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## **Making the Gameplay Matter: Designing Modern Educational Tabletop Games**

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One of the great failings in educational game design is a focus on the question-and-answer model of gameplay. This type of educational game has players engage in some sort of time-wasting activity like rolling a die and moving, and then the focus of the game, the activity of answering a question, is triggered. Thousands of educational games use this roll-and-move model for gameplay inspired by the popularity of Trivial Pursuit. Many librarians and educators creating games for their patrons and students revert to this question-asking model because it is so familiar. However, a different approach, in which the gameplay emerges from the content, can create board game experiences that are vibrant, motivating, and provide opportunities for deep engagement with the material.

### **Improving the Trivia Game Model**

At its core, the trivia-game model for educational games is similar to a traditional pedagogical tool: quizzes. Questions are usually short-answer or multiple-choice, and players are asked a question while everyone else sits quietly. The player either knows the correct answer, or is wrong and is told the right answer. If the goal of using games in the classroom is to allow players to demonstrate previously gained knowledge, then the trivia-game model may be appropriate. However, this trivia-game model can be improved for a more engaging experience in the classroom.

One key problem with this model is that only one player is engaged with the game activity at any time, so developing a mechanism that involves more players can allow everyone to be more involved with the game. Having all players write down guesses at the same time is an improvement, but the commercial game Wits and Wagers takes this a step further. In Wits and Wagers, players all write down a guess to a question with a numerical answer, and then all answers are revealed and players place bets on which answer is closest. To use this interaction in an educational setting, adding a discussion period once the players' answers are revealed would allow players to learn more from one another. This game model does two things: first, it involves all players during each question, and second, it rewards players for being able to pick out a correct answer or pick out the person who should know the answer. It removes the "player on the stage" model of a traditional trivia game, so all players feel more comfortable being engaged with the game.

Another model that can improve the trivia-game model is to take it in the direction of a game show. Rather than have small groups playing their own games, in the game-show model, everyone is engaged in one large game. The traditional game-show model is designed to have a few players compete so that one can be rewarded, which does fit into

the underlying model for classroom-based education. That said, many game-show models can be turned into a large-group model by putting players in teams and treating each team as a player in the game. Each team can then confer on the questions and write down their guesses. This can still be done using the game show metaphor, and allows everyone to be engaged. Even the game of Wits and Wagers can be extended to an entire class by having groups come up with initial guesses, selecting groups to say their answers to provide the set of the possible guesses, and then allowing groups to place wagers on the best answers.

At the heart of these modifications is the concept of player engagement. When creating a game experience, it is important to think about how all players can be engaged with the game experience as frequently as possible. This concept is one that has been seen in many modern board games and can apply well to educational games, too.

## Moving Away from Questions

A better approach to educational design is to move away from asking questions. Yasmin B. Kafai talks about the difference between the extrinsic and the intrinsic integration of content when designing games about topics (1995). The trivia-game model is an extrinsic integration of content, as the topics of the questions could change while the underlying game remains the same. This type of game is relatively easy to create and is also more flexible in that it is adaptable to different topics. Games with extrinsic integration of content can be used when a quiz or exam would be appropriate, as such games are more focused on demonstrating existing knowledge than learning new knowledge.

Games with an intrinsic integration of content have the learning elements built into the game mechanisms, so that the engaging elements of the game are also teaching the desired content (Habgood, Ainsworth, and Bedford 2005). Research by M. P. Jacob Habgood and Shaaron E. Ainsworth demonstrated that players learned more from games with intrinsic integration of content than they did from games where the content was extrinsic to the gameplay (2011). To create these games, the first design constraint is: "Do not ask questions." Instead, the design goal is to locate the game within the content.

Two approaches to bringing games with intrinsic integration of content into the class are possible: adapting commercial games and creating new games. Adapting commercial games is the easier approach, but the challenge is finding an appropriate match between the games and curricular content. Video games like Civilization and SimCity are typical examples provided for this type of content (Lee and Probert 2010). For board games, a useful resource is the book *Libraries Got Game* (ALA 2009) by Brian Mayer and Christopher Harris, in which they look at modern board games that are not designed as educational games and map them to school curricula; those interested in exploring the path of using existing board games should explore that book for further details.

## Creating Original Games

The focus for the rest of this article is on creating original games for the classroom. While this is the most time-consuming approach, instructors can control how the content

in the game maps to curricular goals. If the goal of having games in the classroom is to help students acquire content, then games that provide an intrinsic integration of content with gameplay are the appropriate choice.

Games can be created for different platforms. The focus in this article is on board games, but games can be created as other forms of non-digital games such as card games, role-playing games, or live-scale simulations. Digital platforms include browser-based games, apps to run on phones and tablets, and console games through development kits. The choice of platform may be dictated by resource and technology availability. Games can be created for multiple platforms; increasingly, games that were originally developed as board games are now available as e-boardgames on consoles and computers. Many video-game designers start by creating a "paper prototype," which is, in essence, a board game. Therefore, while the focus in this article is on board games, many of the lessons within apply to other types of games.

