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Building in room to fail: Learning through play in an undergraduate course

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ABSTRACT

True learning happens when we try new things - when we practice something, see how it goes, and then try it again. Pedagogical practices that encourage metacognition and active reflection are built on this premise. But these practices take time, and university instructors are pressured to cover as much content as possible in a term. Practice also feels like a luxury to students who receive few opportunities for evaluative feedback, and who don't want to sacrifice a good grade for the sake of trying something new. As a result, learners tend to play it safe. But when the skills of metacognition are presented through the lens of play, which encourages and builds in room for graceful failure, learners become more open to reflective practices and experimentation. In a term-long course for undergraduates entitled 'Learning Through Play', I introduce learners to an information literacy-based research process while using the language and theories of play. Learners ultimately build their own game, but along the way, they practice key elements of the research process: exploring and researching a topic from multiple angles; reading the scholarly literature in a scaffolded manner; and using relevant background information to create something new. I lead class-wide games to help reinforce these topics, and students adapt and lead games in small groups to practice experimentation and cooperation. In this article, I share my course design, the theories underpinning this approach to learning, and suggestions for others who might want to teach a similar course.

Introduction

The image of academic libraries has dramatically changed over the last few decades. Once viewed primarily as a place for solitary, quiet study, academic libraries are now recognized as places specifically designed for student learning where students can engage with emerging technologies and try out new tools in makerspaces and learning commons (for example, Moore & Caruso, 2020; Spencer & Watstein, 2017). Today, libraries are known as places where students can practice using tools like 3D printers (Filar Williams & Folkman, 2017) or can gather with study groups to visualize their ideas on white boards (Hussong-Christian & Stoddart, 2014). Librarians support students as they try out these tools and provide equipment that allows students to experiment, practice, and learn together. But does this attitude of experimentation and practice translate to more traditional library research and information literacy activities such as exploring topics, finding sources, and reading scholarly

articles? My observations as an instruction librarian indicated that dispositions related to experimentation can sometimes be missing from students' approach to library research. An expectation that searching should provide quick answers with a minimum amount of searching effort (Warwick et al., 2009) and feelings of library anxiety (Onwuegbuzie & Jiao, 2000) contribute to a dampening of students' willingness to experiment with the library research process. As a result, I wondered if an instructional approach to library research rooted in the principles of play-based learning might encourage students to engage with different research strategies.

Elements of the principles of learning through play that are particularly relevant for library research include: scaffolded approaches to learning new skills that build iteratively; the incorporation of reflective practice; and the permission to fail with relatively minimal consequences (Plass et al., 2015). Each of these principles is key to developing as a learner, but lack of class time combined with student evaluation systems that primarily reward the end product, not the effort involved in developing the skills needed for the final learning outcome, reduce opportunities for students to learn in a play-based manner. Scaffolded instruction involves taking into account students' previous learning experiences and allowing them to continue developing those experiences in a supported learning environment as they work toward a higher level of facility and independence (Shaw, 2019). However, a variety of factors including large class sizes and the structure of one-shot sessions (a common teaching modality for librarians) can hinder options for making allowances for varied prior educational experiences and for providing targeted learning supports.

The importance of building in time to practice and to reflect on the learning experience, particularly when skill transfer is desired, as is the case with library research skills, is well established (Perkins & Salomon, 1989). But increasing pressure to focus on subject content can leave instructors and librarians with little time to prioritize library research practice. Creating space to gracefully fail, to learn through potentially unsuccessful attempts without the fear of negative consequences such as low grades, is perhaps the most difficult aspect of play to translate to the learning environment. Consciously or subconsciously, both learners and educators have been trained to value the assessment that occurs at the end of an assignment or course (typically grades) above all else in the learning process and focus on performance rather than interest (Senko & Miles, 2008). Rather than building in assessments that reward trying (and potentially failing) at new things or that encourage stretching beyond current strengths, instructors often choose the more efficient option of providing a single opportunity for feedback at the end of a summative assignment, rather than at multiple checkpoints throughout the process.

As an academic librarian focused on instruction, I draw on a rich community of practitioners who are engaged with pedagogical best practices that encourage active reflection and metacognitive practices that facilitate students' ability to learn (Booth, 2011; Tanner, 2012). Other academic librarians have also recognized the value of incorporating play into their instruction sessions. For example, Smale (2015) developed a brainstorming card game to introduce aspects of information literacy, and Angell and Tewell (2015) experimented with using online information literacy games in their guest lecture sessions. Through pre- and post-testing, Angell and Tewell

found that students showed significant learning improvements in areas like selecting appropriate keywords and understanding citation formats when they played an online information literacy game instead of listening to a live lecture.

A drawback of each of these librarian play-based learning examples is the short duration of the learning experience. American academic librarians, including librarians at my own institution, often reach students through guest lecture or 'one-shot' sessions, but less frequently through term-long credit courses. Providing students with sufficient opportunities to practice, reflect, and receive feedback on the research process can be more difficult when librarians are visitors to a course rather than the instructor of record. This article will discuss a term-long course entitled 'Learning Through Play' I designed for undergraduates that strives to incorporate these principles of play:

- A scaffolded learning experience
- Opportunities for reflective practice
- Space for graceful failure

Throughout the course, students learn information literacy skills and critical reading skills while developing their own game. I will describe how I developed the course and the pedagogical choices I made through several iterations of the course. I will provide examples of course content and reflect on how the course has been applied in a variety of contexts.

Course Development

Course Proposal

The origins of this course on learning through play began as a colleague and I were exploring the intersections of curiosity and research behaviors (Rempel & Deitering, 2017). As we gained a deeper understanding of how librarians and university instructors could facilitate pedagogical practices that encouraged students to engage their curiosity, some of the recommendations for curiosity-based learning such as including curiosity-arousing elements like novelty, stimulation, and active exploration (Arnone, 2003), led me to consider the role of play and practice more deeply. At the time, I was only teaching information literacy guest lecture sessions. I wanted to see what it would be like to develop a play-based approach to learning library research practices throughout the arc of an entire term. Fortunately, my institution offers several opportunities for teaching term-long courses outside the traditional discipline-specific structure, including courses specifically for first-year students and courses that encourage Honors College students to explore novel topics.

