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Challenge, Fantasy, and Curiosity: Activating Students' Intrinsic Motivation Within Information Literacy Sessions

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Abstract

Student engagement is a consistent challenge for librarians in information literacy instruction, especially in the context of single session learning. Two librarians at a small, public liberal arts college took inspiration from Malone's (1981) theory of intrinsically motivating instruction to create a lesson plan that caught the imagination of the students and produced enthusiastic participation. This paper explains the theoretical framework used, examines the reasons for its success in this iteration, and discusses potential applications to other information literacy lessons.

Introduction

Finding ways to build creative teaching practices into single-session information literacy instruction can be challenging. Many barriers inhibit information literacy instruction from the get-go, such as being considered a "visitor," professors requesting too much content to be covered, and often having too little time to educate students and build rapport. These barriers may keep librarians from being overly creative, as sometimes it feels as though you must choose between making instruction fun and interactive on the one hand, and rushing through a lot of different content to cover the learning objectives on the other. While we must acknowledge that environmental barriers influence the way we teach, we must also not use that as an excuse to shelve our creativity. Sometimes we need to take time to explore new instructional ideas to find inspiration and counteract teaching fatigue.

This paper explores how we, two instruction librarians at a public liberal arts college, took inspiration from a developing theory rooted in computer gaming to find a way to engage students by introducing gamified elements of challenge, fantasy, and curiosity into an information literacy session. The lesson described in this paper managed to engage students in a fun and meaningful way while letting them apply information evaluation skills to a course topic for which they initially had very little context. Our purpose in discussing this lesson is two-fold: to provide other librarians with a practical lesson strategy they can use at their own institution, and to inspire librarians to explore learning theories to help them get them out of instructional ruts.

Brief Outline of INTD 105

The majority of students entering college at the State University of New York at Geneseo are required to take an interdepartmental composition and rhetoric course called INTD 105. While each section of the course carries the same learning outcomes, the courses are reflective of the primary instructor's subject expertise, spanning the humanities, arts, social sciences, or STEM. The research instruction librarians at SUNY Geneseo originally advocated for a required information literacy session for each section of INTD 105 that serves as our springboard for introducing students to core library services. Once that goal was achieved, we shifted our focus to the new goal of ensuring that every student got basic instruction on locating, evaluating, and integrating information, in part due to the coordinators of INTD 105 incorporating a mandatory research-based writing assignment into the course's core curriculum.

One of the hallmarks of information literacy instruction at SUNY Geneseo has been the librarians' efforts to make instruction as course-integrated as possible. While we may reuse certain activities in the classroom, we generally try to design lessons relevant to the themes of each section and tied to any research assignments. This requires us to have strong communication with teaching faculty and results in creating better student engagement within the classroom. This process of figuring how to best connect information literacy to course content and/or assignments can sometimes prove to be a challenge, particularly depending on the timing of the information literacy instruction session; there are times that these sessions are scheduled before the topic the students will be researching has been discussed in class, even though librarians make the effort to coordinate information literacy instruction with faculty. This adds a particular layer of challenge in trying to integrate information literacy into the classroom conversation, as students generally have a limited understanding of the topics we will explore during the library instruction.

An example of this problem is in a section of INTD 105 subtitled "Sex, Skulls, and Aliens: Controversies in Anthropology." This section of the course is rooted in anthropological explorations, and one of the research papers the students must write is about the Piltdown Man hoax, a paleo-archeological event wherein discovered bone fragments were believed to be the remains of an early human that served as a connection between primates and man. Archeologist Charles Dawson was credited with the discovery in 1912, and it was believed to be authentic until 1953, when further evidence proved the bone fragments were forgeries. However, the details about who committed the hoax have not been concretely proven, as many different influential archeologists had connections to the Piltdown Man. This hoax provides a unique narrative that easily engages many first-year students who are unfamiliar with anthropology.

