Learning Game Design While Playing Games: A Game Design Crash Course

By: Hamid Nadir

Abstract:

This course investigated game design competencies of graduate students as they engaged in gameplay and learned about game-related concepts, including gamified approaches, game-based learning (GBL), design thinking, maker technologies, and game designs. Students were introduced to the week's topic beforehand and collaborated on design projects during class sessions. Students played a different game each week, focusing mainly on game mechanics. Through the utilization of foundational readings, video tutorials, discussions, assignments, and guidance from the instructor and a guest speaker, students developed a comprehensive understanding of game design principles. This understanding ultimately led them to design both board and video games. No prior programming or game design experience was necessary.

Keywords: Gamification | game-based learning | game design | video games | Constructionism | Maker Technology

Article:

***Note: Full text of article below

Learning Game Design While Playing Games: A Game Design Crash Course

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OVERVIEW

This course investigated game design competencies of graduate students as they engaged in gameplay and learned about game-related concepts, including gamified approaches, game-based learning (GBL), design thinking, maker technologies, and game designs. Students were introduced to the week's topic beforehand and collaborated on design projects during class sessions. Students played a different game each week, focusing mainly on game mechanics. Through the utilization of foundational readings, video tutorials, discussions, assignments, and guidance from the instructor and a guest speaker, students developed a comprehensive understanding of game design principles. This understanding ultimately led them to design both board and video games. No prior programming or game design experience was necessary.

Topics: Gamification, Game-Based Learning, Constructionism, Design Thinking, Maker Technology

Time: 5-week online class with three-hour synchronous Zoom sessions

MATERIALS

- Learning Management System
- Computers with internet access and webcam
- Blog for game tracking
- Readings and resources (identified in the lesson)
- Commercial board game kits from Amazon
- Construct 3 license subscription
- Individual student game consoles
- University maker lab
- Instructor-approved games
- Board game rubric
- Maker technologies rubric
- Video game rubric
- Presentations (Week 2, Week 3, Week 4, Week 5)

CONTEXT-AT-A-GLANCE

Setting
A graduate-level online seminar course at a public research university in the southeastern United States.

Modality
Online, synchronous.

Class Structure
The 3-credit, 5-week seminar course on games and game design was organized as a half-hour lecture during a three-hour class. Course components are hands-on activities and reflective discussions organized within the Learning Management System (LMS).

Organizational Norms
Instructional activities are presented via readings, videos, discussions, assignments, and group collaborations.

Learner Characteristics
Eighteen graduate students majoring in Library and Information Science, with little to no prior game design experience, attended this course.

Instructor Characteristics
An Instructional Design and Technology (IDT) first-year Assistant Professor and former middle-school teacher who was exploring games and game design led this course.

Development Rationale
The modules introduce game studies and game design, including characteristics of games, the integration of rules and logic for board games and game mechanics, gameplay, and web design to manipulate a programming language for video games.

Design Frameworks
Design thinking and Flow

SETUP

The lessons occurred online, necessitating students' access to an LMS and a virtual meeting platform. For ease of access, Zoom was integrated into Canvas. Additionally, students were required to engage with board and/or video games and were prompted to establish multiple free accounts to access and play virtual games. All essential readings, videos, and tutorials were conveniently incorporated into the LMS.

Moreover, students received Do It Yourself (DIY) kits consisting of dice, blank cards, game pieces, a spinner, a timer for board game design, and licenses for paid video game-making software. However, instructors can forgo commercial DIY kits and paid game-making software, instead using readily available household materials and free programming software like Scratch.

CONTEXT AND SETTING

The course was designed as a five-week seminar during the summer of 2023 within the Library and Information Science Department. This novel addition to the curriculum arose from the institution's contemporary initiatives to cultivate a series of courses in eSports, spurred by a heightened enthusiasm among students for games, particularly video games. This concise five-week game design course aimed to impart comprehensive knowledge and skills concerning games. Emphasis was placed on interpreting games as critical narratives and elucidating how games can facilitate learning. Throughout the course, students were actively engaged in playing games and undertook the design of both physical and virtual game experiences.

LEARNER CHARACTERISTICS

In the summer of 2023, the course was developed and delivered at a public university in the southeastern United States. This university is recognized as a Minority Serving Institution (MSI), reflecting its commitment to fostering diversity and inclusivity. The enrolled student body is notably diverse, comprising individuals pursuing their studies in the Library and Information Science Master's program, with a subset also earning graduate certificates in the field of Instructional Design and Technology (IDT).

A demographic overview of enrolled students revealed a distribution of 83% White, 11% Black, and 6% Native Hawaiian or Pacific Islander. Regarding gender representation, approximately 67% identified as female, while 33% identified as male. Noteworthy is the commonality among students in these programs, as many concurrently engaged in full-time employment within educational institutions, healthcare, and/or corporate sectors. Typically, students in these programs undertook enrollment in at least two graduate courses per semester.

INSTRUCTOR CHARACTERISTICS

The instructor served as the course designer, bringing over a decade of teaching experience to the role, with just over a year dedicated to the current University. His professional background also encompasses a position as an instructional designer at a higher education institution. This role equipped him with the expertise to seamlessly integrate effective online learning and teaching pedagogies into the structure of this course. Despite possessing limited programming knowledge, the instructor demonstrated a proactive approach that compensated for potential gaps. Notably, he entered this course with no pre-existing game design knowledge or skill.

COURSE DESCRIPTION

The overarching objective of this course was to offer graduate students a comprehensive exploration of games, encompassing game techniques such as gamification and game-based learning (GBL), as well as game design methodologies across various modalities, including board games and video games. The instructional approach adopted for the lessons embraced a participatory studio workshop format, encouraging students to collaboratively engage in design, creation, and tinkering processes. This collaborative effort was facilitated by diverse instructional tools, including foundational readings, video tutorials, technology tools, job aids, discussions, and guidance from the instructor and a guest speaker.

