Board Game Design and Implementation for Specific Language Learning Goals

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Abstract

Board games provide a social atmosphere that digital-based learning environments are still having a hard time recreating. This is in part due to the shared experiences created by playing together face-to-face. In this paper, a blend of game theory is introduced that illustrates this difference in the game experience and attempts to show how it can be utilized for educational board game design. Using board games in the classroom can be a great instrument for increasing motivation among students to communicate. It is difficult to find a game that not only is both fun and motivating, but also focuses on the intended learning goal. From this blend of game theory comes an approach to design, create, publish and implement a board game experience into a specific learning goal. Important gaming ideas, elements and mechanics of board games are discussed. Development and publishing tools for board games are introduced. As a practical example of the board game development process, games created by the author are discussed.
Keywords: Games Based Learning, Board Games, Game Design, Gamification, Educational Gaming

A recording of this presentation can be found along with research notes at http://erichawkinson.com

Board Games in Education

Games have elements of play and discovery that are very appealing and engaging. This is why games have a long and rich history. The history of board games goes back to 3500 B.C., when Egyptians played a game called Senet, and the actual boards have been exhumed from burial tombs and can still be viewed today. Board games were an evolution in gaming that began to bring elements of game play together and tie them to a physical representation, which can be looked at as the beginnings of simulated gameplay. Some of the oldest and most prominent examples of board games such as chess, go, and shogi are really exercises in battle tactics and strategy. So board games have been a part of our education for a very long time. As game theory and the mechanics of board game play advance, opportunity for the meaningful application of board games for educational purposes is increased.

Board games and video games have been found to instill a higher level of motivation for learning, although it is still disputed as to what elements or processes in games are most essential to motivating learners *(Dondlinger 2007)*. This dispute largely stems from the fact that different learners are stimulated by different things and game elements are no different in this thought.

Board games have been developed for educational purposes in almost every field. They have been used in early childhood education to encourage mathematical thinking skills (*Kamii 2003*) and in medical schools to assist pharmacy students in learning metabolic pathways (*Rose 2011)*. Examples like these show just how detailed learning goals can get for educational board games.

Games are being integrated into the learning process in more fields of study, age groups and corporate training rooms as time progresses. This paper's aim is to refine the ideas behind the design of board games for very specific learning goals. Understanding the elements of gameplay and how the game experience unfolds will help teachers and trainers design more engaging, meaningful games around their learning goals.

Board Games and Video Games

Starting in the 1930s with the rise of big game publishing companies like Milton Bradley (Candy Land, Chutes and Ladders) and Parker Brothers (Sorry, Monopoly), board games found their way into more family homes. This was also when the concepts and mechanics in board games started moving away from the traditional battle simulation type games. This design trend was enforced even further in Germany after World War II where it was forbidden to make or play war-like games. As board game themes and concepts broadened in Europe, US sales were hit in the 1980s when video games started to come into homes. Video games took the forefront away from board games for more than a decade until the mid-1990s when board and card game sales started to increase again. Now, board games are often created based

on video games, movies, and TV. This goes for card games as well. Game designers have become more proficient in taking themes from other media and creating a game experience for fans and thus licensing media brands for board games has become commonplace. This trend that board and card games have found a way to supplement other media is evidence that they also can supplement traditional classroom media.

So, if you are lucky enough to have the choice of designing a video game or a board game for your learning goal, which do you choose? Both board games and video games have advantages and disadvantages when matching them to learning goals. The most important thing to note when talking about the design of board games in contrast to video games is the physical and mental positioning of players and the experience that comes out of those positions.

In the most effective board games, players physically surround a space and interact with board elements and each other. In the most popular video games, the player assumes an avatar or character to use to interact with a virtual environment and other avatars in that space. So the video game experience as a human experience is adding one or more levels of separation between players both physically and mentally. When players assume a character in a board game, they must become that character as an actor does on stage in many ways. From this, a whole different dynamic of informal learning occurs. This is why I contend that board games have a distinct advantage for learning goals that revolve around language, communication and team building.

That is why the example used to prototype and playtest board games in this paper is a game designed for non-native English speakers. Video games have an advantage when the player must interact with environments and objects, especially with environments that might be dangerous or expensive. So, if you had to train a team of engineers to build a bridge and you wanted to incorporate a heavy load of game play into the training, you might start training with a computer simulation of the bridge and test the working environment, the tensile strength of the materials and the physics involved in construction.

You might then bring all the engineers together to play a board game so they can know how their skills are best utilized by others, how each individual's role fits into the overall construction of the bridge and how the construction schedule should progress.

