



Peer-Reviewed Article

Escape Rooms for Learning: A Case Study of a Collaborative, Interdisciplinary Project

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ABSTRACT

As the popularity of escape rooms as a form of entertainment has increased, so has interest in their potential as an instructional innovation. This case study documents a two-year, multiphase project piloting two approaches to using escape rooms for learning. During the first phase (“Escape Room as an Assignment”), instruction librarians embedded with two classes to develop functional inputs for the second phase (“Escape Room as a Classroom/Lab”), which entailed using a library escape room to teach information literacy. This paper contributes to understanding of how academic libraries can support faculty who wish to experiment with incorporating escape room elements into their curriculum while identifying the affordances conveyed by this unique educational environment. It also theorizes how escape rooms for learning might adapt to a variety of subject areas.

KEYWORDS

escape rooms, information literacy, instructional environments, affordances, client-based pedagogy

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Introduction

Since the first escape room opened in 2007 in Japan (Nicholson, 2015), the immersive experiences have become a ubiquitous, global phenomenon. In the United States alone, more than 3,000 escape room businesses currently comprise a \$654 million industry, and despite some pandemic-related decline, continued growth is anticipated over the next five years (Buchko, 2024). Market research reports that three quarters of young adults have either tried an escape room and would be willing to do another one or are interested in trying an escape room for the first time (Boesel, 2022). As the popularity of escape rooms as a form of entertainment increased, interest in their potential application within educational and cultural contexts followed. Many libraries enthusiastically embraced the trend, using them for youth and adult programming, outreach, advocacy, staff training, team-building, and instruction (Kroski, 2019).

Beginning in 2017, Georgetown University Library spearheaded a multifaceted escape room project focused specifically on piloting methods to use them to support learning. The project brought together faculty and staff with varying expertise to explore questions about how to engage students with these interactive games to develop knowledge and build skills. Through a case study of this unique, robust, long-term collaboration, the Georgetown team's experiences could contribute to understanding of how academic libraries can support faculty who wish to experiment with incorporating escape room elements into their curriculum. Implications can also be drawn from this work regarding topics and subject areas that align well with the affordances that escape rooms can provide as educational environments; this article places a special emphasis on how effectively information literacy instruction translates to escape room-based learning.

Institutional Context

Georgetown University is a private, R1 university located in Washington, DC. Founded in 1789, Georgetown is the oldest Catholic and Jesuit university in the United States. The university enrolls 18,081 FTE students across the Main Campus, Law Center, and Medical Campus (Office of Assessment and Decision Support [OADS], 2023b). Of those students, 14,834 are domestic students, and 3,247 are international students (OADS, 2023a). The main campus students and faculty are primarily supported by the John Mark Lauinger Memorial Library, which houses the collections for the arts, humanities, and social sciences, the Booth Family Center for Special Collections, the Gelardin Center, and the Maker Hub. The campus community is additionally supported by the Blommer Science Library, the Bioethics Research Library, and the School of Continuing Studies Library. Georgetown University Library opened the Maker Hub in 2016 to serve as a space for collaboration and creativity. The Maker Hub comprises a community of makers, including students, staff, and faculty, and supports creative endeavors related to arts and crafts, electronics, laser cutting, printmaking, textiles, 3D printing, woodworking, and vinyl cutting.

What is an Escape Room?

For the purposes of this project, we defined escape rooms as a team-based challenge that involves a puzzle game with a narrative component. Participants are often enclosed in a space or area, and they must work together to find clues that lead them through a series of logic-based, hands-on activities to achieve a successful exit from the enclosed area within a limited time period. At the most basic level, escape rooms form from the interplay of space, theme, game play, and user interaction. Table 1 elaborates on the details underlying each of these core elements.

Table 1

Key Escape Room Elements

Space	Theme	Game Play	Interaction
<ul style="list-style-type: none"> ● Physical or virtual ● Props ● Decorations ● Set Design ● Music ● Sensory stimuli 	<ul style="list-style-type: none"> ● Framing story ● Immersive plot ● Narrative artifacts ● Genre elements ● Characters 	<ul style="list-style-type: none"> ● Puzzles ● Codes ● Logic ● Road map ● Time limit ● Instructions 	<ul style="list-style-type: none"> ● Team work ● Communication ● Observation ● Problem-solving ● Help ● Competition

Note. These lists are illustrative, but not intended as comprehensive.