A curated collection of readings, videos, and hands-on activities enriched each week's learning

experience. Students were provided with the week's topic in advance, fostering pre-class understanding, and were encouraged to pose questions and collaborate with their peers during class sessions. Notably, students actively participated in playing games, reflecting on aspects such as gameplay and game design and examining how these elements contributed to the learning process. To further enhance reflective practices, students were tasked with maintaining a design journal or virtual blog, serving as a repository for their thoughts, ideas, and experiences. This practice facilitated tracking changes and developments in their perspectives throughout the course.

Given the course's condensed nature within a short summer session, each week delved into diverse learning topics. For instance, week 1 encapsulated various facets of games, encompassing game theories, game history, gamified techniques, game-based learning, constructionism, and the application of technology tools in games. Each of the five weeks functioned as a distinct module, tailored for specific learning outcomes.

The course's five modules were:
    Week 1: What is a Game?
    Week 2: Board Games
    Week 3: Maker Studio Projects
    Week 4: Virtual/Video Games
    Week 5: Final Project

DELIVERY FORMAT

The course was delivered synchronously online during the 2023 Summer Session I within the Library and Information Science Department. The duration of the course spanned five weeks. Notably, the instructor initially planned for two in-person meetings out of the five scheduled, specifically during the board game and maker studio projects, given the inherently hands-on nature of these activities. However, students collectively opted to persist with online meetings, and consequently, the initially planned in-person meetings did not transpire.

Zoom served as the platform for conducting weekly meetings, while the Canvas LMS functioned as the primary mode of content delivery. Within Canvas, the instructor structured modules, disseminated announcements, posted assignments and discussions, and managed grading. The presentation of course material was designed to foster active

learning, necessitating students to complete weekly readings and watch instructional videos before each class session. During class, the instructor elucidated the designated topics, fostering engagement through discussions, problem-solving activities, and collaborative learning initiatives.

Assignments and discussions adhered to a weekly submission timeline, except for the first week when two discussions and one mini-assignment were due before the initial class meeting. To facilitate student preparedness, the instructor preemptively issued an announcement with directions ahead of the first class. The readings and instructional videos spanned diverse subjects, encompassing the impact of games, gamification, game-based learning, prototyping, maker technologies, board games, and video games. Importantly, access to readings was facilitated through online availability within Canvas Modules, eliminating the need for any textbook purchase.

DEVELOPMENT RATIONALE

Various instructional components, including class presentations, activities, readings, instructional videos, and pertinent resources, were intricately linked with discussions, assignments, and the culminating final project. During the initial three weeks, students played a distinct game each week, followed by reflective exercises. To facilitate this, a compilation of free board games and video games was made available on Canvas. While students had the flexibility to choose a game of their preference, consultation with the instructor was encouraged.

Initially, all technology tools employed throughout the course were freely accessible, and any required paid subscriptions for video gaming software were generously provided to students at no additional cost. Additionally, students were equipped with a Do-It-Yourself (DIY) Board Game kit, a provision made possible through the instructor's utilization of an internal grant to acquire software subscriptions and game kits. Importantly, instructors have the option to forego such purchases, allowing students to utilize readily available materials from home, with the stipulation that Scratch be employed as the designated gaming software for the final project, specifically in video game design.

The course was meticulously crafted as a participatory studio model, primarily focusing on

students acquiring insights into game design through active engagement in playing games and reflecting on their gaming experiences. Consequently, course materials predominantly took on a hands-on and interactive nature, underscoring the significance of peer collaboration. Although assignments were intended to be individually completed, students were systematically grouped during class sessions to facilitate sharing experiences and mutual assistance. Noteworthy is the allowance for group submissions, albeit exclusively for the design of the board game.

The instructor adeptly curated mini-game sessions in the classroom, prompting students to engage actively with gaming principles. For example, in Week 4, the instructor used a Slido poll (an online interactive polling platform, www.slido.com) and asked students to describe their ideal vacation using one emoji. After students used emojis, the instructor engaged them in a conversation about whether this activity was a game or whether a gamified approach had been implemented. Such ice-breaker activities could address the principles of games and gamified approaches. An instructor could integrate Kahoot, Poll Everywhere, Mentimeter, Jeopardy, etc., for ice-breaker activities at the beginning of the class. Utilizing Zoom's breakout rooms extensively, students were provided with opportunities to share their gaming experiences collaboratively and collectively address design challenges, particularly during the programming phase of video game creation. To enhance the learning experience further, a guest speaker was invited during the maker studio project week. This speaker specialized in 3-D printing and laser cutting, offering valuable insights and actively contributing to problem-solving efforts related to students' designs. As part of the experiential learning approach, students were encouraged and empowered to explore the realm of 3-D printing and laser cutting. Specifically, they were urged to utilize these technologies to create game pieces to augment their board games. Students did not need direct access to maker labs for the maker technologies. Students uploaded their design files on Canvas, and the instructor printed them in the school maker lab and shipped them back to the students. Students could also print them in local public libraries and community fab labs.

DESIGN FRAMEWORK

The instructor systematically integrated design principles throughout the course, with particular emphasis on two epistemological tenets: design thinking and flow. These principles held paramount significance in both class discussions and the creation of assignments. Design thinking, acknowledged as an analytical and creative process, encompasses elements such as experimentation, ideation, prototyping, gathering feedback, and redesign (Razzouk & Shute, 2012). In parallel, the concept of flow, as articulated by Csikszentmihalyi (2014), revolves around deriving enjoyment from an activity for its intrinsic value without pursuing traditional rewards.

Additionally, the course incorporated and delved into several design models outlined by Juegoadmin (2021), which were systematically included and comprehensively discussed during class sessions.

- Waterfall Model: A linear approach to development; each step is completed before the next step begins.
- Agile Model: This model is based on agile principles in project development, breaking down smaller features to achieve quicker progress.
- Iterative Model: This is a relatively linear development process. However, steps are performed many times before finalizing development, and feedback is collected at every stage to improve iterations of the project.

