Level Up the One-Shot: Empowering Students with Backward Design and Game-Based Learning

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Designed to be interactive and intrinsically motivating, games seek to create absorbing experiences for players. As librarians struggle with the challenge of teaching information literacy concepts within the time constraints of the “one-shot” library instruction session, game-based learning and gamified activities have garnered increased attention in instructional design discourse as dynamic approaches for enhancing students’ learning experiences.

For first-year and other incoming students still adjusting to the college experience, games invite their active participation in a non-threatening and positive format and ease them into the rigors of a college course. Games can offer an empowering, democratizing experience that encourages students’ engagement with the session’s material, each other, and even with their own learning processes. In fact, games have been cited as an effective way of engaging students in the classroom, particularly those whose communication styles are not as compatible with the one-way delivery of standard lectures.\(^1\) Games are also inherently designed to create opportunities for enhanced interactivity, peer-to-peer engagement, and trial-and-error experimentation.\(^2\)

This chapter outlines some of the ways in which the integration of games and gamified activities can directly impact student motivation in the classroom. We will first discuss how games naturally align with the principles of
both motivational design and backward design and offer an overview of some of the free and open source options that can assist instruction librarians in creating their first games. We will also include some examples of games that we have created and tools that we have customized to enrich student engagement in one-shot instruction sessions.

**Motivation and Student Empowerment: The Case for Gaming**

Before discussing games more specifically, we will briefly explore the connections between student agency and motivation and how gaming helps to promote these concepts in the classroom. Thirty years ago, Paulo Freire, an influential Brazilian educator, popularized the concept of a society and educational system that is complicit in the systemic oppression of student agency. He argued against the prevailing notion that students were “merely an empty receptacle to be ‘filled,’” viewing the ideal formal education as one which encouraged critical thinking and discouraged the elevation of educators, schools, and educational institutions to an unimpeachable pedestal. Building off of Freire’s concepts, Kirk et al. note that schools have the potential to be a uniquely motivating environment for students, arguing that when teachers use power equitably and foster the creation of a positive sense of community in the classroom, they contribute to student empowerment.4

Academic librarianship shares a similar philosophy; for instance, the ACRL Framework for Information Literacy in Higher Education encourages students to critically engage with their own relationship to information by understanding how “authority is constructed and contextual.”5 However, as instructors, we must first engage with the reality of our own constructed authority by acknowledging the historical forces that concentrate power and authority in our hands, from the layout of our classrooms to the demographics of our profession (statistically, 88 percent white—much whiter and much older than our student bodies). The significant homogeneity of our profession also directly impacts who makes the decisions regarding the design of classroom and library spaces as well as the “shared cultural understanding of what the work of faculty and students [within these spaces] is and should be.”7 Gaming, which, by its very nature, motivates players to assume control, creates space for the democratization of the classroom and a more equal distribution of power and authority by empowering students to challenge the historically white structures and norms of the traditional classroom environment. While the typical library one-shot rarely allows librarians the opportunity to establish a long-term instructional relationship, a one-shot game-
based session can still provide an empowering burst that dynamically shifts students’ perceptions of their roles in the classroom, increases their sense of agency, and motivates their own self-learning processes. Even though the instructor still assumes the role of the “gamemaster” by introducing and facilitating the classroom game, the mechanics and the inexorable nature of the gameplay creates an environment in which the instructor can step back and invite the students to autonomously explore.

James Paul Gee’s significant research on game-based learning is also worth acknowledging, particularly his examination of how effective games facilitate learning by tapping into players’ cognitive abilities. Gee provides thirty-six learning principles that educators can take away from gaming, including how games encourage active and critical (i.e., not passive) learning, integrate self-knowledge activities that invite learners to reflect upon their abilities and potential capacities, and allow learners to independently experiment and make their own discoveries through their engagement in the gaming environment. Though Gee’s work focuses mostly on video games, his principles still offer insights into the parallels between game design and successful course design.

The concept of game design is closely reminiscent of motivational design theory; indeed, one of the key elements to successful gameplay itself is motivation. John Keller’s ARCS Model, one of the most influential motivational design theories, tasks instructors to design their instruction based on four main elements: gaining and maintaining their students’ attention, demonstrating the material’s relevance, creating an environment that builds their confidence, and providing them opportunities to feel satisfaction for their learning achievements. Building upon this model as it relates to library instruction, Amanda Nichols Hess provides a comprehensive literature review of the benefits of and methods in which motivational design can and has been employed in a number of library instructional settings. Hess notes that even pedagogical principles such as the ACRL Framework evoke elements of motivational design, further validating the significance of actively incorporating this design theory in library instruction.