The professor teaching this course often requests multiple library instruction sessions for her section of INTD 105. The first session, early in the semester, serves as a library orientation to services and locating information in databases. The second session, which happens before the students study the Piltdown Man hoax, is a session on evaluating information through the lens of identifying the characteristics of scholarly sources. The third session builds on the second session by focusing more intently on media literacy and distinguishing fact from fiction. Having taught this sequence of classes for two years, it became obvious there was a need to improve the second lesson on evaluating information. Previous iterations of this lesson followed the format of a lecture, followed by student evaluation activity, and ending with a group discussion. This model did not sufficiently engage students as evidenced by the lack of actual discussion and enthusiasm in the class. We decided to team teach and play off each other's creativity in order to change the previous instructional design. We began this process by turning to the literature for inspiration and were immediately drawn to literature about student engagement practices, particularly Malone's (1981) investigation of intrinsically motivating instruction.

Literature Review of Student Engagement Research

In the past 20 years, there has been a growing amount of research regarding the concept of student engagement in the classroom (Kahu, 2013; Masika & Jones, 2016). Research on student engagement in the library instruction context followed, with the first articles appearing around 2003 (Howze, 2003). These articles, over time, have arrived at a general consensus on the value of active learning in promoting engagement during library instruction.

A few simply assume its efficacy, using the term engagement more as a verb than as a description of a mental state. Hottinger et al. (2015), for example, use the phrasing "[t]he team wanted to engage the students by having them take part in activity-based learning rather than a traditional lecture" (p. 471). Similarly, Adebonojo et al. (2011) and Devasagayam et al. (2012) explore practical solutions to achieve active learning, using engagement to mean both mental connection as well as active participation. Engagement in these articles is used as the verb "to interact," and these examinations focus more on specific outcomes in their assessments rather than examining engagement levels themselves.

Other articles explore specific instructional practices and their effects on student engagement. These are characterized by assessment of student engagement specifically, as opposed to assessing generalized effectiveness. They include explorations of specific technologies and their effects on engagement (Walker & Pearce, 2014), use of classroom techniques such as pre-assessment (Price et al., 2011), storytelling (Vossler & Watts, 2017), humor and group work (Francis, 2012), gamification (Smith & Baker, 2011; Francis, 2012), and the flipped classroom (Campbell et al., 2015). All are useful in showing the efficacy of their specific modes of instruction, but they suffer from a relative lack of exploration of educational theories which would allow other librarians to replicate the effects of their techniques in a different institutional environment with different resources.

A third set of articles takes that extra step to examine the connection between educational or pedagogical theories and library practice. Some focus on a single theory; Howze (2003) looks at the connection between problem-based learning and library engagement, while Morrison (2017) approaches engagement through the lens of critical race methodology, as well as addressing the problem of students feeling disengaged by virtue of cultural differences with the culture of academia (p. 182). Other studies take on multiple theories: Kitchens and Barker (2016) approach engagement through a deep exploration of multiple learning and pedagogical theories, while Trembach and Deng (2018) conduct a broad exploration of learning theories and how they relate in practice to library instruction of millennial students. This third category of articles explores active learning techniques in varying guises, shows how they connect to pedagogical theories, and demonstrates how they increase student engagement. By providing a theoretical framework to ground their explorations, while also diving into practical examples, these articles provide utility across different institutional situations. Our article aims to fit within this third category, exploring Malone's theory of intrinsic motivation and connecting it to problem based learning and gamification.

Intrinsic motivation as an area of study was jump started by Thomas Malone's research in 1981. He articulated a theoretical framework for intrinsic motivation in educational video games, and his major contribution was to review the literature at the time and bring together several disparate elements into a more coherent whole. His conception of intrinsic motivation for instructional design of computer games outlines three main elements that increase motivation: challenge, fantasy, and curiosity (p. 356).

Challenge encompasses several related concepts, including the setting of personally meaningful goals, an uncertain outcome to the challenge, variability in difficulty levels, and a connection between overcoming challenges and a rise in self-esteem (pp. 357–358). Several of these elements can be difficult to achieve in an educational setting, especially in making the goals personally meaningful to the students, which is where the fantasy framework comes into play.