Board Game Design Theory and the Game Experience

The idea of the game experience is at the heart of what makes our learning goals take on life, meaning and relevance to the game's participants. The game experience can be interpreted in many ways. In the following passages, the layers of the game experience will be looked at first from a broad perspective and then to deeper and more detailed ones. The game experience and its layers will be peeled like an onion.

For the purposes of creating a game, it is helpful to think of the game not as a collection of cards or a set of rules, but rather as an experience that comes from using them. That experience is derived when the player interacts with the environment and other players. That experience is brought about by the dynamics at work between the players and the game's environment. The player is exuding a set of attributes against or with the game and the game's environment has attributes to force players to exude those traits. It's a good headspace to be in to start to understand how the experience is created from the game and how to turn that experience into something that aligns with your learning goals.

Figure 1: The game experience simplified

For teaching language learning goals, a board game experience can be made to resemble real-world situations or represent a literary scenario. As an example, some colleagues and I created a game to help immigrants to America prepare for the citizenship interview test. It's the last step in the naturalization process to become an American citizen. Applicants are given a verbal interview to test their knowledge of American history, civics and government. The game experience was to create the atmosphere and questions that would be present during this interview. The player must exercise the same skills as those tested in the interview, and the game was designed with activities and components to test those skills. *(Hawkinson, et al. 2012)*.

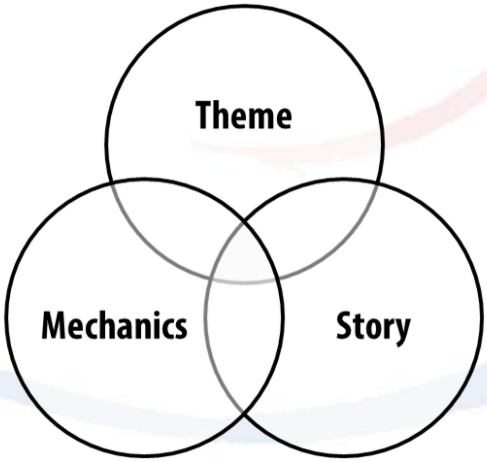
Within these two symbiotic and changing dynamics, there are different forces at work that create and drive the game experience. The player, of course, is vital in the game experience. Almost all board games have the player exude a mixture of three attributes: strategy, luck, and skills/knowledge. The game environment is meant to guide what mixture of these attributes is needed to bring the game to fruition. Too much of one element and not enough of another can greatly deteriorate the game experience and take meaning away from the intended learning goal. For example, if the game relies heavily on a player rolling high numbers on a die or drawing the right

cards, players might not put a lot of effort into using the skills or concepts the game is trying to teach. But if the game has no luck elements, players who determine they are less skilled than their opponents may feel like they have little or no chance to win.

Figure 2: Player-based dynamics

At the same time that a player is navigating a mix of these attributes, the game itself is exacting a mix of different elements to force the player to use them. For example, many times games have a narrative that places players in an imaginary environment and the narrative can drive the game forward. The game sometimes has a background story or narrative involved, to go along with a set of rules and functions to use to progress in the game and a central theme is an essential component to think about, as the theme is the learning goal in its most basic form.

Figure 3: Game-based dynamics



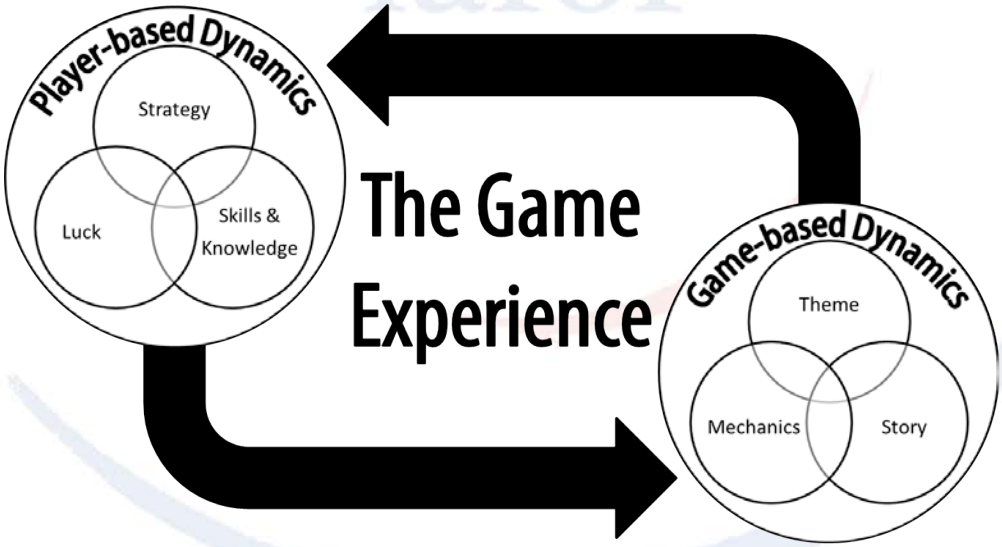
Many board games have already been created around existing stories. *Beowulf, Moby Dick,* and *Pride and Prejudice* are just a few literary works that have board games based on them. These games can be a great way to re-enforce themes, attitudes and characters seen in these works. There are also games based on movies, TV and video games. Non-fiction is even more prominent and can be a great way to teach history. They also can serve as examples on how to create a board game around a time and