In a related framework, Malone’s Theory of Intrinsically Motivating Instruction posits three criteria for examining what makes games motivational: they must have a challenge stemming from meaningful goals, a fantasy that inspires players to enter an environment outside of their actual experience, and a curiosity that is aroused by the feedback structures in place. Other similar theories can also be applied to gaming, including Ryan and Deci’s Self-Determination Theory, which suggests that people are generally motivated by three psychological needs: their own autonomy, the relatedness they feel to others, and the competence of meeting a challenge. When considering how these concepts relate to gaming in library instruction, Maura Smale pro-
vides an extensive overview that includes a number of applications of gaming in information literacy instruction and how they have helped to successfully increase student engagement and motivation. Indeed, already one can see the many overlaps among motivational design, gaming, and information literacy instruction.

Backward Design: Putting Motivational Design and Gaming into Practice

Motivational design, in and of itself, could provide a solid framework for designing games for library instruction. However, even the most exciting, empowering game will not be nearly as successful if it is created simply for the sake of inspiration. Rather, it also has to be, as per the ARCS model, relevant to the course material and learning goals. In other words, in order to better ensure that a game-based one-shot session is not just an isolated burst of energy, instruction librarians must intentionally choose and design appropriate games that are tied to the learning goals of the session and, ideally, the deeper objectives of the course. Instructional design theory can provide an actionable framework at the nexus where multiple theories of motivational design, game design, and student agency converge.

Backward design, as popularized by Jay McTighe and Grant Wiggins, is an instructional design framework which emphasizes planning for enduring understanding rather than the simple acquisition of knowledge. Echoing Freire, McTighe and Wiggins note that the culture of schools frequently stifles students’ spirit of inquiry. To combat this state of affairs, they argue that educators should design backward, using “essential questions” to provide a framework in order to avoid the pitfalls of classroom activities that are “hands-on without being minds-on.”

Backward design consists of three main design stages: first, the instructor identifies a set of desired results and core understandings. Second, the instructor works backward from there to determine assessment measures that ensure learners produce evidence of meeting these results, and third, the instructor develops an appropriate learning plan and experiences aligned to both these results and assessments. While this general outline is a much-abridged version of McTighe and Wiggins’ comprehensive framework, it provides a good structure for approaching and planning game-based learning activities. In practical terms, utilizing backward design in the course of designing games takes added importance. Advanced games, such as simulations or other computer-based applications, often require an incredible investment in time, software, and human capital; thus, it is especially important to en-
sure that the games chosen match the learning outcomes of both the one-shot session as well as the course overall. More “low-tech” games, such as scavenger hunts or games utilizing pre-existing resources such as board games, social media, or other templates, may take relatively less investment to adapt and keep up to date. However, these must still be intentionally integrated in order to more effectively contribute to student learning and motivation, to articulate the game’s contribution to them, and to assess outcomes afterward.

**Assessment**

We would be remiss to conclude this introduction to backward design without a more in-depth discussion of assessment, particularly as it relates to the second and third stages of the backward design. Assessment itself can be high-stakes; increasingly, in primary and secondary schools, measures of student performance are tied to promotions, teacher evaluations, or even school funding. In librarianship, the focus centers around assessment as a tool to demonstrate value by linking the library to institutional student learning outcomes. For the purposes of this chapter, we will limit the discussion to the assessment of learning and its implications for gaming and gamification in the classroom.

As previously noted, the second and third stages of backward design involve generating learning outcomes and assessment measures and creating corresponding lesson plans. McTighe and Wiggins argue that assessment is a critical component of demonstrating institutional values but caution that poorly-designed assessment measures also have the power to undermine. If one’s goal is to create an educational environment that encourages critical thinking, inquiry, and enduring understanding, then assessments and learning outcomes that focus on the acquisition of information over understanding will show students that “‘what counts’ is recall and recognition.” In the context of game design, this might look like the difference between students who can regurgitate a university policy on academic integrity and recite the definition of plagiarism, and students who are presented with an activity where they can articulate how citations contribute to an ongoing scholarly conversation.