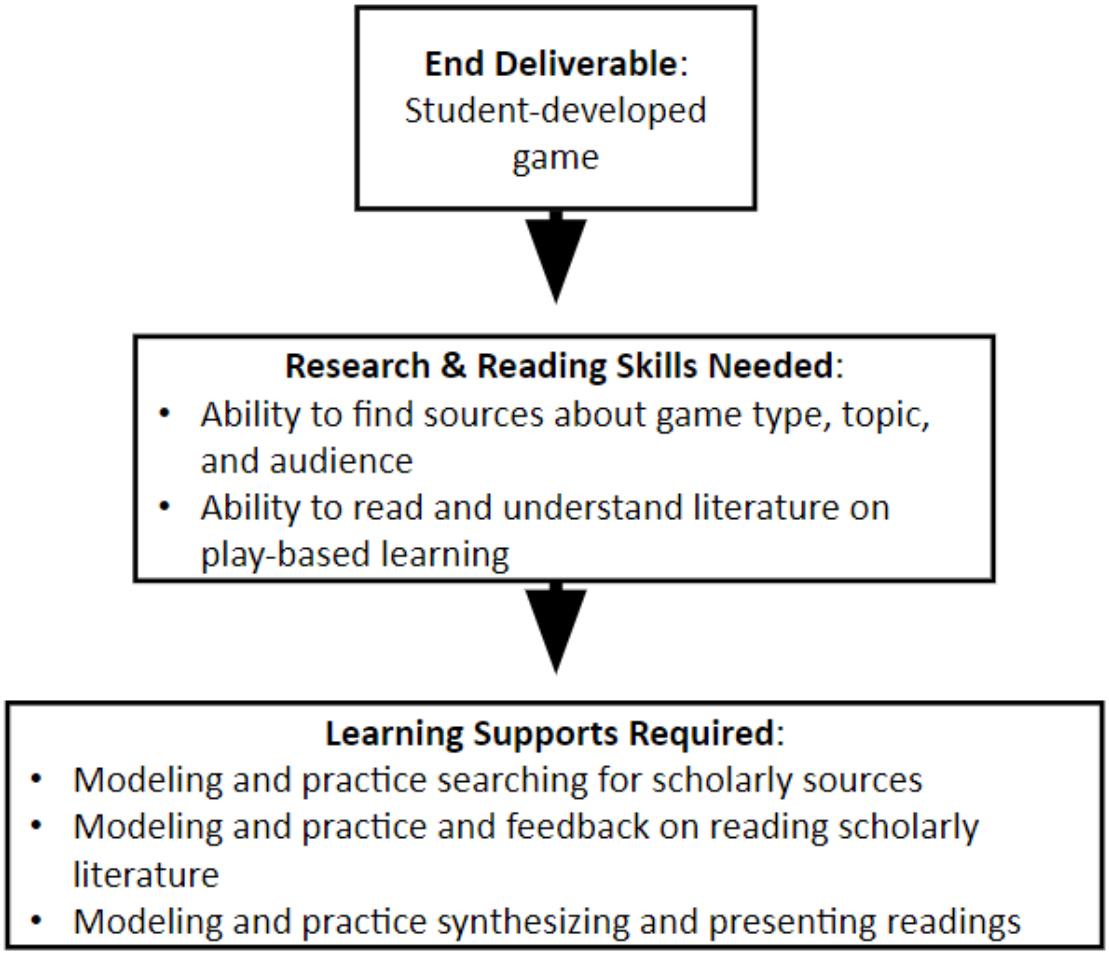
I initially developed a course proposal for a first-year experience course (but as described later, adapted this course for other contexts). First-year experience courses could be on any topic, but at my institution were meant to introduce new students to the university and to stretch their understanding of what a university education could look like, while using established high impact practices, such as setting expectations at appropriately high levels, building in opportunities for reflection, providing frequent constructive feedback, and discovering the relevance

of learning through real-world applications (NSSE, 2021). In addition to facilitating students' learning, these courses also provided instructors with the chance to try out a new pedagogical approach or explore a new research area. Because class sizes were small (24 students or less), instructors could interact more with students and provide more specific feedback.

My course proposal was accepted, and I began designing my course in earnest based on the instructional design best practice of beginning with the end in mind (Smith & Ragan, 2005). Because the theme for the course was play, I decided the end deliverable would be a game that students developed. In order to reach that end point, students would need specific skills, including the ability to research various facets of games and read literature on how play-based learning can be encouraged. Working backwards from those research goals provided the opportunity to structure in learning supports, including practicing searching for scholarly sources using a variety of strategies, reading scholarly literature, and communicating a synthesized version of what they read to their peers (see Figure 1).

Figure 1

Instructional design process illustrating working backwards from the end deliverable to the skills needed to create that deliverable, then back to the learning supports required to develop those skills.



Pedagogical Choices

The Center for Research on Education, Diversity, and Excellence at the University of California (2011) outlines five standards for effective pedagogy that aligned with the principles of play described earlier and which further informed my pedagogical choices for this class. These five standards are: joint productive activity; language development; contextualization; challenging activities; and instructional conversation. I returned to the principle of scaffolding to determine how challenging to make the learning activities. Smith and Ragan (2005, p. 130) suggest that in highly scaffolded instructional situations the instructor provides more learning supports and motivation for achieving the learning goals. The higher the level of scaffolding, the less cognitive processing the learner needs to provide in terms of connecting the relevance of the content to their own context and considering what learning strategies work best for them. Because this course was not part of students' core disciplinary offerings, I wanted to provide a medium-to-high level of scaffolding, so students would more readily see the connection to their own learning experiences and could attempt library research strategies without too much added cognitive load.