Literature Review

Librarians have used physical escape rooms as outreach tools during orientation as a replacement for or supplement to traditional orientation activities (Davis, 2019; Edwards-Waller, 2020; Johnson & Westbrooks, 2021; Mac Gregor, 2018; Veach, 2019; Wise et al., 2018). Escape rooms have been implemented during orientations as a means to increase engagement and minimize library anxiety in incoming students (Veach, 2019). They have also been used to help raise awareness of library sources and services in the student body, teach basic skills, and improve student-librarian relationships (Wise et al., 2018). Typically, these library escape rooms are created by library staff for student audiences rather than including their target audience in the creation of the experience.

Escape Room Guides and Frameworks

The library literature includes a number of how-to guides, best practices, and case studies for developing library escape rooms whether for learning and information literacy, library orientations, staff training and team-building, curriculum support, or critical thinking (Crowe & Sclipa, 2020; Frey, 2018; Kroski, 2019, 2020). These works focus on pragmatic approaches to and considerations for developing escape rooms. There is also a growing body of literature that addresses educational applications of escape rooms in libraries specifically and in higher education more broadly.

One review article addresses educational aspects and student learning outcomes and proposes a decision-making framework for educational escape rooms to aid in aligning learning goals with game design (Veldkamp et al., 2020). The article notes that in educational escape rooms across the disciplines there is a divide between students' perception of learning and the extent to which their learning measurably improves. To that end the review's authors recommend that educators creating escape rooms align learning goals with game goals and puzzle structure. They encourage educators to not be constrained by the notion of a room and consider other puzzle paths that might include stations or a box of puzzles. Giving instructors a physical presence or role within the game can help them to assess student performance and provide guidance as appropriate. Veldkamp et al. (2020) also advises that instructors should include a meaningful debriefing time following game play to reinforce any learning goals. Finally, they recommend tying grading or other assessments to specific learning goals.

Escape Rooms and Library Instruction

For educational experiences within the library, librarians have used escape rooms to teach a variety of skills, resources, and topics. Librarians have used them to teach about catalogs, case law databases, and the library's physical layout (Edwards-Waller, 2020), specialized drug information databases (Gorman, 2021) and PubMed (Alvarez-Diaz & Grifol-Clar, 2021), library catalogs and databases for researching children's literature (Pennucci, 2020), fake news and source evaluation (Pun, 2017), and open access (Sundsbo, 2019).

Some librarians have found it helpful to pair escape rooms with more traditional instructional or orientation sessions. Escape rooms have served as a follow-up to beginning-of-semester library orientation sessions to reinforce key research skills or teach them anew for students who were unable to attend in-person orientations (Edwards-Waller, 2020). In more classroom settings, librarians at the Medical Library for Ramon y Cajal University Hospital and Fundación Alcorcón University Hospital in Madrid required that students complete a required bibliographic search course prior to participating in the escape room that focused on effective use of PubMed (Alvarez-Diaz & Grifol-Clar, 2021). Koelling & Russo (2020) pair their mystery-themed escape room with a more traditional explanation of the purpose of information, the process by which it is created, and the product, or format, in which the information is received.

Assessment of the Effectiveness of Teaching Information Literacy Skills

While numerous articles, as noted above, discuss using escape rooms to teach information literacy skills, the assessment of that learning is less well theorized. In their review article, Lathwesen & Belova (2021) acknowledged that more empirical evidence is needed on the effectiveness of escape rooms for learning even while noting the positive impacts of game-based learning. They also acknowledge, however, that “the evidence on actual learning outcomes fostered by games remains inconsistent” (Lathwesen & Belova, 2021, p. 1) and that the publications they reviewed “describe specific game scenarios with little, if any, evidence of their effectiveness” (Lathwesen & Belova, 2021, p. 9).

Escape rooms can be used to teach information literacy skills such as authority is constructed and contextual, information creation as a process, research as inquiry, and searching as strategic exploration (Fontaine, 2020; Gohr, 2020; Pun, 2017). However, assessment of learning based on the Association for College and Research Libraries (ACRL) Framework for Information Literacy for Higher Education (Association of College and Research Libraries, 2016) tends to be observational or informal. In the library literature, assessment measures tend to focus on number of participants, completion statistics, and participant feedback (Kretz et al., 2021), observational assessment and post-orientation surveys (Veach, 2019), written feedback on Post-It notes (Wise et al., 2018), or post-game surveys (Mac Gregor, 2018).

Even when used to teach information literacy skills, escape rooms can be seen more as ways to increase engagement and are often not intensively assessed for their effectiveness in teaching information literacy skills (Pennucci, 2020). One author noted that at times game play gets in the way of learning. In her open access-themed escape room, Sundsbø (2019) asserted that because players “were so focused on winning,” they failed to “pick up on all the OA references during the game” (p. 4). Having said that, a conversation between the librarian and the players following the game helped to drive home the open access principles they engaged with (Sundsbø, 2019).