Many games are naturally structured to gather assessment-level data within player-centered learning experiences, making them well-positioned to aid in the second and third stages of the backward design process. The very nature of gameplay itself requires continual player input and the progression of skills mastery. Games provide a valuable opportunity to gather in-class student feedback and observe in real-time which concepts students find challenging. By thoughtfully choosing, designing, and exploiting the assessment
measures embedded within games and designing lesson plans accordingly, instructors can not only immediately gauge student learning, they can also demonstrate the unique value of games in gathering instruction data. They better ensure that the games contribute to the course’s goals beyond the one-shot session, rather than forcing the course to adapt to an isolated session and the games showcased within them.

**Getting Started: Example Applications**

At first glance, game design can seem like a daunting undertaking. However, instruction librarians can easily discover, customize, and utilize a number of freely available, open source software and templates to get started. Many of these resources come with built-in gaming interfaces that lend themselves well to librarians interested in taking their first steps into game-based instruction. Below are some freely available options and their potential applications in the classroom.

**Game Shows and Other Preexisting Gaming Systems**

Pre-established gaming systems, such as those within popular game shows and board games, are easy entry points for incorporating gaming into classroom instruction. Pre-existing game structures ease students into a gaming environment that is more recognizable to them, providing instructors with prototypes that have already incorporated core elements of motivational game design within them (e.g., as per Malone’s framework, challenges and goals by striving to earn points, a “fantasy” that transports them from a more formal classroom environment into a self-driven game show, and the curiosity of revealing more information as they play). Since many students are often already familiar with these games, they do not require lengthy explanations or world-building, which can eat up valuable class time.

For example, many librarians have utilized the long-standing game show staple *Jeopardy!* for a variety of instructional settings. Numerous templates, including those made in PowerPoint or designed within a web interface, are freely available online. *Jeopardy!’s* quiz-like format can be employed as an ice-breaking opening activity to pre-assess students’ prior knowledge or as a fun closing activity to reinforce content presented earlier in class; reinforcement can be especially important for one-shot sessions when librarians are unlikely to visit future class sessions. The overarching question categories can be customized according to the learning objectives (e.g., identifying key terminology, types of information resources, search strategies, etc.) and each of the category “clues” can be scaffolded to become gradually more challenging
as students make their way down the board. Designing questions accordingly can provide an instant assessment of students’ comprehension of the material. For students, Jeopardy!’s continued presence in popular culture, as well as its fundamental points-based structure, invite them into a friendly, competitive activity that continually rewards them for their active contributions. Students can be grouped into teams to foster classroom collaboration and invite them to drive their own learning. Each team can autonomously select their “clues” (and thus, the level of difficulty of them) and then discuss and collectively agree upon their response.

Jeopardy! is perhaps the most widely known example that we have utilized; however, librarians can draw inspiration from other games in popular culture. For example, Family Feud or Who Wants To Be A Millionaire can be used to introduce students to a variety of resources and concepts at once (e.g., “According to a poll of your friendly campus librarians, name the top four business databases provided by our library.”) or to review material previously discussed (e.g., “Which of the following is NOT a reason to properly cite your sources?”). Comedy Central’s panel game show, @midnight, is also ripe with adaptable activities. For example, librarians can tweak one of its recurring mini-games, #Hashtagwars, by giving students a themed hashtag (e.g., #ClimateChangeIn5Keywords) for generating their own related keywords or phrases. Similarly, Heads Up!, a charades-like game popularized on The Ellen DeGeneres Show, can also be used as a keyword-generating activity. In this game, a player is tasked with guessing a mystery word or phrase they cannot see based on other words or actions provided by their teammates. Indeed, the highly interactive nature of game shows provides great opportunities for librarians to present information in an engaging format, to collect immediate feedback, and to embolden students to take part in both their own and their fellow students’ learning processes.