The underlying premise guiding the instructional approach is the recognition that meaningful and sustainable learning occurs when learners are motivated, engaged, and experiencing enjoyment, often described as the state of 'flow.' Consequently, the instructional strategy prioritizes authentic learning, wherein learners actively engage in the learning process, predominantly through hands-on activities and learning from their mistakes. The instructor meticulously mapped out learning activities to align with these pedagogical principles, ensuring alignment with learning objectives. Additionally, consideration was given to the diversity among learners, acknowledging varying levels of expertise and learning curves associated with design works. Given that most learners had limited programming experience and design skills, the instructional design and delivery were tailored to provide individual support while fostering a collaborative community for peer mentoring.

Central to the instructional philosophy was the incorporation of the concept of productive failure (Kapur, 2008) and adherence to design principles,

encompassing inspiration, ideation, implementation, prototyping, feedback, and application. This approach aimed to create an environment in which learners felt supported and encouraged to iterate on their projects. Recognizing potential anxieties among students, the instructor proactively established an open discussion forum to nurture community and shared various related technology resources.

LEARNING REPRESENTATION

COURSE OBJECTIVES

Upon course completion, students will be able to:

- Define and describe gamification theories and frameworks (weeks 1 and 2).
- Understand and identify game mechanics (weeks 1-3).
- Play, analyze, and critically review a variety of games (weeks 1-3).
- Use and evaluate contemporary gaming platforms across diverse learning environments (weeks 1-3).
- Apply gamified techniques in different educational contexts (weeks 2 and 3).
- Compare and contrast constructionism with other educational learning theories (week 3).
- Use design thinking and prototyping during tinkering (weeks 2 and 3).
- Learn maker technologies and incorporate them into game design (weeks 3 and 4).
- Locate and manipulate images/videos/resources to use in games (weeks 2-4).
- Use programming software (weeks 4 and 5).
- Construct both physical and virtual games (e.g., board games, digital escape projects; weeks 2-5).
- Reflect on your design practices (weeks 1-5).

COURSE OVERVIEW

The course followed a five-week module flow, where each week's learning materials were grouped together for easy access. Also, design considerations were enacted so there would be a consistent learning progression. For example, students designed their board games in week 2, then learned maker technologies and learned how to 3D print their board game pieces in week 3. A short overview of modules, including the learning activities for this five-week

lesson, is presented below. A detailed description of these learning activities with a corresponding grade percentage for evaluation is presented later.

It is imperative to provide a general overview of an instructional week before highlighting the agenda for week 1. This course was designed as a flipped classroom, where students had to read assigned articles, watch instructional videos, play games, and experiment with design work before they attended class sessions (on Thursday evenings). In class, the instructor provided an overview of the week's instructional materials, engaged students in discussions about the games they played that week, presented instruction about the week's topic, immersed students in design works, and employed reflection. After the synchronous session, later that night or the following morning, the instructor sent an announcement highlighting the topics covered that week and listing the assignments that would be due before the class met next week.

The instructor generally spent the first 5 minutes of the class socializing and building a community. Students were asked to share their professional and/or personal successes or challenges. This created a sense of belonging and empathy, which, in turn, fostered peer mentoring. The instructor then introduced either an ice-breaker activity or a game that lasted about 10 minutes. Students were sent to Zoom break-out rooms for 15 to 20 minutes to discuss the game they played that week. The instructor spent 40 to 45 minutes briefly discussing that week's class readings, instructional videos, and topics. Then, the instructor sent the students into the break-out rooms again for about 45 minutes, where they discussed and worked collaboratively on the week's assignments. These break-out rooms encouraged them to work in smaller groups and learn from each other. The instructor hopped around the break-out rooms and provided guided support if needed.

After each group session, the instructor brought students back into the main room and debriefed them on the learning activities that had taken place that day. During this time, the instructor engaged students in reflexivity and answered students' queries. This phase took 10 to 15 minutes. Lastly, the instructor presented the assignment for the upcoming week and explained the deliverables. Thus, each class session lasted approximately two and a half hours.

Week 1 – What is a Game?

Overview

In Week 1, the instructor reviewed the course syllabus, including course learning objectives, assignments, and grading policies. Even though the course syllabus was shared beforehand and an announcement was sent highlighting the tasks for that week, the instructor took time to explain the objectives and the assignments in detail. The instructor engaged students in a general discussion about games, game theories, gamification, and game-based learning and how they can create meaningful and engaging learning opportunities. The discussion occurred synchronously online, and students volunteered responses. The central objectives for this week were to differentiate between gamification and game-based learning, analyze and critically review a game, and identify and understand game mechanics, including the strengths and weaknesses of a game. The week's readings centered on gamification, and instructional videos covered game design approaches.

Week 1 Readings and Resources

Each week, students were provided with articles that closely aligned with designated themes and topics for the week. For instance, the first week focused on game principles and exploring their applications in education. The readings for each week not only facilitated student comprehension but also enabled students to establish meaningful connections with their learning experiences, enhancing their effectiveness in assignment completion.

Week one readings included:

- A review of gamification research (Koivisto & Hamari, 2019)
- Tailored gamification in education (Olivera et al., 2023)
- Gamification in e-learning (Poondej & Lerdpornkulrat, 2019)
- The role of gamification in education (Surendeleg et al., 2014)

Additionally, students had access to instructional videos and accompanying resources tailored to the designated topic each week. These videos and job aids served as mediums for acquiring proficiency in new tools and reinforcing previously covered topics. Resources included:

- Gamification to improve our world (Chou, 2014)
- Games: CrashCourse (Meadows, 2016)

Instructional Delivery in Week 1

Week 1 was not a typical instructional week, as the instructor and students met synchronously for the first time during the five-week course. The instructor spent about 15 to 20 minutes introducing and providing a course overview by sharing the course Canvas page with the students and walking them through it. Then, the instructor spent about 45 minutes going over the syllabus and explaining learning objectives, assignments, and the grading policy.