### Generate Student-Centered Learning Outcomes

The first step in developing a game for the classroom is to determine the content that will be taught to players. Using student-centered learning outcomes is the best way to do this, as developing those outcomes will require a focus that starting with a general topic or book chapter does not. By aligning these outcomes with state standards, the game becomes a justifiable use of classroom and staff time. What are the impacts that the game should have in the lives of the learners? Just as with any creation of outcomes, considering outcomes that are high on Bloom's taxonomy can result in games that are more likely to create a significant impact on the players.

A common pitfall for educational game designers is to lose focus on the learning outcomes and focus instead on other aspects of the game. Creating a fun game experience can be a fun activity in itself and can lure a designer away from the learning outcomes. As the game is created, the designer needs to step back regularly and ask, "Does this advance the learning outcomes?" Whenever the designer is faced with a decision about rules, mechanisms, or the play experience, the learning outcomes should guide the design. This focus will allow the design to be consistent in advancing the goals of the game.

### Decide on Elements of the Game

Once the outcomes have been selected, the next step is to consider the elements of the game experience. The game experience is bigger than just the game; it includes the game, the interactions between the players, and the setting in which the game is played (Nicholson 2010). All of these come together to form the game experience, and it is important to consider these elements at this time. Key elements to consider at this point are the intended settings, the number of players, and the type of player engagement.

### Settings

The intended settings for playing the game are an essential consideration. A game that is to be played in a shared quiet space should not have a heavy emphasis on players

interacting loudly, while a game designed for playground use should have very few components and easy-to-remember mechanisms. If a game has a complex component that is difficult to create, then that will be a hurdle in making many copies of the game for classroom distribution. Thus, the types of interactions between players, the component choices, and the cost to create the game all need to be considered at this point.

### Audience and Number of Players

When thinking about the game experience, the designer also needs to consider for whom the game is designed. The first decision is if the game will be designed as a single-player experience or a game that players play together. While tabletop games can be designed for one player, they are best used for small numbers of players engaging with each other. Another possibility is to create a game that engages a large number of players simultaneously; examples include a clue-based treasure hunt, a larger-scale simulation, an alternate-reality game or a game-show-type experience. One interesting model for engagement comes from the German game *Fische Fluppen Frikadellen*, where multiple copies of the games can be used at the same time. Each copy of the game represents a different town with a market for goods, but players can sail to other towns by getting up and changing tables to take advantage of better prices elsewhere.

### Type of Player Interaction

Another consideration is what type of player engagement the game will require. Two dimensions must be considered: do players play synchronously or asynchronously, and how do players interact with each other? Some board and card games have players playing in real time against each other, which can be appropriate to reflect a real-world situation under time pressure. Many video games have a time-based element at their core, and students comfortable with time-based video games will be drawn to live-time board games.

In a multiplayer game several levels of interaction among players are possible. In one model players don't interact, but play the game at the same time, attempting to solve the same puzzle. Conversely, the game could require significant direct interaction, such as a zero-sum game where one player wins by taking money or territory from others, or indirect interaction, where players will all improve their situation in the game, and the winner is the person that does the best job. Another option is to create a cooperative game where all players are working toward the same goal, and win or lose as a team. Another model found in several modern board games such as *Shadows over Camelot* may have one player working in secret against the rest of the group.

### Design Document

Once all of these questions have been answered, the decisions can be formalized into a design document. The purpose of this tool is to document all of these decisions so that anyone involved with the game can see the core decisions made about the game and why. This document is also valuable as a justification tool; if design decisions have been made

that tie back to the learning outcomes, then the purpose of the game can be defended against later challenges, and justifications for design decisions can easily be articulated.

## Integrating the Content

The next step is to integrate the content. The learning outcomes can be used as a guide to selecting what pieces from the content will be most useful, as the content selected for integration into the game should support the learning outcome. By being guided by outcomes, the designer can focus on the content that is most important; having a deeper focus on a few pieces of content is more effective for long-term retention than having a broader focus on many pieces of content.

## Link Challenge and Content

After selecting the content, the designer has to figure out the game in the content. This can be the biggest challenge in game design, and all of the limits put into place up to this point are there to help the designer focus in on finding the game. At the center of any game is a challenge, and to make a game that engages the player in content, the challenge needs to come from that content. This is the most important step in connecting the game to content; if the challenge in the game does not relate to the content, then the key aspect of the game with which the players will be mentally engaged will not be something that is leading to the learning outcomes.

## Create Roles Appropriate for the Context and Content

Many games are, at their core, about resource management. These resources could be money, time (as represented by game turns or actions within a turn), people, property, or even social capital in a role-playing game involving relationships. Players have to decide how to spend their resources to accomplish game goals, and there is typically some tradeoff between risk and reward.