Malone used fantasy not in the sense of Tolkienesque elves, dwarves, and orcs, but rather in the sense of evoking "mental images of things not present to the senses or within the actual experience of the person involved" (p. 360). Malone further subdivided the concept into intrinsic and extrinsic fantasy; extrinsic fantasy refers to scenarios in which the skills being used or practiced are easily separable from the framework created around them (p. 361). An example would be the game Hangman, where the process of guessing letters within a set number of guesses is easily separable from the fantasy of a stick figure facing imminent mortality (p. 361). Intrinsic fantasy, by contrast, necessitates that the skills being practiced are dependent on the fantasy scenario. A modern example would be the game of Cluedo, where the mechanics of the game are deeply tied to the fantasy scenario. The fantasy framework interacts with the challenge framework by providing meaning that can be used to set personally meaningful goals. Malone argues that intrinsic fantasy is inherently more useful than extrinsic fantasy for motivating students (p. 361).

The final pillar of Malone's theory is curiosity, which he notes is similar to challenge but distinct in that self-esteem is not a central concern. Curiosity refers to setting the complexity of the new information to an optimal level that invokes the learner's curiosity (p. 362). Malone further divides this concept into sensory curiosity (i.e., new objects, shapes, colors, sounds, and tastes), which can be used to decorate, reinforce the fantasy framework, reward, or better represent concepts (p. 363); and cognitive curiosity, which entails challenging students' existing knowledge to make it seem incomplete and then providing avenues to fill in those gaps or resolve contradictions (p. 364).

The advantage of Malone's approach was to show how all three concepts reinforce each other and combine to provide a much more gripping and motivating experience than if the instructor was only to use one or two. It was, however, somewhat narrowly focused on motivation in the context of educational computer gaming. Two larger bodies of study address the elements not addressed by Malone: gamification and problem-based learning.

Gamification has been studied by many scholars over the years, and the topic has become especially interesting to libraries as a means of promoting engagement. The findings in the literature have been fairly consistent: gamification (by various means) has been confirmed to increase student learning and engagement (Smale, 2011; Buckley & Doyle, 2016; Yildirim, 2017; Sun & Hsieh, 2018). Many of these scholars delved into the connection between intrinsic motivation and gamification, and the findings there were a bit more nuanced. Smale (2011) emphasized the ability of games to grant a new identity to gamers, thus encouraging risk taking and lessening the feeling of real-life consequences for failure (pp. 37–38). Buckley and Doyle (2016) explored the concept of gamified learning interventions with respect to both intrinsic and extrinsic motivation. Their experiment found a statistically significant boost in learning arising from gamified online learning. In particular they found that the gamified framework worked particularly well for students who were intrinsically motivated, specifically for those with a motivation to know or a motivation towards stimulation, concepts which map onto Malone's concept of curiosity (pp. 1172–1173). Sun and Hsieh (2018) focused more on agency and control, studying instant feedback mechanisms and how they impacted motivation. Their experimentation also confirmed that gamifying instruction led to higher levels of intrinsic motivation (p. 114). More recently Xi and Hamari (2019) built on work by Malone and others to explore how gamification met consumers' intrinsic needs (which in turn led to intrinsic motivation to continue the

game) (p. 210). One of their findings was that immersion, which tracks onto Malone's concept of fantasy, fulfills the intrinsic need for autonomy but not other needs (p. 212). This points to the limits of the fantasy framework without other elements being in play. In contrast, they found that allowing for achievement and social-related features fulfilled multiple needs for consumers, and thus were correlated with increased enjoyment (p. 217). Taken together, researchers are still searching for the exact mechanisms of intrinsic motivation in gaming, but the general theory outlined by Malone can be mapped onto subsequent researchers' concepts.