Before the first meeting, the instructor sent a class announcement highlighting the course overview and specific tasks students needed to complete, including playing and researching a game of their choice and starting the game autobiography and gamer profile assignments. The instructor emphasized that each week students would spend 4-5 hours playing and analyzing games (that included researching and finding instructional videos about the game), 3-4 hours reading and watching instructional videos, and 2-3 hours completing assignments.

After completing the discussion about the course syllabus, the instructor sent students to Zoom break-out rooms for about 35 minutes so they could share their gaming experience in smaller groups. Later, in the main room, the instructor asked students if they wanted to share about a game or gameplay they learned from their small group interaction. A few students shared what they had learned from their peers. The instructor then shared expectations about weekly readings and instructional videos. Students were asked to read the first three articles and watch the first three instructional videos on the list for that week. Additional readings and videos were made available each week for enrichment. The instructor then explained the three assignments of that week. The instruction lasted for about 30 minutes. At the end of the class, the instructor presented a short overview of games, game theories, gamification, and game-based learning for about 15 minutes. The

instructor did not provide a PowerPoint presentation in the first week, but presentations were available for the remaining four weeks.

WEEK 1 ASSIGNMENTS

Three major assignments were completed: The first game blog, a gaming autobiography, and a gamer profile. Below is the information that students received in the LMS.

GAME BLOG #1 (DISCUSSION)

** For Discussions, you will follow two due dates. The first due date is for your initial post (Monday 11:59 PM), and the second due date is for your replies (Wednesday 11:59 PM) to your classmates.

Each of you is expected to select and learn one new game (physical or virtual) each week for the first three weeks (a total of 3 games). This means that you will need to spend at least 4-5 hours online or "in-game" each week so that you can ground our discussions not just in readings but also in personal experiences. As part of your gameplay, you can also participate in discussion boards, visit cheat sites, read game magazines and blogs — anything that pertains to that game or virtual world. Each week, you will share your gaming experiences in a blog and reflect on them. Please note that you will write a final reflection in Week 5.

- One way to think about the game review notes is to make it look like a journal documenting how you learn to play.
- Another way is to capture a screenshot of an interesting gameplay instance and explain what you learned here or what was difficult — anything you find worthwhile.
- Yet another way is to tie your reflections to the weekly class topics. For instance, when the readings focus on gender, you could make gender a focus of your observations captured in the game review notes that week, when they are on violence, and so on.

*Games must be instructor-approved and substantial (e.g., Bejeweled, Solitaire, and even Angry Birds won't do the trick here). A suggested list of games can be found in Canvas.

GAME AUTOBIOGRAPHY (DISCUSSION)

As we begin to study games, gamification theories, and design physical or virtual games for learning, it is helpful to understand our own history with gaming and how it might frame our perception of games and learning. Provide a raw reflection.

- Highlight some of your prior experiences with playing board games or video games.
- What games were your favorites and why?
- What games were played in your family, which games did you play with your friends, and which games do you continue to play now?
- Any other relevant experiences and observations.

GAMER PROFILE (WORD/PDF SUBMISSION)

In this assignment, you will observe and interview a child (aged 6-15) playing a new video game for the first time. You can choose from a list of games (find the list on Canvas). The purpose is to understand how they play, their learning, problem-solving, etc., and write a report on the session. Spend about 30-45 minutes watching them play. Ask them to talk aloud as they play. Feel free to ask them questions, "Why did you do that?" "How did you figure that out?"

Write a profile of your participant that tells the reader:

- Who are they? (use pseudonyms, age, gender)
- How often do they play games?
- What kinds of games do they play? (It is okay if they don't play any games.)
- How did they go about their gameplay?
- What you learned from watching them.

* Link it to your experience playing games and the readings/theories from class. You may want to add images of the game. If you do not know a child, contact me.

WEEK 2 – BOARD GAMES

OVERVIEW

In week 2, the instructor engaged students in a discussion about different types of games, constructionism learning theory, prototyping, and gamification approaches in education. The instructor

presented several game design perspectives, including strategies vs. tactics, risks vs. rewards, forms vs. functions, systemic sandboxes, meaning-generating objects, game rules, game alignments, and noises (e.g., white, brown, pink) in game design. The overall learning objectives for this week were to define gamified approaches, critique games and game mechanics, evaluate gaming platforms, locate and manipulate resources, including physical materials, and reflect on the gaming experience.

The week's readings and instructional videos centered on board games and design. In class, students were placed in breakout rooms in Zoom, where they shared their gameplay experiences. Later, the instructor shared various types of board games and their functions, such as card-driven games, cooperative games, deck-building games, drafting games, gateway games, hidden role games, pick up & deliver games, roll & move games, area control games, and symmetrical and asymmetrical games. During this week, two learning activities were considered.

READINGS AND VIDEOS

Week two readings included:

- Ten tips for gamifying the curriculum (McFarland, 2019)
- Intervention with board games (Noda et al., 2019)
- Numerical board games (Siegler & Ramani, 2008)
- Collaborative games (Zagal et al., 2006)

Videos included:

- Board game design workshop (Voigt, 2020)
- Tabletop games (TheOdd1sOut, 2018)

INSTRUCTIONAL DELIVERY IN WEEK 2

The instructor started the class by posing a question on Padlet: "What is game design to you?" After the students answered, the instructor engaged in a discussion about game design. This activity took about 10 minutes. Then, the instructor reviewed the previous week's learning and assignments. The discussion led to the week's topics: Perspectives on game design and Types of board games (see week 2 presentation). The instructional delivery and discussion period lasted about 45 minutes. Then, students were sent to Zoom break-out rooms where

they shared the game they played that week, including the gameplay and why they would or would not recommend it to their peers.

