barab, Gresalfi, Ingram-Goble, 2010), research that illuminates the relationship of games to education and learning. Transformational Play suggests that video games provide opportunities to render the dynamics among person, content, and context as particularly valuable educational experiences.

Game-inspired Teaching Design Principles

Both courses were designed to adopt many of the insights of GBL research aligned to theories of embodied and situated cognition. Both courses began with the assumption that good classes—like good games—are problem solving spaces, and that learners should have agency over their experiences within these spaces. To guide our designs, we developed a set of principles inspired by videogame design and GBL research. Importantly, these principles take advantage of insights from game design while remaining "lightweight" enough to apply to a range of classes rather than being tied to one or two very specific instances. That is, utilizing these principles does not *necessarily* require major reconfigurations of normal classroom set ups (although it does not preclude it, either) nor a tremendous amount of additional work on the part of the teacher (Holmes, 2015). Indeed, many of these design principles are not terribly different than things teachers already do; we have simply organized them in such a way as to call attention to important design features that may go unnoticed or unaddressed in more traditional course

design. Teachers don't have to be game designers (worrying about play mechanics and balance and metaphoric cohesion and a range of other game-specific issues). Instead, these principles are intended to remove game-specific problems while still benefiting from the meaningful organizing structures of games and allowing teachers to see themselves as *designers of good learning experiences*.

Design Principle: Cultivate and resource distributed knowledge and abilities

Many good videogames consist of complex problem spaces which provide opportunities and resources for players to work towards successfully solving these problems within the game; high-level mastery, however, requires social interactions and sharing of knowledge that go beyond "just" the game. *World of Warcraft, Dota 2*, the *Pokémon* series, or *Minecraft* are good examples. Players contribute to wikis and frequently asked question (FAQ) sites, discuss tactics or theories on forums, share "how to" videos on YouTube, stream their own play on Twitch.tv and collaborate through many other sites and methods. Games provide the "shell" for play (the play space, the challenges and goals), and give players tools to play (the mechanics, game features like group chat), but often it is up to players to pool their expertise in order to really play the game.

Good course design can also leverage this kind of distributed knowledge and resourcing of different learners. Learners (like videogame players) often have a range of different skills, abilities, previous experiences, interests, motivations, and goals; a teacher can help connect and cultivate these differences towards some common or shared goal in order to not only amplify the kinds of learning happening but also to provide opportunities to see new perspectives and to capture varied interests. In Course 1, for example, this was a primary goal—borrowing the *World of Warcraft* party model as an organizing structure of the class helped students gain deep knowledge around a specific idea of way of seeing a problem but also broad knowledge across several perspectives by relying on each others' learning and teaching. The teacher, in this scenario, established the weekly challenge and provided resources (such as readings and specific gameplay experiences) to the various groups to help them develop their principles, and facilitated the interactions between the various groups.

Course 2 similarly promoted sharing of knowledge and opportunities for learners to critique other student's work. The course adopted a design studio model in which groups of students worked throughout the semester together. While each student was responsible for their own production of course assignments, the studio teams reviewed each other's work, provided feedback, and also worked on tasks collaboratively. Further, students had plenty of opportunities to evaluate their work against their peers in order to gain a sense of where they were in their own learning as well as to learn from the other students' as well. Both course designs provided ways of promoting distributed knowledge among the students (either by requiring them to jointly develop and share their work or to act as peer-mentors) and to resource learners in different ways.

Design Principle: Allow learners to explore and customize their learning

As noted above, there are many different kinds of videogames players (much like there are many different kinds of learners), and many good videogames allow players to customize the game to their preferences. Some customization features relate to things like difficulty (players can make the game easier or harder) or the appearance of their in-game representation (choosing a gender or changing the face and so on). Other customization features are more nuanced; some games allow players to use different styles of play or tactics (in *Deus Ex: Human Revolution*, for example, players can play stealthily and non-lethally or they can focus on heavily-armed combat), while other games change the narrative progress based on players choices (the *Walking Dead* game, for instance, provides many opportunities for players to make choices that affect how the story unfolds). Customizing their play experiences gives players agency in aligning their interests to the possibilities of the game, which in turn helps promote engagement and motivation in their participation since they "own" the experience.