While Malone's theory is contextualized around computer gaming, the concepts of challenge and curiosity are not exclusively linked to educational gamification. One of the prominent teaching strategies to promote student engagement in the learning process is problem-based learning (PBL). PBL has been referenced in the literature as an effective strategy for engaging learners, as it as an experiential learning approach to investigating, explaining, and resolving meaningful open-ended problems anchored in reality; it is an active learning strategy considered to intrinsically motivate students (Hmelo-Silver, 2004; Pedersen, 2003). The intrinsic motivation stems from the inherent challenge PBL creates as students are asked to develop a solution to a problem that lacks a single correct answer (Pedersen, 2003). Further, PBL stimulates students' curiosity, which is also important for promoting intrinsic motivation (Oudeyer, Gottlieb, & Lopes, 2016). Within the field of librarianship, the concept of PBL has been viewed as a way to resolve the issues of traditional bibliographic instruction and provides librarians a path to move away from lecture-based demonstrations to focusing on facilitating critical thinking about information literacy concepts (Howze, 2003; Spence, 2004; Wenger, 2014). While PBL is not often discussed within the context of gaming, it seems that there are many commonalities in how intrinsic motivation is spurred in individuals participating in PBL and those who engage in gamified learning experiences.

Application of Student Engagement Techniques to the Lesson Planning Process

We chose to gamify the second lesson, one focused on evaluating information, for several reasons. First, the research skills students were being taught were not tied to any particular research paper or assignment, and from experience we knew that that significantly reduced student motivation and retention of information because they were not clear as to the purpose of learning those skills. By gamifying the research process, we hoped to introduce intrinsic motivation through the fantasy framework and increase engagement and retention of the skills that we taught. Second, the preexisting bones of the lesson plan included an open-ended historical question that students would need to explore and develop their own conclusions. This put the lesson into the realm of problem-based learning, in addition to mapping neatly onto Malone's framework of curiosity. Third, the class period was 75 minutes, which gave us more room for creative instruction while still meeting our objectives. Finally, the students at that point had not been introduced to the Piltdown Hoax, and our lesson was intended to act as an introduction to a deeper investigation during later non-library sessions. Accordingly, the students had no context for why they should particularly care about any of the historical figures we were introducing, and we figured that a gamified framework could provide a personal connection to specific individuals by manufacturing context.

The context was the first element we tackled, with the goal of creating an intrinsic fantasy framework that gave meaning to every aspect of the lesson. We used the television show *Scandal* as our template, because the show specifically focused on a team of highly skilled operatives protecting the reputation of their clients (ABC, 2020). Through personal experience with the show, we knew that these operatives did not always use legal means or accurate information to achieve their objectives,

and that concept fit in nicely with the theme of the third lesson of our sequence which examines authority and credibility of information.

To mirror the elite team structure, we decided that we would place the students into random groups of three to four students and give them an official-looking letter appointing them as a Historical Intervention Team, volunteered by the Department of Anthropology to protect the reputation of a specific historical figure implicated in the scandal. This was the element that explained the scenario to them (in the general style of the TV series *Mission: Impossible*) and thus established the fantasy framework. To add additional structure and motivation, the letter took a page from *Scandal* and assigned each team a historical figure defended by another team, telling them to smear that target with blame for the scandal. By giving them a side to identify with and a target to attack, we activated the students' competitiveness and provided them with a challenge to motivate them.

With the framework complete, we looked for ways to add additional structure and to get the students familiar with using research tools for a purpose. In a previous course session, we had introduced the basics of database searching, and that prior knowledge was activated in a brief anticipatory set before we introduced the fantasy framework. The next step, therefore, was to add some boundaries and guidelines to set the parameters of the challenge and to make it achievable, per Malone (1981). This was accomplished in several ways: we specified that defending their client required the use of peer-reviewed sources, but when attacking their target they could use sources of any quality. This forced students to evaluate their sources using the database filters (in order to meet the restrictions) and to seek out different sources of information for different purposes. It also tied the research skills into the scenario, making it an intrinsic fantasy instead of extrinsic (Malone, 1981, p. 361). It set a realistic benchmark for the students, allowing them a path towards filling in gaps in their knowledge that was achievable: the hallmark of Malone's (1981) element of curiosity (p. 362). Additionally, we provided some structure in the form of a worksheet that they could use to record, evaluate, and categorize the articles they found. This element served as an aid to keep them on task and to remind them of the gamified framework they were operating within.