I chose to build in metacognitive reflection opportunities so students could incrementally practice contextualizing what they learned throughout the term. Metacognition involves learning how to learn and using reflection to identify areas of confusion or gaps in knowledge (Tanner, 2012). A variety of techniques can be used including written or verbal processing, guided or open-ended prompts, and individual, pair, or group-based reflection. I chose to build in each of these reflection techniques to allow students to identify which approach might best suit their learning needs.

The educational standard calling for incorporation of joint productive activity seemed particularly relevant for a class based on principles of play because play, especially play in the form of games, rarely occurs in isolation. Educational psychologist Lev Vygotsky identified the core role of social interaction in the development of thinking and learning abilities (McLeod, 2019). As a result, I incorporated significant amounts of group work throughout the class, including the creation of the final deliverable. I decided that students would work in teams to develop their game, providing them with the chance to create connections with other students and balance ideas from a community of learners.

The concept of a challenging activity can be thought of in different ways. In this course, I wanted to incorporate educator Stephen Brookfield's (2012) call to balance discomfort with comfort in order to encourage critical thinking skill development. As Brookfield observes, it is important to include some level of discomfort, or a push beyond the familiar, for learning to happen. Regularly playing games as part of the class routine was one way to provide a balance between the familiar and the challenge of discomfort. Academic librarians Leach and Sugarman (2005) recognized the importance of including a degree of familiarity to encourage new skill development. They used a *Jeopardy!* style game in their class and found it effective in part because students' initial learning curve was quite low, making it easier for them to focus on the content presented in the question-and-answer portion of the game. Because most students in my course would already be somewhat familiar with the basics of game play, I

could use games to introduce elements that would be less comfortable for some students (e.g., drawing games, sharing aloud in games) to push students to more deeply consider their learning behaviors. In addition, navigating this balance of comfort and discomfort would be another way to introduce the concept of graceful failure as students learned they might not always be successful the first time they tried a new skill.

Another aspect involved in making the course challenging was considering whether students would perceive the course as university appropriate or difficult enough. Many K-12 students now make games as part of their learning experience (Kafai & Burke, 2015), so it was increasingly likely that my students would have already experienced making games in other learning settings. When considering what makes course content academically rigorous, Wyse et al. found that the classes where students felt they learned the most were classes where the content was personally interesting, applicable to real life, built on their past learning, the workload was high, and faculty were supportive and had high expectations (2018, p. 6). As a result, my goal was to make sure the games students designed were connected to their interests, there were consistent assignments leading up to the final game rather than just a few episodic major assignments, and that what they learned regarding research and reading, as well as play-based learning and game design, could be applied in a variety of real-life contexts that had meaning to them. At the same time, I did not want to give assignments that felt like busy work and that overly filled the class schedule thereby leaving little room for practice. To address that issue, I aimed to incorporate time in the schedule for in-class project work, group play and reflection, and constructive feedback.

Choosing Course Materials

Another key decision was choosing the course materials students would use. I did not want to use a textbook for several reasons. I did not want to require students to pay for a textbook, as this is a key equity and affordability roadblock for many students (Okamoto, 2013), but instead wanted to use either open access resources or resources students could access through our library's subscriptions. I also preferred to use journal articles for the core course materials so I could use these sources as a model for reading and searching behaviors I would later ask students to demonstrate on their own. Finally, using journal articles would allow me to be more flexible over time in updating course materials, as journal articles could be more readily adapted as updates in scholarship or changes in course focus occurred.

After reviewing the scholarship on play-based learning, I ultimately selected the synthesis article, *Foundations of Game-Based Learning* written by Jan Plass, Bruce Homer, and Charles Kinzer (2015). This paper combines a review of theories that can inform pedagogical choices when developing games for learning situations, with a history of how play has been used to promote learning, particularly in online contexts. The paper includes a variety of gaming examples, which makes it easier to conceptualize how to apply the theoretical concepts to other learning situations, including in-person rather than online learning contexts. Because the paper uses a review of the literature approach, the bibliography is an excellent source for further research. In addition, over time the paper has been increasingly cited, providing another set of sources for students to explore.

Plass and collaborators distill the various theories contributing to play-based learning into a framework that I use throughout the course to guide students' thinking about how playful learning can be incorporated in their own learning experiences. The four elements of the game-based learning framework are: affect; motivation; cognition; and social/cultural (Plass et al., 2015, p. 263). Throughout the course I refer to these four elements as the 'Foundational Elements of Learning Through Play.' See Table 1 for brief definitions of each of these foundational elements adapted from Plass, Homer, and Kinzer, combined with corresponding game design choices.

Table 1

*Foundational elements of learning through play definitions and game design choices**

Foundational Element	**Core Definition for Learning Through Play Class**	**Game Design Choices**
Cognition	Element of play-based learning that requires development of knowledge and skills. Can be facilitated through building on past experiences, scaffolding or providing levels of difficulty, and providing tutorials and feedback within a game.	Choosing how much upfront learning a player will need to invest and how much extraneous information to include.
Motivation	Element of play-based learning that explores differences between intrinsic and extrinsic motivational factors, the balance between creating a competitive setting using tools like points and building in achievement options like badging.	Determining whether the game's enjoyability level and relevance to learning is enough of a motivating factor vs. the need to build in a scoring system for motivation.
Affect	Element of play-based learning that evokes an emotional response, including visual design and story-telling components.	Including visual design elements and considering whether to build in a larger narrative about the game.
Social/Cultural	Element of play-based learning that recognizes the social as well as cultural basis of games. Social learning can occur in online and in-person gaming contexts. Non-western cultural choices are compared to design choices Western students may not have considered.	Thinking about who the audience for the game is (e.g., global vs. local), deciding how many people can play the game at one time, determining whether a cooperative or competitive approach will be used.