The example courses handled exploration and customization somewhat differently. Course 2 was designed around a conceptual progression of gaming from critical consumer to ethnographic participant to game designer and finally to "entrepreneur," where students had to "pitch" their ideas developed in their game design, accounting for thinks like marketplace analysis, social impact alignment, and the overall player experience. In this way, students developed a multi-faceted understanding of the breadth of approaches to videogames, from the player and maker perspectives. Each student produced materials at each point but had the opportunity to focus on a particular frame in their final project design. In this way, students gained insight about several different perspectives but could customize their effort towards a particular perspective that meshed with their own interests.

Course 1 provided somewhat similar customization opportunities as well. Students specialized in the topic that most interested them and had the opportunity not just to collaboratively create their weekly principle but to "teach" it to the other groups. Within each group, students had opportunities to adopt various roles (organizer, maker, communicator among others) so that they could choose not only the topic that interested them but also the *way* they participated in the process. Finally, students' final projects were loosely defined to allow students to produce things meaningful to them; indeed, one goal was to try to help students align their course project with their work in other classes in order to trace connections that may not be readily apparent. In this way, student projects ranged from poems and artwork to more traditional essays and even a joint alternate reality game design project.

Design Principle: Treat learners as Co-Designers and Agentive Participants

This principle closely relates to the previous one. Part of the function of customizing their game play experience is that players get to co-create the game; that is, game designers create opportunities for players to engage the game and provide resources for their play, but players have some responsibility to enact the design in the ways they see fit. This is true in the literal sense (as "interactive" media, games need players to do *something* for the game to progress). But it is also true in the sense that players can make choices (supported by the game design) in how they want their experience to unfold and have the means to enact those choices. Some games do this more radically than others; a game like *Minecraft* is heavily based on providing tools for players and then letting them build and explore a great deal, whereas highly scripted games like the *Final Fantasy* series are relatively linear and provide far fewer opportunities for player agency. These designs vary depending on the intended experience (*Minecraft* is a "sandbox" game whereas *Final Fantasy* games are primarily narrative games) but nearly all games allow players some control over how their participation unfolds.

Both courses, as described in the preceding principles, show varying levels of learner co-design. Both designs promoted active choices from students in how they would participate and what their learning experience would look like. Course 1 provided students not only the chance to "specialize" in a thematic framework but in developing their own principle which they shared with the other groups. They, in some senses, developed the teaching materials and structures for their classmates. The instructor facilitated and supported these moments through timely interventions (planned readings and activities as well as ad-hoc discussions on the course forums and in class) but allowed students to create and execute many of the core teaching acts throughout the course. Course 2 allowed students opportunities within their design studios to structure their conversations and to develop the course materials (in particular thematic "impact guides" and their game designs) which other students would respond to. In both cases, students were co-creating the course within structures of the course design but in active, meaningful ways.

Design Principle: Structure Moments to Gauge How Learner Is Doing and Where to Next

One key feature of most good games is that they perform deep assessment throughout gameplay and provide meaningful feedback to players on their performance (see, for example, Shute and Ventura, 2013). Players learn about how they have just performed on a task and on their overall progress (the *Guitar Hero* games provide real time assessment and feedback on the player's performance; missed notes are accompanied by buzzing noise, flashing icons, and the "audience" booing, while successful play provides different feedback responses, for example). Furthermore, good games also provide information on what the player should do next, either to improve their performance or to progress through the game (in *Batman: Arkham City*, the game will pop up "tips" if a player struggles to land a hit or perform some combo; similarly, the game includes narrative audio tracks indicating the next part of the city to go to during the story as well as a marker/indicator on the players map to help guide them to the next task in the game). Both kinds of feedback—on how they are performing and what they should do next—are important to keeping players progressing through the game successfully.

