What Game Are You Playing?
Affordances of Tools for Incorporating Game Elements into Classrooms

Caitlin Holman, Stephanie Wooten, Barry Fishman, University of Michigan
cholma@umich.edu, swooten@umich.edu, fishman@umich.edu

Abstract: A variety of applications have been designed in response to the growing interest in using game elements to create more engaging classroom environments. We reviewed these systems, identifying which game mechanics each supported and type of motivation they support. We propose a classification system to help frame the discussion around the patterns of implementation in these applications.

Introduction

Inspired by the intense engagement produced by video games, efforts to add "game design elements in non-game contexts" have grown rapidly (Deterding, Dixon, Khaled, & Nacke, 2011). In education this has taken the form of using game mechanics to make classroom environments more motivating (Fishman et al., 2013; Sheldon, 2012). Managing these courses with the tools built for the traditional classroom has proven administratively challenging, with both instructors and students reporting difficulty keeping track of progress (Holman, Aguilar, & Fishman, 2013), thereby limiting the potential for this pedagogical shift to impact engagement.

To address this issue, course management applications have been developed that support a variety of game mechanics directly. However, each system has implemented support for individual game mechanics independently, selecting the items they perceive to be most desired by their particular community, or most important to creating a particular vision for new course designs. Do the courses these systems then support result in different styles of games? Do the mechanics that are available and the manner in which they are implemented suggest different types of motivation are being supported for the students who use these systems? Our goal was to identify which systems currently support which mechanics, as a first step to understanding any differences in the style of games available, and the motivational impact of each platform.

All of the systems support core elements that define games; many also use playful language to affirm the different frame within which these courses are operating. Beyond these basics, we have classified each game mechanic as being either "gamified," or "gameful." We term *gamified* mechanics as ones that primarily rely on extrinsic motivators in order to encourage students to participate in class activities. *Gameful* mechanics require the re-design of classroom structures to emphasize agency, belonging, and support for competence in way that is meant to increase intrinsic motivation.

Methodology

	Core Game Mechanics			The Game Frame		Gamified Mechanics				Gameful Mechanics				
	Points	Individual Quests	Levels	Game Language	Interactive Avatars	Leader boards	Badges	Rewards	Penalties	Teams	Group Quests	Unlock Quests	Unlock Abilities	XP/SP
3D GameLab	■	■	■	■		■	■	■				■		■
ClassCraft	■		■	■	■	■		■	■	■			■	■
Class DoJo	■				■			■						
Gamified	■	■	■			per game	■							■
GradeCraft	■	■	■	per class		■				■	■			
Youtopia	■	■				■	■			■				■

Table 1: Game Mechanics Supported per Course Management Application

We identified all available systems designed to add game elements to classroom instruction. We excluded applications that host educational games (e.g. BrainPOP, Manga High), and instances where the gamified features are part of a platform delivering set content (e.g. Duolingo, Khan Academy). We selected six systems for analysis: 3D GameLab, Classcraft, Class Dojo, Gamified, GradeCraft, and Youtopia.

Using documentation, branding materials, and, where possible, demo accounts, we documented each system's game-related features (Table 1). We classified each mechanic as primarily producing extrinsic or intrinsic motivation. We identified individual quests, points, and levels as elements that are core to the game itself. The use of avatars and game-like language (i.e., renaming "Assignments" to be "Quests") stood out as features that are not truly game mechanics but do establish a playful environment, reducing perceived risk and encouraging the exploration of identity. We have labeled these features as supporting the "Game Frame."

Discussion & Conclusion

Points and leaderboards are the only mechanics that appear across all six systems. *ClassCraft* and *ClassDojo* are specifically designed to manage *classroom behavior* using game mechanics; as a result they do not include a way to set quests for learners to choose from (thereby supporting autonomy), but rather students are rewarded with points (or receive "Hit Point" penalties) in exchange for good behavior. *ClassCraft* is the system that supports the perception that you are playing a game (particularly a role playing game) most strongly, having an interface that uses extensive game language, and an elaborate interactive avatar system; it offers a mix of extrinsic and intrinsic mechanics, placing a strong emphasis on teamwork by enabling students to use their powers to 'save' other classmates, and offering a sense of that one's competence is progressing through the 'unlock' of abilities (i.e., eating in class, taking notes into a test) in exchange for good behavior. *ClassDojo*, on the other hand, supports the same gamified mechanics of leaderboards, rewards, and penalties, but none of the gameful ones. It also does not include the majority of features we would consider core to games, and thus relies solely on the extrinsic motivation of gamified mechanics to spur action.

3D GameLab, *Gamified*, and *GradeCraft*'s approach is quite different from that of *ClassDojo* and *ClassCraft*, as the systems lay out all available quests for students to autonomously select from, and then inform them of their progress per task, and for the whole class. These three systems generally support similar game mechanics: they establish a playful environment using game language, use badges and leaderboards to extrinsically motivate action, and support one to two gameful mechanics each. *3D GameLab* has implemented both an quest unlock system, requiring students to complete tasks to specific degrees of mastery before they are able to progress on to more advanced tasks, and a distinction between experience points (XP) and skill points (SP), encouraging students to reflect on their growth in competence throughout the course. *Gamified* (the platform) also supports the XP/SP breakdown. *GradeCraft* has supports the gameful principle of belongingness through implementing the mechanics of Teams and Group Quests. *Youtopia* is the best at supporting multiple contexts, being intended for use in classrooms as well as co-curricular spaces. Like *ClassDojo*, *Youtopia* has chosen not to implement core game features like levels, game language, and avatars, in favor of supporting two core gamified mechanics, and three gameful ones, as a result feeling less like a game but engaging in a variety of different ways.

De Shutter, B., & Abeele, V. V. (2014). Gradequest - Evaluating the impact of using game design techniques in an undergraduate course.

Deterding, S., Dixon, D., Khaled, R., & Nacke, L. (2011). From game design elements to gamefulness: defining gamification, 9–15.

Fishman, B. J., Deterding, S., Vattel, L., Higgen, T., Schenke, K., Sheldon, L., … Aguilar, S. (2013). Beyond Badges & Points: Gameful Assessment Systems for Engagement in Formal Education. In *Games + Learning + Society*. Madison.

Holman, C., Aguilar, S., & Fishman, B. (2013). GradeCraft: what can we learn from a game-inspired learning management system? *\ldots International Conference on Learning \ldots*, 1–5.

Sheldon, L. (2012). *The multiplayer classroom: Designing coursework as a game.* Boston, MA: Cengage Learning.