*Adapted from Plass et al. 2015

Use of 'Play' vs. 'Games'

The terms 'play' and 'games' are often used interchangeably; however, they have somewhat different meanings. In my class (and therefore, in this article), I generally choose to use the term play. Play is a broader term and incorporates the core principles I want to emphasize throughout the class including iterative practice, reflection, and opportunities for graceful failure (Plass et al., 2015). Learning through play can include more free-form play experiences, but also can include structured games. In contrast, game-based learning most typically characterizes

a specific set of learning experiences (and research on learning) focused on the use of computer games (Plass et al., 2015). In class I acknowledge that conversationally we may conflate the two terms. But because students conduct research on learning games, I establish a distinction between the two terms early in the class so they will have more success finding sources discussing a variety of play-based learning experiences. In this article when I use the term game, I am referring to a broader category of games rather than just online gaming.

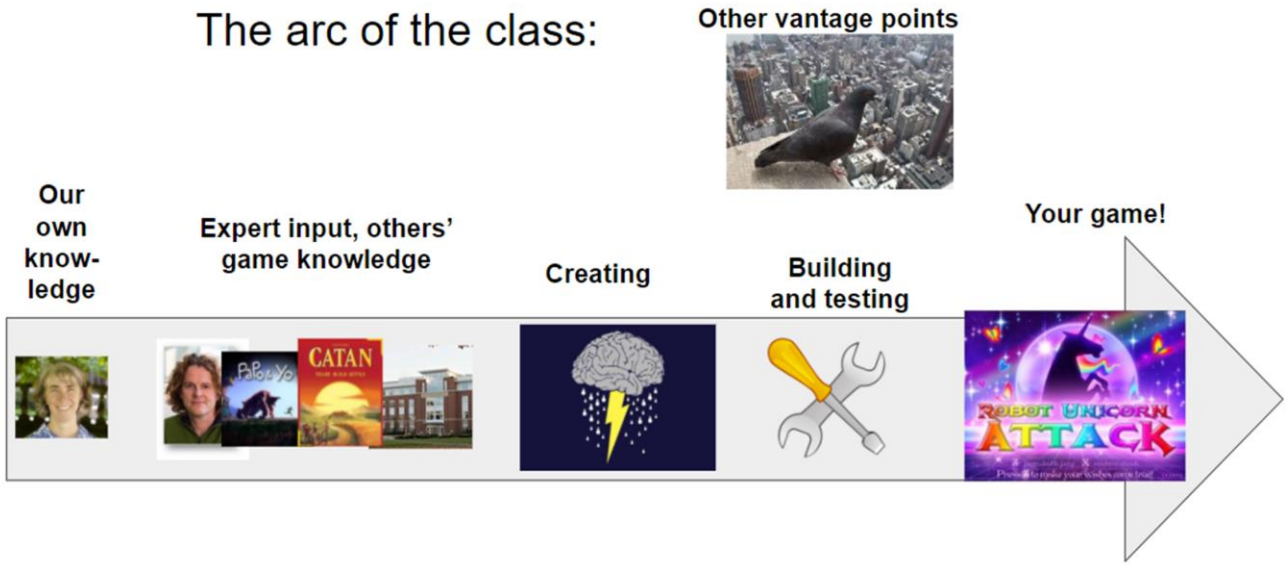
Course Structure

The course structure I designed is based on some unique constraints at my institution. My institution operates on a 10-week term system and so my course content reflects that scheduling structure. This course has typically been offered for two credits, which means the class meets twice a week for 50 minutes. The content can be adapted to other scheduling and credit structures by adding in more opportunities for practice or prototyping iterations, or by emphasizing additional content in more depth such as instructional design or game design techniques. The course content falls into three main parts. I will begin by describing core activities used throughout the entire course, and then I will delineate the learning objectives and learning materials used in each of the three parts of the class.

At the beginning of the course, I introduce students to a visual of the arc of the class so they can better understand the purpose for various class activities (see Figure 2). The figure is meant to be somewhat silly and playful, but it is also intended to succinctly reference the instructional design choices I made when constructing the class. The visual shows that students will be working toward building their own game but will arrive at that point after reflecting on what they already know about play and by learning from others. They will then have time to brainstorm and create their game concept. Next, they will build their game and test prototypes. Along the way, they will consider other perspectives on play and games, including the impacts of identity and culture on how games and play are perceived.

Figure 2

Graphic used to communicate the arc of the class to students



The arc of the class corresponds with the learning themes in the following three main parts of the class schedule:

- Part 1: Weeks 1-3
    - Defining play-based learning
    - Exploring the foundational elements of learning through play
    - Practicing finding and reading sources
    - Learning course social norms
- Part 2: Weeks 4-6
    - Choosing a game topic
    - Researching and designing their games
    - Implementing group work strategies
    - Giving and receiving feedback strategies
- Part 3: Weeks 7-10
    - Building and testing their game
    - Reflecting on play-based learning choices
    - Presenting their game

The three parts of the class will be described in more detail in succeeding sections of this article.

All-Term Activities

I use several core activities throughout the term to build students' metacognitive skills, to make space for practice (including failures), and to develop shared community experiences.

Reflective Prompts After Games

The first activity I repeat throughout the term is the practice of reflecting and questioning after each all-class game I lead. I ask the same series of open-ended questions so students become familiar with the prompts and can see how asking these questions can impact their own game design decisions:

- What can we learn by playing this game?
- Was this game helpful for learning those skills or objectives?
- What adjustments could we make to the game to make it a better learning opportunity?

Especially during the first few weeks of the term, I emphasize that the games I lead are not perfect. Adaptations and improvements can always be made to these games and design is an iterative process. Through these open-ended conversations, students begin to learn they have permission to attempt new things without the fear of failure. I back up this message by introducing the idea of graceful failure via the Plass et al. text so students have shared language to accompany our discussions about iterative practice and learning.