place that relates to your learning goals. The story is the stage, and in language learning it can be good inspiration for writers looking to dig deeper into a story. It can also be good for reading comprehension as it helps readers pull new meanings from what they read.

The theme of a game is sometimes confused with the story. The theme in educational board gaming is the basic learning functions a teacher or trainer is trying to have learners practice. Whereas the story is the background, the theme is what the players are doing to navigate the story. Themes are best represented in a game as principles or concepts rather than facts or language functions. For example, in our "American Citizenship" game, the goal was to prepare learners for an interview exam. So the theme was confident verbal communication based on American history, civics and government. So the mechanics of the game were built around having players interact verbally. Mechanics are the most complicated feature of a game because it is such a broad term. A game mechanic is any function of a game that guides interactivity. In board games, mechanics are seen as more than just a set of rules, but any detail built into the game physically or otherwise to either contain or free game play. A mechanic can be as simple as a system of taking turns or as elaborate as a cause-and-effect table.

Take all these attributes together and a clearer view of game design concept is formed.

Figure 4: Board game design theory for learning goals



Gamification Mechanics for Learning Goals

Because game mechanics for board games come in countless forms, it is useful when designing board games for learning goals to think about mechanics from the concept of gamification. There are many definitions of gamification, but what is really means is taking game elements and putting them into real-world context. This notion fits the idea of making games in the classroom and training room very well and is a good way to start thinking about mechanics in board game design for learning. Gamification

has been around for many years, but the term was first coined in 2002 *(Marcewski 2012)*.

Table 1: A list of gamification mechanics

- Achievements
- Appointments
- Behavioral Momentum
- Blissful Productivity
- Bonuses
- Cascading Information Theory
- Combos
- Community Collaboration
- Countdown
- Discovery
- Epic Meaning
- Free Lunch
- Infinite Gameplay
- Levels
- Loss Aversion
- Lottery
- Ownership
- Points
- Progression
- Quests
- Reward Schedules
- Status
- Urgent Optimism
- Virality

Source: Gamification.org (Accessed April 2013)

Many of these mechanics are used in multiple contexts. Airline companies give status to frequent flyers, credit card companies 'level up' customers with good credit from gold to platinum and bonuses are given to employees who meet their quotas. All these functions change behavior in some way and they are good places to start thinking about incorporating learning-driven mechanics into a board game.

Using Game Design Theory to Go Beyond Trivial Pursuit and the "Race Game"

Games like Trivial Pursuit may help us obtain and remember fact and figures, but games are best utilized when designed around a concept as a learning goal. To have a deeper understanding of the knowledge, we must go beyond this level of design. There are many versions of trivia games and they are basically gamified quizzes. Race games are where players are racing towards a goal and along the way have questions to answer or challenges to overcome. A large number of educational games available are unfortunately based on either of these ideas as they can be versatile with content and therefore can be used in a variety of situations. It is my contention that board games can be much more than this and when they are built around a good theme and supported with good mechanics and a great story, a board game can become a deeply profound learning tool. Plus, just like we get turned off when reading a book with a clichéd plot, players' motivations to learn from the game are diminished when obvious or redundant gameplay mechanics are used.

Prototyping

Alpha testing a website is to software engineers as prototyping is to game designers. This is a phase of the process after game design elements have been brainstormed and

creation of a playable game is started. Game designers can use anything in creating a prototype. In many cases, a combination of pieces from existing games can be used, or simple items like index cards, cardboard boxes or coins can be put to work. In the example of "American Citizenship", the rapid prototype wasn't anything physical. This was advantageous as the designers were collaborating overseas. Images of the game board, pieces and cards where created and placed on the web via Google Sites. Designers then used Google Hangout to video conference and the game images were shown to participants. A few online sessions with a digital version of the game allowed the designers to find problems in game play.