After about 10 minutes, students were grouped in the main room, where they shared about exciting games that they would recommend to their peers. The instructor checked and ensured that all the students received commercial Board Game Kits that were shipped to them during week 1. The instructor provided some design ideas about using those materials for board games. For example, students could use the spinner to determine who would take the first turn when playing a cooperative board game.

Students were again sent to break-out rooms for another 45 minutes, where they brainstormed their board game design ideas and sketched the prototypes. The instructor visited the rooms and provided guided support as needed. After the virtual studio session, students were grouped in the main room, where some of them shared their ideas and received feedback from the instructor and their peers. The instructor reviewed what had been learned that day and explained the board game rubric in detail before the class ended.

WEEK 2 ASSIGNMENTS

Students were tasked with completing a second blog entry and designing a board game using constructionism learning theory and gamification approaches. The following assignments and rubrics (as applicable) were posted in the LMS.

GAME BLOG #2 (DISCUSSION)

Like week 1, students selected a new game (either from the instructor-supplied list or their choice) and played it. The game could be physical or virtual. They were given the same prompt in the LMS that they received in week 1 of the course (so it is not reposted here).

BOARD GAME (A FILE UPLOAD)

Using constructionism learning theory and gamification approaches, create a simple or complex board game that captures players' attention. The board game should be designed for multi-players and should integrate logic, sequence, and motivation as

referenced in the literature. Design a paper prototype or diagram before you finalize your game design. Each of you will receive a DIY game kit before the beginning of the course to create your physical board game. You can utilize any or all of the items of the game kit for your game design.

* This will be a hybrid week where you will have an opportunity to meet in person at the UNCG campus and collaborate with a partner. You will have to communicate ahead of time whether you will attend an in-person class and intend to design the board game with a colleague. You can self-select a partner or I can pair you up with someone who is available.

BOARD GAME DESIGN RUBRIC

A 50-point board game rubric with four scales (excellent, meets standard, needs improvement, and no submission) was used to score student board games based on the following criteria:

- **Originality and Innovation:** Are the game's concepts, mechanics, theme, and overall design unique and creative? Do game elements set this game apart from existing games?

- **Rules Clarity:** Are the game's rules clear and coherent (e.g., easy to understand, concise, and effective at communicating how the game should be played)?

- **Gameplay mechanics and Strategic depth:** To what extent were game mechanics considered (e.g., how well do they work together, how intuitive they are, and how engaging and balanced do they make the gameplay)? In addition, did the designer consider the level of strategic decision-making required in the game, the complexity of choices, the depth of tactics, and the impact of player decisions on the outcome?

- **Player engagement and interaction:** How well does the game keep players engaged and entertained? Did the designer consider factors such as player interaction, pacing, replayability, overall fun, negotiation, cooperation, competition, and the impact of player interactions on the game's dynamics?

- **Components and Materials:** The quality and functionality of the game components, such as the game board, cards, tokens, and any other

physical or digital elements used in the game. Consider durability, aesthetics, and how they enhance the overall experience.

WEEK 3 – MAKER STUDIO

OVERVIEW

In Week 3, the instructor presented information about design thinking, productive failure, tinkering, and maker technologies, such as 3D printing and laser cutting. A guest speaker, an expert on maker technologies who runs a maker lab, was invited to class. The guest speaker demoed the 3D printer and laser cutter through Zoom and guided basic tutorials in Tinkercad and Inkscape. The overall learning objectives for this week were to analyze games and game mechanics critically, evaluate diverse learning theories and environments (including constructionism), understand design thinking and prototyping, and learn maker technologies. The week's readings centered on making and instructional videos covered maker technologies. In addition, step-by-step Construct 3 video game design tutorials were shared with students.

This week, the instructor also engaged students in a discussion about the impact of games in real life. Students were placed in breakout rooms in Zoom to discuss the game they played, including game mechanics. During this week, the instructor explained the requirements for the final project (i.e., Video Game Design for Learning) and guided students to create individual accounts in a 2D video game design platform, Construct 3. The instructor purchased paid subscriptions to Construct 3. However, for this assignment, an instructor could choose the free subscription license in Construct 3 or another free video game design platform, such as Scratch.

READINGS AND RESOURCES

Week 3 readings included:

- Making magic machines (Anderson, 2013)
- What do prototypes prototype? (Houde & Hill, 1997)
- Playing and making games for learning (Kafai, 2006)

- It looks like fun but are they learning (Petrich et al., 2013)
- All I really need to know about creative thinking (Resnick, 2007).

Resources included:

- Game design tutorials (Fisher, 2023)
- 3D printing workshop (Fisher, 2023)
- Inkscape tutorial (Skills Factory, 2021)
- Inscape keyboard reference
- Tinkercad
- Construct 3
- Beginner's Guide to Construct 3
- Construct 3 Tutorial (Leatherstocking Writing Project Teacher Co-op, 2020).
- Free Game Assets

INSTRUCTIONAL DELIVERY IN WEEK 3

The instructor started class with a game designed in Triviamaker (www.triviamaker.com). The quiz game consisted of 10 U.S. Landmark questions (free and available in Triviamaker), which students could play on their cell phones or computers using the game code the instructor provided. After the game, the instructor engaged students in a discussion about the game's mechanics. This activity took about 10 minutes to conclude (see week 3 presentation).

The instructor then presented a YouTube video on simulation and engaged students in discussing hands-on learning activities. Then, students were sent to Zoom break-out rooms for 15 minutes, where they discussed the games they played and the gameplay. When students returned to the main room, the instructor presented information about game design considerations and video game properties. In addition, the instructor provided a brief description of maker technologies and how they can be incorporated into game design, leaving room for the guest speaker to present those technologies and their uses later in the class. The instructor presented a demo of video game design software, Construct 3, and asked students to tinker with it. The instructional delivery process took about 30 minutes. The instructor also spent about 10 minutes discussing the week's readings.