Student-Led Games

I form small group teams (usually 3-4 people per team) then ask each member of the team to sign up to lead a game in their small group during class. Students are given the following criteria for these games:

- They must include everyone on the team
- The game needs to be able to be learned quickly as I only allot about 10-15 minutes for team play
- The game leader needs to think of a learning objective for the game
- The game leader needs to make at least one significant adaptation to the game

The student-led games serve multiple purposes. Selecting a game provides an opportunity for students to begin to reflect on the audience for a game and what learning opportunities games can provide. Leading a game requires students to distill game directions and explain them to others. For some students this is a low-stakes way to begin talking and presenting to others in preparation for future larger presentation requirements. Making an adaptation to a game the student is already familiar with gives them an opportunity to practice "designerly thinking". Cortes, Gee, and Kessner (2020) use this term when emphasizing the value of redesigning a game rather than requiring learners to build a new game from scratch as a way to develop and scaffolded design skills.

After playing the game for about 10 minutes, I ask students to complete a rubric evaluating the game based on the four foundational elements of learning through play. I emphasize that this rubric is not evaluating the game leader but is an opportunity to reflect on how different games make use of the elements of cognition, motivation,

affect, and social/cultural to varying degrees. Students fill out the rubric separately but discuss their choices with each other providing an opportunity to hear different viewpoints.

Games and Culture - Two Truths and a Lie Presentations

An overarching programmatic learning goal is that students will engage in inquiry so they can contribute to meaningful conversations outside of their discipline, understand diverse perspectives, and effectively communicate with others (Oregon State University, 2007). As a librarian teaching this course with the intention of incorporating information literacy and critical reading learning goals, I have a corollary learning goal — students will be able to read scholarly literature so they can present an evaluative, synthesized version of that literature to their peers. To meet those goals, I ask students to choose an article on a topic connected to games and culture and then give a short presentation based on specific prompts to the class.

Students can either choose from a list of curated articles that I have compiled on topics like empathy and games, gender and games, non-western games, negative aspects of play, and race and games, or students can select their own article. See Table 2 for several examples of articles that students have frequently chosen.

Table 2

Examples of popular 'games and culture assignment' articles students have selected for their presentation

Games and Culture Category	**Example Article**
Gender and Games	Ruihley, B. J., & Billings, A. C. (2013). Infiltrating the boys' club: motivations for women's fantasy sport participation. *International Review for the Sociology of Sport*, *48*(4), 435–452. https://doi.org/10.1177/1012690212443440
Negative Aspects of Play	Markey, P. M., & Ferguson, C. (2017). Teaching us to fear: The violent video game moral panic and the politics of game research. *American Journal of Play*, *10*(1). http://www.journalofplay.org/issues/10/1/article/4-teaching-us-fear-violent-video-game-moral-panic-and-politics-game-research
Race and Games	Burgess, M. C. R., Dill, K. E., Stermer, S. P., Burgess, S. R., & Brown, B. P. (2011). Playing with prejudice: the prevalence and consequences of racial stereotypes in video games. *Media Psychology*, *14*(3), 289–311. https://doi.org/10.1080/15213269.2011.596467

Student presentations on games and culture are given throughout the term, but only begin after they have completed the Learning Foundations Research Assignment in part 1 of the class (see a description of this assignment in the following section), in which they practice identifying components of scholarly articles so they can identify and synthesize key information. Specifically, students are asked to share the article's purpose,

methods, main findings, and conclusion. They also need to connect the paper to at least one concept from the foundational elements of learning through play. To add an element of play to this learning exercise, I ask students to begin their presentation with two truths and a lie from the article, and classmates guess which statement is the lie. This exercise is not only playful but provides a teaser about the article to pique the interest of the other students. It also encourages students to look closely and critically at some of the details presented in their article, and succinctly present that information.

Course Part 1 - Foundations of Play-Based Learning

The first third of the class includes learning goals focused on learning core play-based learning principles, weaving in information literacy approaches, and establishing class rhythms and social norms (see Table 3 for a more detailed overview of the themes, course work, learning resources, and assignments for the first part of the course). During the first week, students are introduced to the idea of play-based learning. They reflect on play and games they enjoy and begin to distinguish between different types of games and game mechanics. I share a portion of the Plass, Homer, and Kinzer article to introduce concepts that contribute to play-based learning, but also to model how to read a scholarly article and what portions of the text to emphasize when presenting to others. At this stage of demonstrating how to read a scholarly article, I encourage students to look up vocabulary they have not previously encountered. One of the class rhythms I introduce in the first week is playing games as a class and then reflecting on the value of the game as a learning opportunity. I model playing low-tech games that have familiar elements so that the whole class can become engaged quickly.

During the second week of the class, I introduce the theoretical framework for the course, the foundational elements of learning through play. I model introducing a section of the Plass et al. text, and then students use the jigsaw method (The K. Patricia Cross Academy, n.d.) to teach each other about the four foundational elements of learning through play (cognition, motivation, affect, and social/cultural) based on their reading of assigned sections from the *Foundations of Game-Based Learning* article. To prepare them for reading future articles, I illustrate typical section topographies of scholarly articles in the sciences and social sciences fields (e.g., Introduction, Methods, Results, Discussion). The game I use to demonstrate course concepts in week two is usually a simple adding game like blackjack or a definitions game like the dictionary game. Students can reflect on the benefits and limitations of simple games for promoting learning. Students are assigned a short reflection paper that asks them to think about either a game they have recently played or types of games they like to play. Students use the newly introduced foundational elements of learning through play to reflect on the role those elements can play in their learning and engagement with games.