Cho et al. (2023) incorporated a highly structured approach to data collection in the escape room they designed. The authors of this study comprise scholars and PhD students at the University of Washington’s Information School plus an academic librarian. The team collaborated to create an escape room to use in local public libraries that teaches about misinformation and information literacy. They assessed the participants’ experiences first through audio-video recording during both gameplay and the debrief and then through participant surveys, a session report, and a focus group. The assessment focused on both participants in the escape room and librarians at the public libraries that hosted the event.

In addition to the ACRL Framework, learning theories play a role in some librarians’ pedagogy. Fontaine (2020) and Reade (2017) noted the importance of constructivism, an

interactive approach to learning, in understanding the role of the escape room in teaching information literacy skills. Constructivism is one of the theoretical approaches noted in Vorderbermeier et al.'s (2024) review article, which notes nine learning theories that educators have used to strengthen their pedagogical approaches to escape rooms. Additional theories include active learning, collaborative learning, experiential learning, problem-based learning, situated learning theory, self-determination theory, flow theory, and Bloom's taxonomy. With greater attention paid to theoretical underpinnings, escape rooms for learning could have stronger pedagogical grounding. Vorderbermeier et al. (2024) do not recommend one specific theoretical foundation.

In another review article, Fotaris & Mastoras (2019) noted that across the literature escape rooms are described as being beneficial for developing soft skills such as teamwork and collaboration and for increasing enjoyment and engagement; however, challenges such as evaluation, time, and sample size also were noted. They also corroborated other scholars' observations that further study is needed to determine the educational impact of escape rooms.

Scalability and Labor Intensiveness

While the escape room design process and outcomes tend to be reflected upon favorably by librarians, they also note that a relatively labor- and resource-intensive process has the potential to pose significant challenges, including constraints related to budget, space, staffing, and time (Wise et al., 2018). Wise et al. (2018) noted the labor-intensive nature of successfully pulling off their orientation escape room, which required training 13 facilitators, dedicated space, and careful scheduling. Similarly, Veach (2019) commented on the substantial time and personnel resources needed to develop a library escape room from early phases of ideation through testing the finished product. D'Orio (2018) acknowledged that the labor- and staffing-intensive nature of escape rooms has impeded their ability to offer them with regularity. Edwards-Waller (2020) noted the time and staffing required to pull off escape-room style library orientation tours yet argued that the benefits were worth the costs.

Librarians at the John Jay College of Criminal Justice noted the labor-intensiveness of running an escape room and argued for the necessity of partnering with other campus entities in order to meet the staffing needs for running their escape room at scale (Davis, 2019). Some librarians partner with disciplinary faculty (Glotfelty-Scheuring, 2019), student clubs (Gohr, 2020), or student affairs or student activity centers (Mac Gregor, 2018). Working with partners was essential for these libraries in successfully developing and running their escape rooms.

Even when working with partners, typically librarians create escape rooms for particular target audiences: freshmen and transfer students, specific classes, or student library assistants. It is less usual to see individuals who are part of the target audience participate in the invention and development of the escape room experience. One notable exception is Thoegersen & Thoegersen's (2016) involvement of elementary school-aged children in developing an escape

room for the Morton-James Public Library in Nebraska City, Nebraska. The children worked alongside the librarians throughout the entire creation process, including creating puzzles, developing the backstory, and creating costumes.

Project Description

Georgetown University Library's pilot project represented an interdisciplinary collaboration that pulled team members from multiple units within the library and multiple academic departments. A core team ultimately encompassed five Research Services librarians (with instruction and outreach responsibilities), two members from the Gelardin New Media Center (the department head and the operations manager), the manager of the Maker Hub, and two teaching faculty (one each in the Communication, Culture & Technology (CCT) and English departments). The project started with some simple conversations around, "Hey, do you want to build an escape room?" but evolved significantly as team members sought more scalable applications than a basic outreach event.

Prior to the project starting in earnest, the team examined escape rooms as an abstract idea, a concrete activity, and a material entity. We set out to deconstruct escape rooms, seeking to identify the most important concepts and component elements, and then reimagining and reassembling them into a fusion of a flexible environment and a series of actions that could support a variety of learning outcomes. This helped formulate the escape room definition used for our project.

To support early exploration, the team took advantage of the library's microgrant program to fund trips to multiple local commercial escape rooms and to purchase one [Breakout EDU](#) kit that provided combination locks and other tools useful for implementing educational games. The team also received planning support from Georgetown University's Center for New Designs in Learning and Scholarship (CNDLS) at their 2017 Teaching, Learning & Innovation Summer Institute (TLISI). TLISI is a conference for Georgetown faculty, staff, and graduate student instructors that offers the opportunity to explore pedagogy, instructional technology, and teaching strategies, and each year, one component of TLISI is the Productive Open Design Spaces (PODS). During the week of TLISI, PODS provides a dedicated space for innovation-in-practice as project teams receive coaching in design thinking to move their ideas forward. The PODS experience allowed the escape room team to take their disparate ideas and preliminary brainstorming and develop them into a new, cohesive goal: to create an escape rooms for learning framework and toolkit.