The guest speaker, a maker lab director, joined the second half of the class and demonstrated different maker tools, including a 3D printer and a laser cutter. The guest speaker provided a short presentation and

guided students to create accounts in Tinkercad (www.tinkercad.com) for 3D printing and Inkscape (www.inkscape.org) for 2D and vector designs. The guest speaker showed students how to design a game piece and game board on both platforms so students could use these tools to design their board game materials. Students were given time to practice their designs and ask questions. The guest speaker stayed about an hour and guided students to refine their designs. An hour-long optional lab session was offered on Monday of the following week to help students with their designs.

WEEK 3 ASSIGNMENTS

Students completed their third game blog. They also created artifacts for their board games using a 3D printer and laser cutter. The following directions were provided in the LMS:

GAME BLOG #3 (DISCUSSION)

Students selected a new game (either from the instructor-supplied list or their choice) and played it. Students were given the same instructions as in previous weeks (so they are not provided here).

3D PRINTING/LASER CUTTING (A FILE UPLOAD)

Using maker technologies (e.g., 3D printing, laser cutter, sewing machine, etc.), you will create artifacts for your board game. For example, you may want to design your game board and use a laser cutter to construct it. Also, you may want to print your game pieces in 3D printing. You will draft your design, iterate it, and then use software (e.g., Tinkercad, Inkscape) to construct your final design. We will print your design items at the SOE Maker Lab and ship them to you.

MAKER TECHNOLOGIES DESIGN RUBRIC

A 25-point maker technology rubric with four scales (excellent, meets standard, needs improvement, and no submission) was used to score the maker technologies assignment:

- **Shows creative uses of the 3D modeling program:** Were different tools and techniques learned and used from the tutorials?

- **Shows creative uses of the 2D vector program:** Was Inkscape used to design game pieces (based on what was presented in the tutorials)?

- **Narrative about Maker Technologies:** Were game pieces described, including how they fit into game design? Was a reflection provided about what they found easy and challenging while working with the program?

WEEK 4 – VIRTUAL/VIDEO GAMES

OVERVIEW

In Week 4, the instructor reviewed past projects (such as board game design, 3D printing, or laser cutting design) and presented video games and their design considerations. First, the instructor engaged students in sharing their video game design ideas with their peers in breakout rooms on Zoom. Then, the instructor shared several facts about video games and how video game design could influence many professional fields, such as education, instructional design, UX/UI design, esports, cybersecurity, data analytics, and computer systems engineering. The overall learning objectives for this week were to manipulate images/videos/resources to use in games, employ programming software, design a virtual game, and reflect on the design process. The week's readings centered around game-based learning, especially video games and instructional resources, video game narratives, loops, and storytelling. In addition, step-by-step Construct 3 video game design tutorials were shared with students.

READINGS AND RESOURCES

Week 4 readings included:

- Comparing 2D and 3D game-based learning environments (Ak & Kutlu, 2017)
- Acceptance of game-based learning (Bourgenjon et al., 2013)
- Are they learning or playing? (Lu & Lien, 2019)

- Effects of digital game-based learning (Serrano, 2019)
- Video game-based learning (Squire, 2008)

Resources included:

- [Construct 3](#)
- [TinyTap interactive games](#)
- Writing 'Nothing" (GDC, 2017)
- Games that change lives (GDC, 2019)
- What are loops in game design? (Game Design with Michael, 2018)

INSTRUCTIONAL DELIVERY IN WEEK 4

At the start of class, the instructor engaged students in playing a game in Slido (www.slido.com) and reviewed past projects.

This week, the instructor engaged students in understanding video game properties, including patterns, design models and flows, domains of play, emotions and motivations, goals, player types, and game mechanics (see [week 4 presentation](#)). The instructor asked students to consider the following criteria when immersing in game design:

- Does the game have a specific and measurable outcome?
- How long is the game?
- Is the interface clear and understandable for the target audience?
- Has the game been run through cycles of usability testing?
- Does the game have internal means of measurement and reward that engage players?
- What are the limits and potentials of the game?
- Does the game provide physical or cognitive challenges that do not overwhelm the player?
- Does the game consider the player's ability, as well as diversity?

The instructor also presented facts about video games and the rise of the video game industry. After week 3, students were not required to play and document descriptions of a new game. So, this week, the instructor mainly drew students' attention to Construct 3 and how to use the software to design functional video games. The instructor spent about 30 minutes delivering instruction.

Later in class, students worked on their designs in breakout rooms, where they designed and iterated their prototypes and shared tips and tricks with their peers. The instructor did not correct students' design errors during workshop time, allowing them to experience productive failures and learn from peer mentoring. However, at the end of the session, when the whole group met in the main room, the instructor reviewed some common mistakes and discussed ways to tackle them. No tasks were assigned this week; students were asked to work on their game design and bring a draft prototype to present in the following week's class. However, the instructor shared the final project (i.e., video game design) guidelines and reviewed the video game rubric (presented in Week 5) with the students.

WEEK 4 ASSIGNMENT

Students were given the following assignment within the LMS during week 4:

VIDEO GAME DESIGN FOR LEARNING (A FILE UPLOAD)

(Assignment- due during the final week)

You will create a final project that incorporates the skills you learned throughout the sessions. You will create your own game with the purpose of learning. This is a technical and design challenge. **Using Construct 3, you will make a 'role-play' game** *highlighting the learning and/or experiences you have accumulated. This could be a solo or multiplayer game.*

* Warning: Don't get so caught up on the technical side of things that you neglect the actual design of your game. In some cases, a detailed layout of a game intended to be designed for a technical platform may be adequate (i.e., you want to design a full-blown role-playing game but are not a full 100-person technical team). More details and how-to guides will be provided in class.