With the active learning portion of the segment set, we turned to the final element of the scenario: the discussion/debate, which had been part of the previous iteration of the class and had generated lackluster results. Research on discussions in classroom settings by Pollock et al. (2011) showed variable benefits between small-group discussion and larger groups, particularly in terms of engagement and participation in larger groups. We wanted to have the class as a whole have a discussion while simultaneously having 100% participation, and the small-group structure that we landed on proved an opportunity to have the best of both worlds. Each student had a client and a target within the fantasy framework, and those overlapped with the clients and targets of each other group. This allowed us to create a circle of groups where the attacks of each group naturally sparked the defense of another, putting students into direct conflict with each other and providing the challenge aspect of Malone's (1981) theoretical trifecta. Per Jagger (2013), the process of getting attacked on a position with which they identified themselves was designed to provoke immediate engagement (p. 43). This element concluded the scenario, which we followed up with a discussion co-facilitated with the professor regarding the content of the Piltdown Hoax and the decisions they made in selecting sources.

Structurally speaking, the class worked as follows: As students were brought in at the beginning of class, we showed them a three-minute clip from the show *Scandal* to set the mood. They were then divided into groups of three to four and handed a physical letter emblazoned with the anthropology department letterhead explaining which historical figure they were defending and who they were supposed to pin the blame on. We gave them two to three minutes to read the letter and then spent

another five minutes explaining what they would be doing, specifically instructing them to divide the labor in their groups so that two students would research to defend their client and two students would research info to smear the target. We also reminded them to record the information that we found on a sheet designed to remind them of their goals in the exercise and to help in the discussion. We then gave them around 40 minutes to research. Once the research period ended, we spend two minutes moving them over to side tables away from the computers, arranged in a circle as described above, then dedicated the remaining 20 minutes of the class to that discussion, which included a coda at the end where we asked the class as a whole who they thought was actually guilty and what it was like to use different resources with varying degrees of credibility. All elements were handed off between the two library faculty, one running the debate while the other took the lead in the small lecture segment. Both faculty members assisted students during the research portion, and the professor was there to answer questions as well when the need arose.

This structure was superficially similar to the previous iterations of the course. Both involved a short lecture followed by students researching pre-assigned topics connected to the class, ending in a group discussion. The major difference, and the one that appeared to spark genuine interest in the students, was the framework surrounding the lesson. The initial runs of the lesson were simply telling the students how to use a database and then having them look for specific source types. The framework provided a sense of purpose and made the assignment open ended; rather than looking for an arbitrary set of articles meeting specific requirements, they were searching for information for a purpose, within set guidelines, and then planning to use that information to compete with their fellow students and complete their mission. The elements of low-stakes competition added excitement to the experience, and transformed it from having librarians tell them how to perform library skills into showing them the utility of those skills for completing specific tasks.

Our overall lesson-planning process followed the principles of backwards design. This instructional design model reverses the process of designing instruction by focusing on what the instructor wants the students to be able to demonstrate at the end of the lesson and building the assessment and learning activities from that perspective (Wiggins & McTighe, 2006). This meant we started by determining what we wanted students to achieve by the end of the lesson, which was two-fold: we wanted students to be able to describe the historical controversy surrounding the Piltdown Man hoax and learn how to evaluate the credibility of sources to support an argument. From there, we determined how to best check for understanding (this was evidenced by the final debate-based discussion), and the last step was designing the activities and learning materials for the lesson. We found this to be advantageous when designing a gamified information literacy session, as it helped to keep us focused on the student-learning outcomes rather than focusing on ideas we personally wanted to incorporate into the gamified lesson. We consider this successful in that we stuck to our learning goals and incorporated creativity into a lesson plan that seemed to spark students' intrinsic motivation to engage in the lesson and helped them to emotionally and intellectually invest themselves in the research process.

Outcomes of the Lesson

After investing significant time in creating this lesson, we were nervous about how students responded; these were college students after all. Would they find the theme of the lesson to be too "childish" or "nerdy" for their more sophisticated tastes? Our concerns subsided upon our observation of the students reading the letters that explained why they were recruited to the Historical Intervention Team that would be protecting a Piltdown Man suspect and framing another as guilty. Some students laughed, a few rolled their eyes, and others immediately started logging onto their computers. As students were acclimated to their research tasks, students in more enthusiastic

groups really got into the competitive spirit, proclaiming, “Charles Dawson is going down!” Given this was the first time we taught this lesson, we couldn’t tell if the student engagement was a fluke or not. However, we continue to receive similar responses from students. We believe that the lesson’s novelty contributes to this, particularly as it subverts their typical expectations of a library instruction session. We believe this lesson structure provides a framework that motivates students as they work toward a common goal for their group.