The designer needs to develop the role of the players in the game to contextualize the challenges. In many cases, players take on a role that is in line with the topics to be explored. These roles may come from the content in a subject like literature or history, or the roles may be related to individuals using the content in a real-world setting when looking at content like mathematics or science. Another option is to create a game that is more abstract based upon the content, such as having players take on the role of molecules in a chemistry game or a verb tense in a game about language arts.

## Explore Possibilities for Mechanisms

The underlying game mechanisms in an educational game serve as the tool that connects these different elements. These mechanisms enable the players, within a role, to engage with the central challenges of the game. At this point the designer needs to do research by exploring the mechanisms used by other games. To use a crayon analogy, if all of the crayons the designer has to work with are Monopoly-, chess-, Trivial-Pursuit- and Scrabble-colored, then the resulting picture will look like one of those games. By

exploring the wide variety of modern board games, designers will add many more crayons to their design toolkits. Because many designers create games without exploring the world beyond mass-market games, too many new games look very much like games that are already in existence.

Another method to learn about different game mechanisms is to talk with game enthusiasts, such as students or local game groups; if all of the rest of the decisions have been made, a game enthusiast should be able to help the designer with suggestions for different game mechanisms. The BoardGameGeek website <<http://boardgamegeek.com>> is an incredible resource for game designers, as it documents thousands of different games and supports search features to allow the exploration of games by their mechanism. Finally, board game reviews, such as the author's video series Board Games with Scott <<http://boardgameswithscott.com>>, will allow the virtual exploration of a wide variety of different games.

This process of building the gameplay out of the learning outcomes and the content is a challenging one, but, if done well, can result in a game that can teach, motivate, and engage learners, and help them develop a long-term understanding of curricular content in ways much more effective than a simple trivia-game model.

## Developing and Testing the Prototype

After fleshing out the design document, the next step is to create a prototype. This prototype can be made of very basic items, such as poster board, index cards, and basic components like dice and flat beads. The concept of "rapid prototyping" comes into play here; the initial prototypes should not involve more art or production than what is needed to test the game. Cards can be handwritten on index cards, or developed in Microsoft Word or PowerPoint and printed on cardstock, and then cut out. A board can be printed on paper and mounted on a foam core board.

## Playtest and Revise

Playtesting and revising is a significant part of the design process. Many times, a game cannot be completed on its first play, and the designer should be prepared to abandon test games. It is important to convey to playtesters that the purpose of playtesting is not for them to worry about winning; rather, the goal is to explore the game space, and see what works and what falls apart.

During this process, the designer should also work on writing the rules for the game; writing rules is a challenge, but the process will help to solidify the game. This is also a case where the BoardGameGeek website can be valuable, in that many rule sets have been uploaded to explore. Playtesting and rewriting the rules are iterative processes in which each test and revision will help to make the game better.

Playtesting involves two risks. The first is the temptation to correct a problem by adding to the game. Adding a rules exception or a new mechanism may solve one problem, but many others can be added. While adding something seems like a good solution, removing

something is usually the better solution. Discarding something that is part of a creation can be hard for a new designer, but keeping a game simpler is usually the better choice in creating a game for the classroom. The cognitive load for the players should be focused on exploring the content, not on remembering exceptions to rules.

The other risk is that the cycle of playtesting and revising can draw the game away from the learning outcomes, so the designer must continually think back to the outcomes to bring the game back in line with the goals and learning outcomes. After every few rounds of revisions, the designer should review the learning outcomes to ensure they are still part of the game.

### Get Results and Feedback from Typical Players

Once the game is complete, it can be tested in the classroom. Employing a before-and-after test can be useful to see if the game is making a difference in students' learning. By having some students use the game and other students use other pedagogical tools, the designer can see how much of a difference the game makes. Feedback from the players is important to the process of making the rules more clear and making the game work more efficiently.

### Publish!

Once the game is finalized, the designer has several options. One option is to submit the game to a game publisher that publishes similar games, although this can be a long process; it can easily take two to three years from the time of acceptance before a game is published. Another route is to look at a print-on-demand service like [Gamecrafter.com](http://Gamecrafter.com) where designers submit the game and then anyone can pay to print one copy of the game. A third option is to turn the game into a print-and-play game where anyone can download a copy of the game, print it out on their own paper, cut it out, and play it. The game can be packaged as a PDF file and sold to other educators.

### Conclusions

The process of building a game that has players engaging with course topics (instead of simply asking questions about the topics) is challenging, but can result in a game that is much more effective as a pedagogical tool.

If creating a game yourself seems like too much of a challenge, another approach is to have students create games! An instructor or school librarian can use the process presented in this article with groups of students, using game design as a pedagogical tool. While the resulting games may not be as tied to the learning outcomes as those created by teachers and school librarians, the process of game creation will help those students to spend much more time deeply considering various aspects of the material.

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