WEEK 5 – FINAL PROJECT

OVERVIEW

In Week 5, the instructor reviewed course objectives, assignments, and grading policies. The instructor asked students to pick one game they enjoyed playing and share the reasons (i.e., gameplay, game mechanics) in the breakout rooms. The overall learning objectives for this week were to manipulate images/videos/ resources to use in games, employ programming software, design a virtual game, and reflect on the design process. The week's readings focused on gamification, game-based learning, and how games can enhance foundational literacy. The instructional resources covered game design skills and Construct 3 game design tutorials.

This week, the instructor engaged students in presenting their 'almost completed' draft video games in breakout rooms, where they received critical feedback. The instructor modeled how to provide critical feedback beforehand. Once students demonstrated their game designs, the instructor reviewed the video game properties and the assignment rubric one more time with the whole group.

READINGS AND RESOURCES

Week 5 readings included:

- What is gamification? (Kapp, 2012)
- Games for enhancing basic reading and math skills (Lämsä et al., 2018)
- Teacher competencies in game-based pedagogy (Nousianinen et al., 2018)

Resources included:

- Inklewriter
- How to make a video game on Wix (Gamify, 2020)
- Beginner's guide to Construct 3

INSTRUCTIONAL DELIVERY IN WEEK 5

The instructor started the class by reviewing the final assignment criteria and discussing the essential components of a functional video game for about 10

minutes. Then, the instructor engaged students in an activity on Google Jamboard.

Students were then placed in Zoom break-out rooms for about 15 minutes, where they shared their favorite games and game mechanics. When students returned to the main room, the instructor summarized all the learning activities students worked on and their connections to the game design (see week 5 presentation).

The instructor then explained the informal game demo session that students would be engaged in and showed how to provide 'warm' and 'cool' feedback. Students were sent to break-out rooms where they demoed their 'almost done' video game designs and received feedback from their peers. This design demo and feedback session lasted for 45 minutes.

WEEK 5 ASSIGNMENTS

In addition to the Video Game Design for Learning assignment described in week 4, students also completed a final design blog. The following details were provided in the LMS:

FINAL DESIGN BLOG (WORD/PDF SUBMISSION)

This is a final reflexive blog about your game design experience. Take us on your journey:

- *What did you learn?*
- *What game mechanics did you focus on?*
- *What was your design process?*
- *What strengths did you bring into this course?*
- *What were some challenges you encountered?*
- *How did you iterate?*
- *What are the takeaways you savor from this experience?*

* This final blog should discuss ways in which your experience and this course have informed your views on games, game design, and learning. Refer back to class readings. Minimum 1,500 words, not including references.

VIDEO GAME DESIGN FOR LEARNING (A FILE UPLOAD)

Again, students were asked to incorporate the skills they learned in this course and create a video game using Construct 3 gaming software. The game could be a solo or multi-player game that highlights the solution to a design challenge. Design thinking and iterations were emphasized for this assignment. Students were asked to submit both Construct 3 video files (zip files) and a game link after uploading their game to the itch.io website. They were evaluated on this task with the following rubric:

VIDEO GAME DESIGN RUBRIC

A 75-point video game rubric with four scales (excellent, meets standard, needs improvement, and no submission) is used to score student video game design assignments based on the criteria and their description as follows:

- **Originality and Innovation:**
  - Does the game have a unique and interesting concept?
  - Does it bring something new or innovative to the gaming industry?
  - Is the game idea well-executed and coherent?

- **Graphics and Levels:**
  - Are the visuals appealing and well-crafted?
  - Does the art style align with the game's theme and atmosphere?
  - Are the animations smooth and visually pleasing?
  - Are the levels well-designed, offering challenges and rewards?
  - Is there a good balance between difficulty and player progression?
  - Do the levels encourage exploration and experimentation?

- **Gameplay Mechanics:**
  - Are the gameplay mechanics well-designed and intuitive?
  - Do they provide a balanced and enjoyable experience?
  - Are the controls responsive and easy to understand?

- **Story and Narrative:**
  - Is the story compelling and engaging?

- o Are the characters well-developed and interesting?
- o Does the narrative enhance the gameplay experience?

- **Sound and Music:**
  - o Does the game have appropriate sound effects that enhance the gameplay?
  - o Is the music engaging and immersive? Does the audio design contribute to the overall experience?

- **Replayability and Longevity:**
  - o Does the game offer enough content to keep players engaged over time?
  - o Are there different modes, challenges, or achievements to incentivize replayability?
  - o Does the game provide opportunities for community engagement and updates?

- **Fun and Entertainment Value:**
  - o Is the game enjoyable to play?
  - o Does it provide a satisfying and rewarding experience?
  - o Would players be likely to recommend the game to others?

- **Technical Execution:**
  - o Are there any technical issues or bugs that affect the gameplay?
  - o Does the game run smoothly on different platforms or devices?
  - o Are the loading times reasonable and optimized?

COURSE GRADING

Below is a comprehensive breakdown of all assignments and their weight on grading in the class.

DISCUSSIONS AND ASSIGNMENTS

- Participation and preparation: 10%
- Game Autobiography: 5%
- Game Blogs: 15%
- Gamer Profile: 8%
- Design a Board Game: 20%
- Design Maker Projects: 10%
- Video Game Design for Learning: 25%
- Final Design Blog: 7%

CRITICAL REFLECTION

The learning representation was first implemented during Summer Session I in 2023. Notably, this marked the instructor's inaugural venture into game design, and concurrently, the course was introduced for the first time within the Information and Library Science Department.

LESSONS LEARNED

The Seminar in Game Design course attracted a cohort of 18 graduate students, comprising K-12 teachers, librarians/media specialists, entry-level instructional designers, and full-time graduate students. Impressively, approximately 83% of the students provided a highly favorable evaluation of the course quality, with a standard deviation of 0.64, as indicated in the course evaluation. Notably, students lauded the engaging nature of the activities and assignments, expressing their positive experiences.