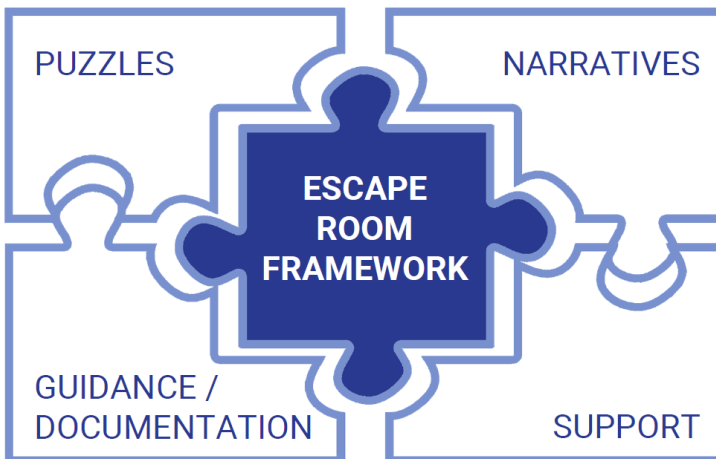
The team settled on the idea of a "framework" as a flexible and extensible set of resources because they wanted to provide an initial structure that enabled faculty, librarians, and other members of the campus community to effectively experiment with using escape rooms specifically in an educational context. The team envisioned the framework encompassing a collection of reusable (and potentially circulating) puzzles that coordinated with a library of

available narratives, as well as extensive guidance for how to use both the puzzles and narratives to build and run escape rooms. The team wanted the guidance, envisioned as tailored specifically for Georgetown's institutional context, to cover basic instructions for use, practical advice, and higher-level discussion of the pedagogy and affordances involved with using escape rooms as a learning space. The final component of the framework involved developing capacity to provide consultative support to those seeking to use the puzzles, narratives, and guidance as a toolkit for their own purposes. Figure 1 visualizes the escape room framework.

Based on their PODS work, the team conceived a multi-phase project plan in which each round of work would intentionally yield outputs we could exploit as the project moved forward. During the first phase, the faculty team members redesigned courses with escape room-related content that prompted students to learn through the hands-on creation of artifacts useful for implementing an escape room. During the second phase, some librarian team members parlayed the students' work into a functional escape room they piloted for information literacy instruction. The team intended for the lessons learned from both phases to inform a comprehensive guidance document for other faculty interested in implementing their own educational escape rooms.

Figure 1

Planned Components of the Escape Room Framework



Note. The escape room team developed this image to aid in communicating with stakeholders during the project (Surbaugh et al., 2018).

Phase 1: Escape Room as an Assignment

Phase 1 covered the 2017-2018 academic year and focused on asking students to create escape room elements. For the fall 2017 semester, Professor Evan Barba refreshed his CCT 617: Interaction Design course, and in spring 2018, Professor Matthew Pavesich updated his section

of WRIT 015: Writing and Culture Seminar (a first-year writing requirement in Georgetown's core curriculum).

The Interaction Design course asked students to explore how to create and test prototypes of electronic artifacts and consider how these artifacts acquire meaning to their users. In place of a previous, more freeform final project, Dr. Barba sought to impose constraints on the design exercise to encourage more creativity. He assigned students to create abstractable puzzles that could be repurposed with an emphasis on modularity (Leader-Smith, 2018).

He required the students' designs to incorporate both an "input" and an "output," ensuring that the resulting puzzles could be linked together in essentially any order. For example, one puzzle incorporated an antique typewriter wired to a locked box. If a hypothetical game player typed in the correct codeword (input), then the box would unlock allowing them to retrieve an item from inside (output). Figure 2 elaborates on a second sample puzzle. At the completion of Dr. Barba's course, the escape room team counted 16 puzzle devices among the project's assets.