Gamified Social Media

While the pre-existing structures of game shows offer a great starting point, game-based opportunities exist in other less obvious contexts. For instance, many smartphone apps incorporate user experiences that can be gamified into a classroom activity. One such example is Instagram (https://www.instagram.com), a popular photo-sharing app. Although it is most commonly recognized as a social media tool, its inherent features as a user-generated and social space lend themselves to creating a gamified, student-driven activity. Using the example of a one-shot library orientation session, below is one potential application of gamifying Instagram in instruction, which we adapted from an activity at the University of Montevallo.25
After starting with a brief overview of the library and providing students with some foundational knowledge and context (e.g., introducing them to certain areas of the library, how to navigate to the online catalog, etc.), students are placed in groups and given a short list of discovery prompts that task them to post photos of items throughout the library. The prompts may ask students to seek out unique study spaces, their favorite books, or even library staff members they encounter. Open-ended prompts which invite students to document something surprising, confusing, or interesting in the library allow students the freedom to proactively explore, record, and then later inform their fellow classmates about other areas and ideas that intrigued them. Encouraging the students to simultaneously insert descriptive captions to further elaborate on why they documented a particular item adds an element of reflection while introducing them to concepts such as keyword generation. For first-year students, in particular, this photo-journalistic activity can empower them to teach each other about an unfamiliar space on their own terms and within a medium that is familiar to them. It also builds their confidence within their new environment and helps to reduce library anxiety and information overload. At the same time, the real-time updates visible through students’ postings introduces an element of competition, motivating them to seek out other resources or services that their fellow students have not yet posted.

While we have used this particular example in one-shot library orientations, Instagram and other gamified social media activities can be implemented in other settings. For example, a shared class account or hashtag can be created for semester-long projects in which students regularly post photos of primary resources or even quotes or passages of interest from their readings. Rather than posting on the discussion board of a learning management system, students can be tasked with commenting on their fellow students’ Instagram posts. This activity encourages instructors and students to value the information and contributions that the students bring to their learning experience and gives them additional opportunities outside of the classroom to construct their own collaborative community of practice.

Instructors have several options to consider when implementing social media-based activities in the classroom. For instance, they can create a shared class account that all the students can temporarily access on library-owned devices distributed during class. Alternatively, they can opt to share a temporary password to this account, which students can then access on their own personal mobile devices. Another option is to assign a unique class hashtag to the activity, which students, with their own (public) accounts, can use to tag their contributions for later discoverability and viewing. While a detailed discussion of the other implications of introducing social media in the classroom is beyond the scope of this chapter, we recommend instructors provide
a quick overview the game’s basic rules in order to outline expectations and prevent inappropriate content or behaviors. For further information, instructors may also want to consult with resources such as the Electronic Frontier Foundation (https://www.eff.org), the Electronic Privacy Information Center’s Social Media Privacy section (https://epic.org/privacy/socialnet), and the Pew Research Center’s Internet & Technology reports (http://www.pewinternet.org). These resources offer a number of news and updates related to social media and privacy that can be introduced into classroom discussions beforehand. Indeed, gamified social media activities present librarians with opportunities to cultivate digital citizenship skills with their students. They can also engage students with broader concepts, such as those from the ACRL Framework. For example, social media projects could open up discussions on how scholars can discover trending conversations within their respective disciplines as well as some avenues for entering and contributing to these scholarly communities.

**Open Source Tools**

The rise of educational technology has opened doors for librarians interested in taking their first steps into game design. It has also led to an increase in open source tools—some of which require little to no prior coding experience—that can aid in this transition. One such example is Twine (http://twinery.org), a freely available storytelling tool developed by Chris Klimas. As a visual, highly customizable, and interactive medium, it is a user-friendly way to engage students with humor and targeted institutional and cultural references. Twine offers a web interface or downloadable application. We highly recommend downloading the application, as games created using the web interface are saved within one’s browser and accidentally clearing browser data will also delete the game.

More than just a software program, Twine is better viewed as a storytelling tool. Users can create simple stories or stories with an infinite number of branches and variables. Thus, we highly recommend storyboarding and keeping detailed records of file names and other components. While advanced users can incorporate CSS or JavaScript, the game’s basic functions allow conditional formatting and easy incorporation of images, making it possible to create games without any knowledge of coding.

The impetus behind utilizing Twine in this instance was a common frustration: the desire to push the limitations of one-shot information literacy sessions in response to an instruction request for an introduction to academic integrity. Teaching sessions on academic integrity (which is often conflated with plagiarism) are a familiar request for most libraries and a source of frustration for librarians and teaching faculty alike. Compounding this frustration, these
sessions are often requested at the beginning of students’ college careers in English, writing, or first-year experience courses, when students may not yet have a firm enough conceptual framework in which to place such ideas. In other words, they lack the specific context for the discussion and its applicability, leaving the classroom with only vague memories of warnings. The question then became: How can we provide students with this framework in a way that encourages discussion and exploration, allowing students to meaningfully engage with new concepts and build upon their own experiences?