We intentionally created recording sheets to help guide students through the exercise as we thought they might be confused without it. They are also used by the professor as proof of in-class participation. The strategy seems to achieve its goal of keeping students on task, as most of the questions we receive are about where to find databases on the library website or technical issues with the databases themselves. While the students work, we circulate around the classroom, and observe their conversation and engagement. There are times when a student is not engaging with their group members. When this happens we draw the students back into the activity by asking the group questions about how they were approaching their research. The social pressure seems to redirect them to their task. By checking in with each group, we are able to learn about the development of their arguments and can offer them guidance if necessary. Sometimes we have to talk to students about developing a logical argument, particularly when an excited student wants to take a sensational approach to framing their target. When the research exercise is over, we offer students an additional five minutes to review their arguments for their client and the target they were going to “expose”; we also encouraged them to start thinking about why they selected some sources over others, as information evaluation was part of the conversation ahead.

Once the students finalize their evidence, we have the entire classroom move to a different section of the room to sit in a large circle. Sometimes, the students seem tentative about how this debate is going to work, but after the first group begins accusing their assigned suspect, the idea clicks. Often, students pretend to express anger or conceit as they present their arguments, further demonstrating their buy-in to the fantasy element of the lesson.

Following the debate, the professor asks the students some content-oriented questions to ensure students are aware of the complexities surrounding the Piltdown Man hoax. We follow up these questions with the ones about information evaluation, and students begin explaining their decision-making process for selecting sources. While inevitably a couple of students will indicate they just used what they could find, several students are able to articulate ideas about credibility of information and we reinforce such comments with additional examples. Many of the students who shared their evaluation process indicated they found inspiration in current events and discussed how the prevalence of fake news has made them more cautious in believing information they read online; however, they also noted it was fun to try to dig up “dirt” on their targets by using “shady” (i.e., ill-researched) sources.

The first time we taught this lesson, we chose not to formally assess the session as the lesson was experimental and we were still working on the lesson hours before we initially taught it. Fortunately, even without a formal assessment in place, we received informal student feedback. Four different students came up to us to tell us that they thought the lesson was a lot of fun. Another student noted that they couldn’t believe how fast the class went because they were expecting a “regular” (i.e., database-focused) library class. We were elated to receive this kind of feedback in an unsolicited manner from our students. We had never received this type of feedback from students when we taught the traditional lecture version of the class, in which it was difficult to solicit participation from the students.

Over the past four years, we have taught this specific lesson at least once per academic year for the same professor. During this time, we have introduced more formal qualitative assessment techniques. In class, we have incorporated a one-minute paper assessment to gauge the students' takeaways from the session. The one-minute paper is a formative classroom assessment technique where the instructor gives the students one or two questions to reflect on at the end of the class period (Stead, 2005). In regards to information literacy instruction, this type of assessment is helpful for pointing out where librarians can improve their lessons (Choinski & Emanuel, 2006). We chose this method primarily because we wanted to get a better understanding of what the students were taking away from the library session and iteratively improve the lesson. We asked the students the question "What is your main takeaway from today's class?"

After collecting the students' one-minute papers, we reviewed and coded them according to responses. Some of the prominent themes that emerge can be categorized under "Piltdown Man hoax," "evaluating information," or "not helpful." After the lesson, the majority of the students demonstrate improvements in their understanding of the Piltdown Man hoax and the relevancy of this topic to the anthropological community. We believe these answers show the students were actively engaged in class. The responses relating to "evaluating information" are returned at a lower-rate than the first theme. In this type of response, students focus on the process of finding credible information. Finally the "not helpful" theme is where students either leave the question blank, respond with "I don't know" or give a snarky comment. We average about four or five students who may leave this type of response. Early on, it was clear that we needed to address evaluating the credibility of information. We decided to introduce this concept briefly in the first lesson and expand upon it a little more in this lesson. This helped improve the classroom discussion about source credibility, and we saw more focus on this idea in their one-minute papers. We have also revised the student recording sheets to have them answer "Why would you trust or distrust this source?" to get them thinking about source credibility prior to the whole class conversation.