Playtesting

If prototyping is the alpha test, playtesting is the beta. This phase can be the most frustrating, but also the most important part of the design process. It is important that you find people to play the game who are not biased to the designers and who are not told how to play the game. One of the most difficult aspects to predict in prototyping for designers is how easy the game can be learned and how easy it is to play for first timers. Ideally, players will need only a small fraction of the time it takes to play the game to an end to learn how to play. So if a game takes an hour to play, ideally it should take five minutes to learn how to play. Observing gameplay will allow designers to revise game elements. Informal testing should be done to see if the players discovered new knowledge, a different perspective or a deeper appreciation of the learning goal from playing the game. In most cases, this process should be repeated several times.

Publishing

In many cases, teachers and trainers who are creating a board game experience to supplement learning the content can be very specialized. Because large quantities of the game are not in demand and therefore made not profitable by publishers. There are other options available to publish a board game to reach more of the intended audience.

Self-publishing is one option. In the example of "American Citizenship", the prototype used for playtesting was created by a self-publishing website called The Game Crafter. This website allows users to choose from a wide variety of game pieces, upload and attach images to pieces and cards and place the game for sale. As changes were made to the game in the playtesting phase, images and pieces were changed to the uploaded configuration on the website and subsequent printed copies were updated.

Print and play is also a popular option for teachers. It simply means that the game pieces are available on the Internet and can be downloaded to be printed individually by teachers. There are many websites that catalog such games such as theboardgamegeek.com.

Future Development and Research

Even with the emerging technologies in game-based learning, the use of board games will still be quite relevant in many situations. Due to the divergence of media and technologies, board games are being re-introduced on tablets and on line. Digital tabletops are being developed for use of board games. Augmented reality gaming can be merged with board games to give players a mix of video games and board games. Research should be done on how these digital technologies may affect the learning processes from more traditional forms of board gaming. Finally, as gaming in the classroom becomes more widely used, it will be beneficial to the feasibility of using games as assessment tools.

References

Al Mahmud, A. and Mubin, O., et al. (2008) Designing and evaluating the tabletop game experience for senior citizens. *Proceedings of the 5th Nordic conference on Human-computer interaction*, p.403-406.

Dondlinger, M. J. (2007). Educational video game design: A review of the literature. Journal of Applied Educational Technology, 4(1), 21-31.

Elverdam, C. and Aarseth, E. (2007) Game Classification and Game Design Construction Through Critical Analysis. *Games and Culture*, 2 (1), p.3-22.

Gamification.org (2010) *Gamification Wiki | Gamification Wiki*. [online] Available at: http://gamification.org [Accessed: 1 April 2013].

Kafai, Y. (2006) Playing and making games for learning instructionist and constructionist perspectives for game studies. *Games and Culture*, 1 (1), p.36-40.

Kalles, D. (2007) Measuring Expert Impact on Learning how to Play a Board Game. *Artificial Intelligence and Innovations 2007: from Theory to Applications*, p.101-113.

Kamii, C. (2003) Modifying a Board Game To Foster Kindergartners' Logico-Mathematical Thinking. *Young Children*, 58 (5), p.20-26.

Marczewski, A. (2012) *Gamification: A Simple Introduction*. p.Forward.

Nicholson, S. (2012) A User-Centered Theoretical Framework for Meaningful Gamification. *Games Learning Society2012: Madison*.

Ogershok, P. and Cottrell, S. (2004) The pediatric board game. *Medical Teacher*, 26 (6), p.514-517.

Rose, T. (2011) A Board Game to Assist Pharmacy Student in Learning Metabolic Pathways. *American Journal of Pharmaceutical Education*, 75 (9).

Salen, K. (2007) Gaming literacies: A game design study in action. *Journal of Educational Multimedia and Hypermedia*, 16 (3), p.301-322.

Salen, K. and Zimmerman, E. (2003) *Rules of play*. Cambridge, Mass.: MIT Press.

Schell, J. (2008) *The art of game design*. Amsterdam: Elsevier/Morgan Kaufmann.

Thegamecrafter.com (2012) *"American Citizenship"*. [online] Available at: https://www.thegamecrafter.com/games/american-citizenship [Accessed: 1 May 2013].

Togelius, J. and Schmidhuber, J. (2008) An experiment in automatic game design. *Computational Intelligence and Games*, CIG'08. IEEE Symposium On p.111-118.

Whalen, T. (2003) Playing Well with Others: Applying Board Game Design to Tabletop Display Interfaces. *ACM Symposium on User Interface Software and Technology*, 5.

Zichermann, G. and Cunningham, C. (2011) *Gamification by design*. Sebastopol, Calif.: O'Reilly Media.

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