In week three I extend the use of the foundational elements of learning through play by incorporating the four elements in a rubric students use to evaluate the games played in class. I lead a modified version of the game *Scattergories* to encourage students to think of the four foundational elements in new ways. In order to expand students' knowledge base of the scholarship on play-based learning, I introduce them to strategies for finding

scholarly sources, including using the bibliography of an initial relevant source, as well as exploring the articles that have cited an initial source they have found. In the assignment for the week, students find sources using these two methods. Next, students annotate the sections of the articles they find and compare notes with other students in the class. Students extend their practice of reading articles by responding to prompts connected to the purpose of each article section. A library scavenger hunt is used to introduce students to finding sources on the library's website and in the library building. In different iterations of the scavenger hunt, I have had teams race against each other, but have then included a time handicap based on how far away books were located in the library building. But in some iterations, I don't time the teams. For online scavenger hunts, I have sometimes rewarded uniqueness of the sources found (i.e., sources not found by other students). I vary my use of these typical game-based motivators depending on my observations of the specific class. Ultimately, my intention is to include a library research game where students' comfort with using the library increases and their curiosity about novel sources is sparked. Through observing and discussing shared searching difficulties with their peers, my hope is students will feel less anxious about finding sources and will explore the library more.

Table 3

Course part 1 learning objectives, class work, learning resources, and assignments

Week	Theme / Learning Objectives	In-Class Work	Learning Resources	Assignments
1	• Introduction to course content • Introduce some course behaviors • Play vs. games • What is play (game)-based learning?	*Modeling*: • Teaching the class how to play a game • Reflective prompts after playing games • Initial demonstration of how to read an article (Plass et al.) - look up new vocabulary *Pair or Group Work*: Self-assessment of games they have enjoyed playing *Games*: Get to know you game (e.g., meet new people bingo, four on a couch, telephone pictionary)	*Text:* Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist*, *50*(4), 258–283. *Games:* Four on a couch game http://www.greatgroupgames.com/four-on-a-couch.htm Telephone pictionary game - prompting question - two words to describe how are you feeling about school at the beginning of this term http://www.ultimatecampresource.com/site/camp-activity/telephone-pictionary.html	

2	• What qualities of games make them appropriate learning tools (foundational elements of learning through play)? • Learning the structure of a scholarly article and identifying the parts of an article they find on their own	*Modeling:* Demonstrate how to annotate an article and what the parts of an article are *Pair or Group Work*: Present sections of the class article text to each other using the jigsaw method *Games:* Simple math game (e.g., blackjack) or definitions game (e.g., dictionary game)	*Texts:* Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist*, *50*(4), 258–283. - specifically the sections on cognition, affect, motivation, and sociocultural components (the foundational elements of learning through play) Gottesman, A. J., & Hoskins, S. G. (2013). CREATE cornerstone: Introduction to scientific thinking, a new course for STEM-interested freshmen, demystifies scientific thinking through analysis of scientific literature. *CBE Life Sciences Education*, *12*, 59–72. https://doi.org/10.1187/cbe.12-11-0201 - Use annotating instructions, provide students with a note-taking template for recording classmates' presentations about the article text *Games:* Dictionary game - use vocabulary words from the foundational elements - https://www.greatgroupgames.com/the-dictionary-game	*Group Article Description:* Describe an assigned portion of the class text to a small group (jigsaw method) *Gaming Reflection*: Use prompts based on the class text to reflect on games they like to play or a game they have recently played
3	• Evaluate games based on Plass et al.'s foundational elements of learning through play • How to find articles using a bibliography or cited by information • Practice reading articles based on using reading prompts • Explore articles on the topic of game-based learning (Plass et al.)	*Modeling:* • Demonstrate and practice using one good source to find another • Introduce a rubric for evaluating games we play based on the foundational elements of learning through play *Pair or Group Work:* Annotating the sections of an article using online tools like *Perusall* or *hypothes.is* *Games:* • Modified *Scattergories* based on the foundational elements of learning through play	*Text:* Plass, J. L., Homer, B. D., & Kinzer, C. K. (2015). Foundations of game-based learning. *Educational Psychologist*, *50*(4), 258–283. - specifically the sections on cognition, affect, motivation, and sociocultural components (the foundational elements of learning through play) and the bibliography *Games:* *Scattergories* (modify for the class) https://scattergoriesonline.net/	*Learning & Games Foundation Research Assignment:* Submit two articles, one citing the Plass et al. article and one cited by the Plass et al. article. Annotate the structural parts of the articles and respond to prompts about what the purpose of the articles was.

		• Library scavenger hunt (online or in-person) • Small group games		

Course Part 2 - Designing and Researching a Game

In the middle portion of the class, students begin to apply what they have learned about the foundational elements of play-based learning to designing their own game (see Table 4 for a more detailed overview of the themes, course work, learning resources, and assignments for the second part of the course). The overall requirements for the game that teams design include the following aspects:

- Games must be created in groups
- Games must connect to the chosen game theme
- The game must include at least one object the team created (e.g., cards, online interface, game board)
- The game may be an adaptation of an existing game, but must include three significant, original elements

Drawing on the pedagogical best practice of using shared class experiences, the class decides upon a single theme that each game design team will use as their game topic. The game topics are meant to be broad enough so that each team can interpret the game in different ways. Examples of past themes include the first-year experience, space, international travel, and UNESCO World Heritage sites. As students shift to engaging in more group work, I introduce guiding principles for working in groups along with supports for making group work more effective, including project work plans and assigning specific roles.

After a shared topic is selected through a process of discussion, negotiation, and voting, the teams begin to focus on developing their own game. They begin by selecting a specific audience for their game. Next, they select a more specific area of the larger shared topic chosen by the class. Then they choose a game type (e.g., card game; board game). To expand their understanding of their audience, game topic, and game type, I ask students to find sources on each of those aspects. Within a team, each student must find different sources so that their shared knowledge base is larger. I model an approach to synthesizing information from a source using the précis method. Students write a précis and find or create an image representing each source they find to facilitate conversations about their sources with their teammates.

In week five, I use a peer conference feedback model so students can get multiple suggestions about their game ideas. Prior to giving feedback to each other, I give examples of how students can give feedback that is specific and kind. After receiving feedback, the teams discuss what feedback they will use moving forward. While the peer conference approach can be time consuming (often a full class period), the input students receive from other teams is usually key for the direction the game ultimately takes. Students begin to turn their ideas into actionable tasks by creating a project work plan using a template. Students assign team members to specific roles, and practice breaking a large task into smaller chunks and setting deadlines. At this point in the term, I ask students

for a mid-term evaluation of how the course is meeting their learning needs using Stephen Brookfield's Critical Incident Questionnaire (n.d.).