Beyond the somewhat "normal" assessment and feedback used in each course (grading papers/projects, for example, and leading class discussions), each course included several organizing structures for students to gauge their own progress and to understand upcoming tasks and expectations. Course 2 used several game-like metaphors which framed the student's experience as a "journey" with "quests" (thematic sections of the course). Both courses used the terms "boss" and "mini-boss" to indicate an important or more difficult challenge. Course 1 used the metaphor of the *WoW* party to help students understand their organization and their interdependence, tied to in-game activities. While both courses did adopt some of these terms from games, they were not "game" elements per se; rather, they were quick metaphors for understanding how the pieces of the course related to the whole. These metaphors provided a shorthand (particularly to "gamers" but also to non-experienced gamers since they were tasked with playing games throughout the semester) to help students know what was expected and what they should be doing at any given moment. Adopting these terms is not necessary, but we both found the convenience of melding game terminology with key elements of the course useful and effective.

Design Principle: Provide Ways to Develop a Critical Narrative for Learning Trajectories

Most games are, at their core, narrative experiences. Some games, of course, are about the story on the screen (the journey of the protagonist in *Bioshock* or the personal consequences of World War 1 in *Valiant Hearts*). Some are primarily about the player's experience (their epic *Flappy Bird* run or *Drop 7* game). Most games balance the designed and emergent narratives. In many important ways, games are about the way the player and the game together create some kind of meaningful story. Like any compelling narrative, players should feel somehow changed by the experience, that they know or feel something different than when they began; perhaps not always profoundly (a game of *2048* may not be life changing), but at the least the player has some new critical understanding of some phenomenon and some sense that their participation has mattered.

Good learning should do the same, though often the "story" of the learner's experience is ignored. Indeed, one of the most compelling factors in learning, as mentioned above, is that the learner has something at stake and that they feel that what they are learning matters (see Hattie and Yates, 2013, for more). Both courses took this design principle as the foundation for all the other design choices, that the students should develop some kind of critical narrative over their learning and that the story of their journey is of the utmost importance. Course 2 provided the most concrete articulation of this; the course was described as a "journey" to students, and throughout students took on "roles" (critical consumer, ethnographer, designer, entrepreneur) which promoted personal investment and identity building. Course 1 was designed to connect students in-class and in-game experiences to their other courses and their other non-academic experiences and promoted engagement with people and activities beyond the classroom so that students could see their learning as part of their everyday life in meaningful and critical ways. Both courses were intended to orient learners not just to facts or content or even to general themes but to help students learn to incorporate their learning into broader personal stories about their experiences and their participation as critical citizens in the world at large.

Implications and Further Research

This paper is primarily a theoretical paper intended to synthesize GBL research with a models of game design in order to create classes which capture the good teaching present in many good videogames. Our chief aim is to highlight two important ideas: first, that videogames provide models of good teaching and good experiences for learning and that teachers should conceive of themselves as *designers of good learning experiences*; and second, that using games as a model for course design does not necessarily rely on including game components but can still benefit from the insights of videogames in their design. In other words, we want to provide design tools to teachers inspired by videogames without forcing them to necessarily become game designers, thus avoiding many of the problematic issues of *game* design often found in gamification models.

We have not directly provided evidence from the actual implementation of these courses here, although this is an important next step in determining the effectiveness of these models. We do believe that our design principles are built on more than 10 years of research into GBL and have a strong empirical foundation, but more rovust analysis of the way these courses run may validate (or invalidate) these design theories. We have collected data from one implementation of Course 1 and two implementations of Course 2. Further instances of both classes are planned for in upcoming semesters in which we plan to collect more qualitative data from students participating in the courses. The design principles developed here illuminate how these designs played an integral part in the instructional process, and our continued data collection will show to what degree the structure of these courses influenced student dispositions towards their learning. Ultimately, we believe that by seeing teaching as a form of designing good learning experiences, based on evidence born out in the GBL literature and in our own course designs, that we can open up new and effective instructional approaches.

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