Figure 2

Screen Capture of a Student Video Demonstrating How a Puzzle Functions



Note. For this puzzle, four nearly identical abstract prints, each a different color and pattern, hung on a section of white wall. Beneath, a thermal printer was mounted near the bottom of the wall. The pictures corresponded to four small, printed tickets that, when aligned to match the arrangement of the pictures on the wall, revealed a message telling a game player to knock three times on one of the picture frames. That frame was connected to a piezoelectric sensor, which detected changes in pressure, and an Arduino computer, which read the amount of pressure and then triggered the printer if the correct amount of pressure registered. When knocked in the correct spot, the thermal printer yielded a slip of paper with a message. (Obus, 2017; Leader-Smith, 2018)

In turn, Dr. Pavesich wanted his first-year writing students to explore escape rooms as a genre. He assigned student groups to design escape room narratives that librarians could use to implement a planned gamified learning experience that taught research skills. Students received an introduction to the ACRL Framework by the librarian project team members. Assignment requirements included accommodating up to eight players, completing game play in under 45 minutes, using at least four of the puzzles developed by the Interaction Design students, and employing at least five different library resources. Each narrative contained four components: 1) a framing story, 2) instructions for players, 3) a “road map” that articulated a birds-eye view of how the game was intended to unfold, and 4) written props. The escape room team did not expect students to produce fully realized escape rooms, but rather well-crafted plans with the most important pieces ready to go. The five narratives the students conceived involved:

- Discovering a secret speakeasy within the library
- Investigating UFOs with ties to the television show *Stranger Things*
- Rescuing a kidnapped mascot
- Locating a rumored Cold War-era shelter in the library during a bomb scare
- Uncovering a mysterious society from clues left in a library study room

For both courses, librarians embedded with the classes for the whole semester, playing a dual role as clients and audience and helping the students potentially tap into benefits associated with creating meaningful work for an audience beyond the immediate classroom context (Pope-Ruark, 2011; Wickliff, 1997). The librarians provided critiques at the midpoint of the semester and on the students’ final projects. For the writing seminar, Dr. Pavesich assigned each of the five student groups a dedicated librarian consultant; five subject liaisons partnered with the groups from the point they received the assignment through their final presentations and hands-on testing of their narratives. This approach allowed students in both courses to engage with an authentic project in an immersive, real-world problem-solving scenario.

Also, both sets of students had sustained, substantive interactions with the Maker Hub as they created or adapted puzzles and props. This provided a significant opportunity to demonstrate and build capacity for curriculum integrations for the Maker Hub.

Phase 2: Escape Room as a Classroom/Lab

For fall 2018, librarians on the escape room team used the combined student-developed inputs (puzzles and narratives) to create an educational escape room focused on information literacy.

First, the team assessed the available narratives to determine which had the most potential to integrate with library resources and align with preliminary ideas for learning outcomes, as well as which narrative would require the least amount of effort to re-work into an

effective escape room. The team chose the secret society narrative to adapt. The next step involved in-depth discussions to define the flow of game play, establish a final list of desired learning outcomes, enhance the educational components, and make necessary technical modifications to the puzzles. Although not having to start from scratch proved immensely helpful, completely fleshing out an operational escape room still required significant effort over the summer, including developing detailed workflow diagrams to chart the pathways envisioned for players, lesson planning, and augmenting the student-developed props with additional librarian-created items serving functional and aesthetic purposes.

The team held conversations with colleagues throughout the library that helped identify an appropriate time frame and space. Although the team initially planned to run the escape room during the university's new student orientation (NSO) weekend, logistical issues dictated that the team instead use NSO to advertise escape room events scheduled during Georgetown's Weeks of Welcome (GWOW), the first six weeks of the fall semester. The team decided to use a group study room in the Lauinger Library that could accommodate groups of 3-6 players with a large, wall-mounted LCD monitor, a table and chairs, and a window that would allow those running a game to observe the players as they navigated the escape room experience.

The team prioritized incoming first-year students as an audience for the escape room, indicating the learning outcomes should focus on foundational research skills. The selected learning outcomes included:

- Build familiarity with library chat and how to ask for help from library staff.
- Learn about available library spaces and services.
- Practice source evaluation using news articles.

The team incorporated activities, props, and other parts of the environment designed to teach or reinforce the learning outcomes within the context of a fictional narrative, branded as *Escape the Hilltop Conspiracy*. The narrative involved following in the footsteps of a missing student journalist who disappeared while investigating a powerful Georgetown alumnus and their possible connection to mysterious and troubling rumors about a secret campus organization. Through the narrative and the resolution of a linear progression of puzzles, players received instruction to:

- Find a book by call number
- Use a non-fiction book's index
- Identify a referenced source
- Know which library floors house specific call number ranges
- Learn about various types of specialized services available within the library
- Think critically about news articles

- Identify categories of “fake” or misleading news

For a step-by-step description of the escape room experience, see the Appendix.

The team sourced a bookshelf, a lamp, and some other items from a surplus office furniture depot maintained by the campus facilities office. Other notable tasks conducted while refining game play included decorating a corkboard with “evidence” drawn from the library’s digital archives (see Figure 3), coordinating with the campus identification office to print a dummy student ID for the missing journalist, constructing an ID scanner, setting up a separate chat queue for escape room players to use to request hints, making a large banner to serve as a backdrop for winning teams, and creating buttons with fun designs as a giveaway to players.