Despite encountering challenges with specific components, such as programming, students reported a sense of accomplishment in other areas, notably 3D printing and board game design. Their dedication to the course was evident through active participation and collaborative efforts. A noteworthy illustration of commitment occurred when a student, despite being on a vacation cruise, actively participated synchronously throughout the entire three-hour session during one of the weeks.

In this course, students consistently conveyed positive experiences playing the games and acquiring proficiency in new tools. The engagement extended beyond mere enjoyment, with students actively participating in discussions about their games and enthusiastically sharing intricate details. To enhance the learning experience, each class session was recorded and subsequently shared with students, affording them the opportunity for a comprehensive review. The instructional philosophy encouraged students to embrace experimentation, learn from mistakes, and engage in continuous iterations.

A prominent feature of the course structure involved placing students into Zoom breakout rooms during every session. They collaboratively delved into discussions encompassing game mechanics, gameplay strategies, and related topics within these spaces. These synchronous interactions cultivated a

supportive community marked by empathy for each other's learning. One student, expressing the sentiment in the course evaluation, noted, "...gave time for SEL to build community online which is nice in an online environment."

As an instructor, this course marked my inaugural experience, functioning both as a trial run and a gateway for designing additional curriculum in game studies. My fascination with the captivating dynamics of games and their innate ability to foster learning has been a driving force behind my decision to delve into this pedagogical realm. As a graduate student, my exposure to a participatory studio-type course involving toy-hacking, making, and experimentation with physical and virtual tools made an indelible impact on me. The memories of that course, filled with fun and engaging learning experiences, linger to this date. I aspired to infuse the same enthusiasm and excitement into my classroom, and creating this game design course provided the ideal platform for merging enjoyment with learning. The joy derived from teaching this course mirrored the evident enjoyment my students experienced in their learning journey.

Furthermore, this course serves as a pivotal catalyst for developing future game-related courses within my department. An illustrative example is the recent submission of proposals for both an undergraduate and a graduate course on game and game design to the University Curriculum Committee, slated for consideration in the upcoming term.

The practice of playing games has been ingrained in human culture since the Bronze Age, offering valuable lessons in problem-solving, tactics, communication, and collaboration. Within the context of this course, students were not only encouraged but also explicitly urged to engage in experimentation, iteration, and the occasional failure. This intentional approach aimed to provide them with opportunities to learn from mistakes, fostering resilience and eventual success in their design endeavors. Anticipating the steep learning curves associated with mastering several new technologies within a condensed timeframe, I envisioned this challenge as a source of inspiration, motivating students to exert considerable effort and explore their full potential.

I am pleased to report that despite the inherent challenges of acquiring proficiency in new technologies, many students found this course a

gratifying and valuable addition to their academic trajectories. Their collective efforts in problem-solving and collaborative learning were evident, fostering a sense of empathy and peer mentoring among the students. One student attested, "I felt very connected to my classmates in a way that I haven't in other classes."

Leveraging my past eLearning design skills proved instrumental in structuring the course materials in a manner that facilitated an incremental learning path. This strategic organization progressively introduced various games and game design materials in subsequent weeks, establishing a cohesive connection throughout the course. However, I encountered occasional challenges stemming from the deliberate decision to provide abundant resources simultaneously. This approach inadvertently led some students to feel overwhelmed and stressed, particularly as they grappled with learning maker technologies and programming language for the first time.

To address students' concerns and mitigate potential frustration, I implemented measures such as offering optional meeting days. During these sessions, a smaller group of students had the opportunity to work closely with me and the guest speaker, allowing for more personalized support. Additionally, to enhance accessibility and enrichment, several instructional videos were incorporated into the course materials, providing students with supplemental resources.

Assessing students' reflections within the constrained timeframe of the five-week course posed a challenge for me. The brevity of the course, coupled with the need to navigate weekly readings, added another layer of complexity. The limited time often resulted in the inability to thoroughly discuss all required readings, necessitating a swift transition to design works. Incorporating assignment rubrics proved to be a valuable tool to address these challenges. Rubrics facilitated a systematic and timely grading process for student deliverables and projects.

Upon reflection, if I were to teach the same course within a short time frame in the future, I would consider refining specific course materials. The condensed five-week period proved challenging for covering an extensive array of topics, particularly when many students were concurrently learning new technologies. To address this, I would streamline the

content by reducing the emphasis on maker technologies and allocating more focus to games and game design.

For instance, in a revised structure, I would dedicate the first week to covering foundational topics such as games, game history, and game techniques (including gamification and game-based learning). Subsequently, the second week would delve into board games and design. In the remaining weeks, the emphasis would shift towards instructing students to manipulate video gaming software and design functional video games. This approach aims to allow students to acquire a comprehensive understanding of game techniques while immersing themselves in the intricacies of game design.

In the initial week of the course, the discussion centered around gamification and game-based learning, exploring their roles in facilitating effective learning experiences. Given that the majority of students were in-service teachers, a deliberate emphasis was placed on gamification, which has demonstrated effectiveness in enhancing student engagement according to studies by Hamari et al. (2014), Oliveira et al. (2023), and Surendeleg et al. (2014). In future course iterations, I will maintain a comparable level of attention to game-based learning (GBL), acknowledging its efficacy in serious game design, as highlighted by Squire (2008).

If I were to offer the same course again, I would contemplate extending the duration to a more conventional 15-week or 10-week long summer course. The compressed nature of the 5-week format posed challenges in effectively covering a diverse range of topics, including various games, rules, principles of the game, game theories, strategies, and game design. This adjustment aims to enhance the learning experience for both the instructor and students by allowing for a more manageable content distribution.

In future iterations, I would also refine the curriculum structure by systematically chunking the material, ensuring a more coherent and digestible progression. Additionally, there would be a concerted effort to precisely articulate course learning objectives and align them with specific learning outcomes. This strategic mapping would give students a clear framework for their learning progress.

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