To address this problem, we used Twine to create a Choose-Your-Own-Adventure (CYOA) novel. In the game, students are hanging out in our library when, after a sudden earthquake, they black out and wake up in an enchanted forest. After meeting a kind fairy who offers to take them home, they discover that an evil wizard has stolen her gems of power and sold them to the five great scholar-monsters of the realm. Much like the students, the scholar-monsters are hard at work writing papers, but they find citations quite confusing, and they are willing to trade great wealth for answers to their questions. Students must journey through the forests and caves of this strange land and answer citation-related questions.

Arguably, Twine’s most valuable feature in the classroom is its ability to incorporate conditional logic in storyboarding. The game designer can easily create and interweave connections across different branches of a story, setting students on an inexorable path toward a pre-set conclusion, removing pressure and shifting the focus of the activity to exploration. Much like a reader with a CYOA novel using their finger to reserve their place in case they met a bad end on a particular page, Twine offers the ability to learn from mistakes and self-correct in real time. For example, when faced with the following question:

Which of the following is the CORRECT way to cite a passage from page 46 of Dr. Swift’s ground-breaking text, *Players and Haters: 26 Years of Shaking It Off*?

students are directed to choose among several versions of a quote and citation and must select one answer to continue. Using another medium, such as a paper scavenger hunt, students would have to wait until the end of the activity to learn the answer and unpack the explanation. Thanks to Twine’s conditional formatting, students receive immediate feedback based on their answers. If students select the correct answer:

Swift notes that the nature of players and haters is inflexible, stating “the players gonna play, play, play, play, play, And the haters gonna hate, hate, hate, hate, hate.” (46)
they immediately see a screen which notes:

According to the MLA format for in-text citations, this is correct! The author’s last name and the page number where the quote can be found must appear in the same sentence. The paper writer mentions the author’s last name in a sentence, so all that is required for an in-text citation is the page number in parentheses.

Twine is a powerful tool for democratizing learning because it removes the instructor from the place of power as the arbiter of right and wrong. The instructor’s influence is still present, as they have created the story, the quest, and programmed the answers. However, the CYOA format taps into the motivational theories of self-determination. In other words, it provides students the agency (and, by extension, the authority) to collaborate, confer, debate their own paths, and ultimately learn at their own pace. It also creates a narrative structure and places students into a first-person perspective. These instructional strategies have proven effective for knowledge transfer and retention.

Twine is just one example of open source software that can be used by educators to create educational games. Quest (http://textadventures.co.uk/quest), another open source tool for creating text-based games, and Adventure Game Studio (http://www.adventuregamestudio.co.uk) and GDevelop (http://compilgames.net), two systems that can be used to create simple platform games, are other powerful tools for game creation if one has the imagination and time to invest. Additionally, the recently released ACRL Framework for Information Literacy Sandbox has the potential to serve as an open repository of information literacy games as it continues to grow. As of this writing, at least one game has already been submitted.

Conclusion

Game-based learning and gamified techniques present a natural fit for instruction librarians looking for creative ways to “level up” their one-shot sessions. The self-driven, motivational structure of games encourages students to autonomously engage with their own knowledge creation and reflective practices and to acknowledge the value they offer in the classroom. Games embolden students to take control of and develop confidence in their learning process, and they provide instruction librarians with inventive new approaches to assessment and lesson planning. They can also provide opportunities to break down the traditional classroom structures that have been historically shaped by the homogenous culture of librarianship and academia.
For those who are approaching games for the first time, getting started may seem intimidating. While many educators may not have the programming or technical skills to build games from scratch, they can often repurpose other games, tools, or software for their own purposes. However, they must also be cognizant of the fact that the games they utilize may not have been initially created with educators, let alone librarians, in mind. Furthermore, game-based learning and gamification can be particularly vulnerable to “mission creep.” Yet by (backward) designing their lesson plans by first focusing on the learning outcomes and then intentionally selecting and adjusting games accordingly, instruction librarians can better ensure that these tools are focused on the course goals. They are able to better envision student learning and success beyond the one-shot session, articulate gaming’s contribution to these goals, and ultimately create an empowering classroom environment that both inspires their students and motivates their own creative pedagogical practices.

**Endnotes**

10. Karl M. Kapp, “Chapter 3—Theories Behind Gamification of Learning and Instruction,” *The Gamification of Learning and Instruction: Game-Based Methods and Strategies for Training and Education* (San Francisco: Pfeiffer, 2012), Books24x7.

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