The team ultimately ran the escape room eight times across four events for 37 players. For the first event, the escape room team invited library staff, interested faculty colleagues, and some other campus contacts to test the experience prior to official piloting. After implementing some suggested improvements that emerged from testing, the escape room team hosted two pilot events for students recruited via flyers, social media, and other routine marketing channels. Each event included three possible start times for the escape room. Students could register online for six available slots for each start time. For each of the two pilot events, there was one start time where no one who registered showed up, but librarians still conducted two successful trials at each event. Finally, as a supplementary test, librarians hosted a STEM faculty member’s lab group by request as part of a team-building event.

Throughout implementation of the library escape room pilot, the escape room team captured extensive documentation with the goal of using it to eventually develop guidance for others who wanted to use escape rooms for teaching. The team envisioned creating checklists, decision trees, and other planning tools for developing escape rooms.

Figure 3

Photograph of Escape Room Corkboard Prop



Outcomes

This two-year effort yielded outcomes for a variety of participants, including librarians, faculty instructors, students, and library users.

Phase 1 Outcomes

During Phase 1, two disciplinary faculty instructors revised their courses' content to culminate in final group projects that assigned students to design escape room elements. The escape room team observed primarily positive outcomes from these efforts, captured through standard learning assessment and course evaluation practices and documented in the professors' post-pilot written reflections.

Instructor Perspectives

Dr. Barba reported feeling satisfied with how his revised syllabus supported effective course management and the pace of learning in his Interaction Design course. He perceived no gains or losses in terms of student learning of technical and design skills in comparison with previous iterations of the course. However, he noted some tradeoffs in terms of the level of students' feelings of personal investment (i.e., being told to make a puzzle instead of whatever they wanted) and the amount of professional polish obtained in the final projects. Dr. Barba also described his students as grappling with the concept of abstraction and how to respond effectively to imposed constraints (E. Barba, personal communication, May 20, 2018).

Dr. Pavesich reported benefits from opening his writing seminar as almost "a kind of community event" with the five librarians embedded, as well as an external consultant (a doctoral student and escape room professional) who had one advising session with each student group, sharing pragmatic knowledge with them about how players interact with escape rooms. The course redesign prompted students to engage in highly in-depth conversations about writing for an audience that are crucial for learning concepts in rhetoric; creating the more unusual compositions (e.g., fake historic letters, maps, and digital documents) resulted in students interacting with knowledge and audience with a degree of sophistication not otherwise encountered in a traditional writing course. Dr. Pavesich ultimately felt extremely pleased with the quality of the students' work and the pedagogical design of his revised curriculum, and he discerned that developing "real" projects that could outlive the course itself changed his students' perceptions of the importance and urgency of their work (M. Pavesich, personal communication, May 18, 2018).

Both instructors on the escape room team indicated that the flexibility inherent to the subject matter they teach facilitated successful integration of escape room elements. Interaction design and writing courses both conveyed skills, and learning in these courses was "as much about what students *do* as they were about what students come to *know* or discrete bits of knowledge" (M. Pavesich, personal communication, May 18, 2018). Courses intended to impart

a body of disciplinary knowledge might find incorporating escape room elements more challenging.

Student Perspectives

Both professors reported receiving positive feedback from their students through standard learning assessment and course evaluations that the professors' shared as written reflections with the project team. Dr. Barba stated that, beyond some frustration with puzzles not always functioning as planned, the Interaction Design students were all happy with their work. Dr. Pavesich required his students submit written reflective assessments, asking them to evaluate their teams and the strengths and weaknesses of their final projects. Dr. Pavesich summarized his students' post-assignment reflections as follows:

- Students felt empowered and trusted to work on their own because their instructor asked them to make something with their learning rather than to simply repeat knowledge that they'd acquired in the class in a test or essay.
- Students had fun and valued working with each other in relatively autonomous teams.
- Students reported a sense of pride and accomplishment in their final designs.

(E. Barba, personal communication, May 20, 2018; M. Pavesich, personal communication, May 18, 2018)

Phase 2 Outcomes

Heading into Phase 2, the writing seminar students delivered five different viable narratives to the subject liaison librarians on the escape room team. They in turn adapted one narrative into an operational escape room experience intended to impart foundational research skills and information literacy concepts with mixed results.