Week six includes time for students to continue researching their games. Having sufficient time to carry out their research and share it with their teammates allows them to make more thoughtful source choices and to use what they read to inform their design decisions. One of the first game deliverables is a draft of the directions. I present some technical writing skill basics to give them a framework for writing clear directions, using predictable headings found in many game directions. To reinforce the idea of game directions as a genre to emulate and learn, we play a class game of game directions trivia. I read from common sections of game directions such as the introduction, equipment and supplies, main instructions, and tips and ask students to identify the game based solely on the information from that portion of the directions.

Table 4

Course part 2 learning objectives, class work, learning resources, and assignments

Week	Theme/Learning Objectives	In-Class Work	Learning Resources	Assignments
4	• Brainstorm their own game topics • Game topic selection • Choose an audience • Choose a specific topic • Choose the game type	*Modeling:* • Selecting an audience and topic for a game • How to present a Games & Culture: Two Truths & a Lie presentation *Pair or Group Work:* • Students present a Games & Culture: Two Truths & a Lie presentation • Brainstorming potential game topics, use consensus to narrow game topic options • Negotiate to choose a game topic across all groups • Discussions within small groups to select an audience, specific topic, and game type *Games:* • Picture or word-based prompt brainstorming games • Small group games	Game Developers Conference. (2016, May 2). *Magic: The Gathering: Twenty years, twenty lessons learned*. https://youtu.be/QHHg99hwQGY - Importance of knowing your audience, presentation by Mark Rosewater, game designer Example sources for précis demonstration Curated list of article options for Games & Culture: Two Truths & a Lie presentation	*Description of game audience, topic, and type*

5	• Learn to give peer feedback on topics • Learn how to write a précis to succinctly summarize a source • Using project work plans to facilitate group work	*Modeling:* • Giving specific and kind feedback on project ideas • Asking for feedback (Critical Incident Questionnaire) • How to write a précis for different source types *Pair or Group Work:* • Giving specific, subject-specific, and kind feedback on project ideas • Create project work plans • Research their game audiences, topics, and game types • Students present a Games & Culture: Two Truths & a Lie presentation *Games:* Small group games	Conference feedback worksheet with specific prompts for directed feedback Work plan template with specific roles: http://teachingcenter.wustl.edu/wp-content/uploads/2017/12/POGIL-role-cards-traditional.pdf Class check-in survey - Critical Incident Questionnaire - http://www.stephenbrookfield.com/critical-incident-questionnaire	*Peer conferences* - discuss game ideas and receive feedback *Group project work plan*
6	• Researching game audience, topic, and type • Writing clear directions	*Modeling:* • Building in time for research • Basics of technical writing through the lens of game directions *Pair or Group work:* • Research together, share findings • Students present a Games & Culture: Two Truths & a Lie presentation *Games:* • Game trivia - based on reading from specific elements of the well-known (and less well-known) game directions • Small group games	Direction writing resource - https://www.prismnet.com/~hcexres/textbook/instrux.html	*Game development research summary scrapbook* - includes three sources, a précis for each source, and a visual representing key ideas from each source

Course Part 3 - Building and Testing a Game

During the last section of the class, students begin to build and test their games (see Table 5 for a more detailed overview of the themes, course work, learning resources, and assignments for the third part of the course). They also reflect on how play-based learning impacted their design decisions and present their final game. In week seven, students begin to work on a prototype for their game. The idea of a prototype and the iterative nature of design is introduced to reinforce the concept of graceful failure so students feel more comfortable creating drafts and getting feedback, rather than submitting a perfect final product on the first attempt. To make sure work is evenly distributed across teams and that students' individual strengths are recognized, I encourage students to continue to use their project work plans to clearly communicate progress on tasks. I make time in class for students to work on developing their games. The in-class work time also provides me with the opportunity to make sure students have the resources they need so they don't feel pressured to purchase expensive game components or construction materials.

In week eight, the teams submit their first draft of the written game directions. I use the peer conference feedback method again so teams can test the clarity of their directions with several audiences. Teams continue to develop their games based on the iterative feedback they receive.

In week nine teams turn in a revised draft of their written game directions. I require students to make changes between the first and second drafts to emphasize the value of iterative feedback and practice. Teams also submit a prototype of their game to make sure they are on track with completing their game, but also to allow for time to make changes as needed. As students prepare to present their games during the final week of the course, I ask teams to reflect on several elements of their game and the game design process. Reflection prompts include making connections between their game's learning objectives and the foundational elements of learning through play, thinking about why they chose their game type and audience, and what future adaptations they might make to their game given more resources.

During the last week of the class, teams present their games. One element of their presentation includes discussing the reflective prompts about their game choices and how their game makes use of the foundational elements. But the most engaging part of their game presentation involves actually playing the games they developed. This stage of game play typically looks more like game testing than playing a shelf-ready game. Sometimes design gaps or issues with playability are not clear until teams play their game with others. However, the rubric and evaluation of the games is not rooted in a goal of creating a game to sell. Instead, evaluation is focused on how the teams were able to incorporate learning objectives connected to the foundational elements, the reflections on the design process, and whether the games clearly connected to the audience and topic.