We also gathered qualitative data from the professor, asking her questions about student performance after each iteration of the lesson. Compared to the original lecture-based version of the lesson, the professor was elated about the increase in student engagement. Each time we teach the class, she has reported back that the students had more to say in class discussions about the Piltdown Man hoax. She explained that students especially seemed more articulate about the clients and targets their groups researched. She has also told us repeatedly that the students' papers for this particular topic were strong in comparison to the first two assignments they completed. This outcome cannot be solely attributed to our instruction, but is still a good indication that the lessons are having an effect.

The feedback we have continued to gather from this section of INTD 105 is that this particular session seems to be the students' favorite lesson out of the three we offer this class. We have even had students visit us for research assistance and comment how much they enjoyed the Piltdown Man hoax library exercise. While the goal of the lesson was not necessarily to increase traffic for research assistance, the positive connection in the classroom has made it easier to establish a rapport with the students who utilize library services outside of the classroom.

Discussion

Our experiment with applying student engagement strategies showed that they can be an effective tool for building course sessions. The downside of this approach is that it takes a lot of work to put together; building a straight lecture on database searching is a quick endeavor, whereas building a

gamified session with actual learning objectives in a manner that self-reinforces requires much more effort. There are other methods of inspiring intrinsic motivation, and this approach might fare poorly in a graduate school environment where intrinsic motivation to learn can be presumed by mere attendance. Accordingly, when exploring whether to include gamified elements into a lesson, instructors should consider the learning goals for the students first.

We posit that gamified instruction is a good option if the following elements are true:

- Students are not necessarily already intrinsically motivated.
    - This generally includes mandatory classes, one-shot library instruction sessions, and general education courses that are required for non-majors.
- Students are mostly familiar with the concept and unwritten rules of gaming.
    - This tends to be difficult with non-traditional learners and grad students, though that trend is likely to fall as gaming has increasingly become a mainstream pastime for adults.
- Instruction is not tied to a graded research project.
    - In higher ed, according to our experiences, grades are intrinsically motivating to most of the students we have encountered. This is likely to vary from institution to institution, but tying instruction to a graded research assignment usually results in higher student engagement.

While we have presented a lesson designed for a specific course at our institution, this lesson or the concepts it is built upon can be adapted to fit a variety of themes or subject matter. As instructors delve into their planning process, they should identify an open-ended problem that can be situated within the discipline or topic of the course. Based on our experience, we think it is important to carefully calibrate the difficulty level of the lesson's overall challenge and the problem-based learning scenario. Malone (1981) noted that if the task is too challenging, it can cut off engagement with the activity. Setting the difficulty level usually requires pilot testing on the instructor's part, and we recommend recruiting students to walk through a gamified lesson as they will provide invaluable feedback that may be difficult to elicit from colleagues. For the element of curiosity, instructors should strive to challenge students to reexamine preconceptions about the problem being investigated, and give them the tools to discover the truth rather than handing the answers to them. However, if time constraints are a factor, it might be necessary to find a balance between the information provided and the elements left to discovery. For the element of fantasy, Malone's theories do not refer to elves, magic, and swords; fantasy simply refers to a fictional scenario integrated into the challenge. The fantasy will be more powerful if it ties into skills and interests that students already possess. Challenges should be inextricably tied into the fantasy framework; intrinsic fantasy is powerful because the narrative reinforces the skills and the skills reinforce the narrative.

Conclusion

Intrinsic motivation adds to the efficacy of your instruction by making your students partners in learning rather than passive recipients. Malone's theory of intrinsic motivation provides an excellent set of ideas to manufacture intrinsic motivation where it doesn't exist, and has the potential to spark lifelong interest in topics. Future experimentation in this category could look into more quantitative assessments of the effect of these lessons on student performance, and there is also potential for research on group dynamics and how they can reinforce or diminish intrinsic motivation in a classroom setting.

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