Librarian Perspectives

The librarians envisioned the escape room potentially serving as an alternative or supplement to an existing online tutorial mandated for incoming students who subsequently needed to pass a post-test with a score of 75% or higher. The tutorial covered research integrity, basic library catalog searching, and an overview of available library services. After implementing the escape room, the librarians remained interested in pursuing this goal, recognizing in the escape room opportunities related to teaching modality to both accommodate different learning styles and also study the transferability and "stickiness" of learned concepts.

The escape room team noted some logistical observations about running the games. Most player teams needed close to an hour to complete the experience, indicating a need for streamlining to meet the anticipated runtime of 45 minutes. If continuing to market to a wide campus audience, it would work better to use a tool for online scheduling that allowed wait lists.

Generally, those organizing the escape room events would benefit from developing a reservation system that more effectively handled no-shows, which could potentially include a shorter window available for registrations, additional automated reminder emails, mandating individual – as opposed to team – sign-ups, or asking for a small refundable deposit. However, increased incentives to keep escape room appointments are not as relevant to many instructional scenarios where students' attendance could be required. The escape room team also acknowledged that the existing puzzles amounted to prototypes rather than final products; while the puzzles worked effectively in theory, most were too fragile and unreliable for usage by anyone external to the project team, rendering them ill-suited to make widely available as part of the framework. Maker Hub staff members could possibly develop more robust versions, but even with further effort, the current suite of puzzles and props would remain less than ideal for framework purposes. However, the team still maintained that it is possible to develop an escape room experience that functioned as a mobile, easy-to-use kit.

The information literacy escape room pilot established concretely that an appetite for escape rooms (for both fun and instructional purposes) existed on campus, and the team successfully identified additional interested faculty to approach for a potential community of practice or learning community. But, while the escape room definitely worked as a game, the librarians expressed lingering doubts about whether it worked as a teaching tool/environment, particularly given that often players were able to circumvent the intended workflow by skipping over the educational components built into gameplay. Some edits after the first round of testing helped address this problem, but it remained an issue throughout the pilot. More testing, including valid learning assessment, felt necessary.

Escape Room Assessment

The librarians asked all escape room participants to complete a brief online feedback form after each of the four piloting events. They collected 13 responses from a mix of librarians not involved with the project, students, staff, and faculty. The feedback form asked respondents to rate the difficulty level of puzzles and how memorable the specific library concepts incorporated into the escape room were. The form also asked respondents to report on whether their teams used specific elements (i.e., information or props found in the escape room space) to solve puzzles and whether their teams took advantage of the library chat function to ask for hints when they felt stuck. Other questions asked if respondents enjoyed the escape room overall and if they would recommend the experience as a way to learn library concepts.

The librarians examined the feedback we received in combination with our own observations as game monitors. It appeared that players mostly enjoyed the escape room and found the Georgetown-themed storyline especially enriching. All of the puzzles seemed to land in an appropriate midrange, neither “too easy” or “too difficult.” However, even teams who effectively completed the escape room did not use every element intended to help them move

forward. Notably, the more educationally focused props/items (i.e., a book index, an infographic) saw the least use even among successful teams. Further data and testing would be required to make claims about how effectively the escape room met our learning goals.

Generally, our experience did not make a strong case for using this escape room to teach information literacy. The escape room's library concepts were not memorable. Neither positive or negative comments we heard indicated a focus on the learning aspects of the escape room, instead highlighting mechanical issues or the affective experience of the game.

Challenges

Throughout both phases of the project, the escape room team encountered high-level and granular challenges. Achieving true modularity with the puzzles proved elusive, and the puzzles' fragility presented serious issues even in the context of the single escape room developed by the team's librarians. Consequently, the team could not realistically plan on circulating the puzzles as part of the framework in their current form. The team also struggled to achieve the right balance between gameplay and instructional elements in the information literacy escape room.

An ongoing conversation involved the scalability of library support. From the earliest project discussions, team members kept scalability at the forefront, aiming to maximize returns from the inputs of resources and, most importantly, staff time. The idea of the framework itself stemmed from a pragmatic appraisal that a single escape room or even a suite of escape rooms could not serve a sufficient number of students to justify the labor-intensive processes of creating and hosting the events. This pilot required considerable amounts of time and effort from numerous librarians, and continuing this level of embeddedness over time would not be sustainable. However, the pilot allowed the escape room team to build expertise necessary for developing guidance written for disciplinary faculty to walk them through using escape rooms to teach. After another round of intense effort to draft and finalize the framework, the team hoped to eventually transition to a relatively self-service model of supporting educational escape rooms primarily through making guidance and tools available with limited amounts of consultation with users and updating over time.

Space also consistently cropped up as a significant challenge on an urban college campus with a relatively small footprint. Neither the library nor other campus partners could provide a dedicated space for hosting escape rooms, and even making arrangements for temporary pop-up spaces could require careful coordination. This indicated that any future framework guidance will need to include detailed advice to instructors on how to navigate space issues involved with hosting an escape room.