Table 5

Course part 3 learning objectives, class work, learning resources, and assignments

Week	Theme/Learning Objectives	In-Class Work	Learning Resources	Assignments
7	• Developing a game prototype • Using a project work plan to check in on group progress • Cultural factors of game play	*Modeling:* Building in time for game development *Pair or Group work:* • Work on game development together • Draft written game directions • Check in on project work plan • Students present a Games & Culture: Two Truths & a Lie presentation *Games:* • Barnga - a cross-cultural communication game • Small group games	Barnga cross cultural communication game https://sites.lsa.umich.edu/inclusive-teaching/2017/07/10/barnga/	
8	• Create physical or online game structures • Testing directions with their peers	*Modeling:* • Building in time for game development • Giving specific, subject-specific, and kind feedback on written directions draft *Pair or Group work:* • Work on game development together • Provide peer feedback on written game directions • Check in on project work plan and discuss peer feedback • Students present a Games & Culture: Two Truths & a Lie presentation *Games:* Small group games		*Written game directions* (first draft)
9	• Sharing game design decisions	*Modeling:* • Demonstrating how to highlight the foundational elements of learning through play from their game design	Mafia game basic directions: https://icebreakerideas.com/mafia-game/ (modified to include graceful failure and	*Written game directions* (second draft) *Prototype or physical/online object for game*

		• Building in time for game development *Pair or Group work:* • Work on game development together • Check in on project work plan • Choose game design presenter roles • Students present a Games & Culture: Two Truths & a Lie presentation *Games:* Mafia - foundational elements of learning through play adaptation	foundational elements of learning)	
10	• Present games	*Modeling:* Enjoying playing games *Games:* Games developed by classmates		*Game presentation* - including reflection and design choices *Game presentation* - playing the games

Adaptations, Feedback, and Lessons Learned

Adaptations

Several adaptations to this course have been made over time to meet the needs of different student audiences. The first transition was from a first-year student course to an Honors College course. During this transition, I returned to the question of whether this course was challenging enough and whether it included a holistic exploration of play and games. To meet those concerns, I added in the Games and Culture presentation assignment. The remainder of the course stayed largely the same. While Honors College students can take this course at any point in their undergraduate studies, they come from a range of disciplinary backgrounds. As a result, the material is usually unfamiliar, and the activities that require them to work together still provide enough challenge to keep them engaged.

I also adapted the course content to a European context while teaching the course in the Czech Republic to Erasmus students who came from throughout the European Union. In this adaptation, I needed to examine my assumptions of students' shared knowledge of games and game types. Another difference I observed in this context was increased interest in playing games that used collaboration rather than competition as a motivating factor. In addition, because the course was worth more credits, I had the opportunity to build in more material on how instructional design principles connect to learning through play.

During the global pandemic, like many instructors, I needed to adapt my teaching to the online environment. For many of the course activities, I found the transition to be quite simple. Small groups worked well in breakout rooms, *Google Jamboard* worked well for brainstorming and simple games, in the same way a whiteboard would in a classroom. But the platform students used for building games needed to change. Students could not build a physical board or card game and instead needed to find online platforms (e.g., *Flippity.net*) that would allow them to create free online games, with a low learning curve. Ultimately, student games were equally creative and effective in this environment as in the in-person iteration of the class.

Feedback

Course feedback was collected throughout the term and at the end of the course. Formative feedback received through the Critical Incident Reflections provided input that helped me determine where adjustments might be needed or where the course was on track. When prompted to reflect on what action anyone (teacher or student) took over the beginning portion of the term that they found most affirming or helpful, students noted the benefits of learning from and consistently interacting with a small group of peers. When asked about what surprised them the most about this class, students were surprised that they could learn while also playing and having fun in the class. They also noted surprise about how much research and intentional work goes into creating games with a learning focus.

End-of-term feedback has been positive. For example, one student observed, 'Quite honestly I started the class without much hope of enjoying it. I didn't think a class about games would be interesting. However, slowly I started to gain some interest in the class and by the end of the term I really enjoyed the class.' Other students have reflected on how this class has helped them think differently about how they can structure learning experiences into their formal and informal role as teachers, in lab groups or as teaching assistants.

Lessons Learned

One lesson I have learned is that learning games do not need to be flashy or tech-based to be effective. Building from a simple and often familiar game allows students to see the value of iteratively developing a game and adding in learning objectives. Reflecting on how well these simple and low-tech games work gives students the chance to practice with fewer stressors. Most importantly, they practice incorporating feedback and suggestions as part of an iterative cycle of learning and design.

Another takeaway has been that play can translate across cultures and different student experiences. Adding in an explicit evaluation of how games and culture intersect greatly enriched the course and has consistently resulted in more thoughtful reflection on the assumptions all of us bring to our play and learning experiences. Initially, I was unsure as to whether this exploration might be too abstract or tangential, but students have contributed thoughtful and often vulnerable insights, as they think more deeply about larger structural impacts connected to games.

Finally, in the latest iteration of this course, I have used a pass/no-pass method of grading. While I was initially

uncertain as to whether students would stay motivated and continue to complete assignments without the use of letter grades or percentages, this transition provided the opportunity to more fully align with the principle of graceful failure. I felt freer to give students feedback on their assignments and game designs without worrying that they would be upset about the details of the grade assigned. Students continued to participate at a high level motivated by their small group dynamics and genuine interest in the process of creating a learning-based game, without the fear of receiving a lower grade for trying something new.

Conclusion

I developed this course to introduce students to more playful approaches to research and information literacy skills. Students learned a variety of techniques for searching, evaluating, and reading literature in a field (play-based learning), with which many of them were previously unfamiliar, which they could then apply to other contexts. The use of games, peer learning, novel topics, and low stakes assessment encouraged students to explore more freely. Creating a space for graceful failure that encouraged learning from repetition and practice was at the heart of my pedagogical strategy. Building in a scaffolded learning experience with opportunities for reflective practice allowed me to devote enough course time to allow for graceful failure, which could then lead to play-based experimentation and learning. I also modeled the practice of reflective question asking each time I presented my own less-than-perfect games, as another way to demonstrate the practice of failing (and trying again) gracefully. In addition, students learned the metacognitive skills of active reflection, which they can apply to future learning and research settings. This pedagogical approach demonstrates that a course structure rooted in play-based learning principles can be an effective way to engage students with information literacy concepts through the lens of play.

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