Discussion

If interest in using escape rooms for learning remains strong, then academic libraries could choose to provide a new type of service to instructors in the form of access to supportive resources, such as guidance, equipment, or space. Through direct application, the pilot project helped identify multiple ways to incorporate escape rooms into course content and educational contexts, and it also helped librarians on the team walk in the shoes of this potential new clientele of escape room-using educators. Furthermore, both faculty members on the escape room team also mentioned that the pilot gave them ideas about how to use escape rooms as a research laboratory; escape rooms could support research designed to study teamwork and group dynamics, pedagogy, gamification, learning modalities, and other topics.

For libraries, implementing an escape room-related service could provide opportunities for interesting collaborations, not only with the disciplinary faculty seeking to include escape room elements in their classrooms, but also with other campus partners. For example, centers for teaching and learning may want to coordinate with librarians and faculty on exploring pedagogical considerations. Or librarians could work with student clubs with dovetailing interests (e.g., game design) or local maker communities on sourcing puzzles, props, and more for use in educational escape rooms. Mutually beneficial, reciprocal partnerships allowing for the development and exchange of know-how and materials would enhance the sustainability of such a service.

The results of this pilot reinforced that, as educational environments, escape rooms have unique affordances and drawbacks. Deciding whether distinct subject matter and learning outcomes match with what escape rooms do well requires careful consideration. Librarians consulting with faculty on escape rooms for learning (either one-on-one or via workshop series) across a range of subject areas could develop expertise in recognizing complementary course content.

Based on the pilot and discussions with additional interested faculty who connected with the project through TLISI, the authors developed preliminary ideas on where escape rooms for learning could provide evident advantages. Because of the emphasis on immersion in a specific scenario, instructors (especially those in area or regional studies) might want to use escape rooms when their students would benefit from being tangibly enveloped in a historical event/context or cultural milieu. Before or during intensive group work, instructors could use escape rooms to promote social cohesion in project teams. And instructors could realize the most gains when the solutions to the puzzles integrate closely with the subject matter or learning outcomes (and are enhanced by narrative elements rather than strictly relying on them). For example, puzzles that demonstrate the science of light or sound for an introductory physics course.

While the gamification and active learning associated with escape rooms may promote knowledge/skills retention, escape room narratives combined with strict time limits for game play often deliberately induce stress in players. As one instructor who participated in testing the library escape room remarked, “A stressed-out brain is not ready to learn,” perhaps working against information recall in the long term. However, as discussed previously in the literature review, instructors could potentially offset this effect by combining an escape room with preceding instruction and making it so that solving the puzzles required application of the new information. Thoughtful game design to prevent players from circumventing portions of game play (and associated educational content) also remains important.

In addition to designing services for faculty, academic libraries could also choose to use educational escape rooms themselves to augment conventional library instruction. Does information literacy lend itself to using escape rooms for learning? We feel this is still an open question. The pilot demonstrated mixed to negative results in Phase 2, but the Georgetown University Library escape room focused more on basic library orientation rather than the more holistic dispositions captured in the ACRL Framework. Studies on library escape rooms at other institutions have proven to deliver numerous types of positive outcomes, but the evidence regarding their effectiveness for learning remains inconclusive. More research is needed, and the authors encourage other librarians using escape rooms to teach information literacy to build structured learning assessment into their studies in order to effectively compare escape rooms with other modalities.

Conclusion

The Georgetown escape room pilot project began with significant momentum and enthusiasm but then slowed due to unforeseen external influences. Our team made exciting progress in 2017-2018, leading to in-depth discussions of next steps, further planning, and research into sources of potential additional grant funding in 2019. However, entering a prolonged crisis mode in early 2020 stymied the project. Additionally, in rapid succession, almost all members of the original project team left Georgetown for alternate employers. These staffing changes left the campus’s internal bank of escape room expertise gutted, and those team members remaining found it difficult to regroup, leading to an indefinite pause in this work. In light of an extended period without momentum, Georgetown University Library is unlikely to realize a completed escape room framework in the near-term future.

The arc of the Georgetown project mimicked the broader trend in escape room interest. Google Trends charts the rise and fall in usage of “escape room” as a keyword, which serves as a proxy for tracking the immersive experiences’ history as a hot topic. The data demonstrates slow-building interest through the early aughts with a spike in interest beginning in 2015. Searches hit an explosive peak through 2018-2019 only to drop off significantly in light of the COVID-19 pandemic. (Google Trends, n.d.)

However, while interest in escape rooms and their accompanying rapid growth have perhaps stabilized from the dizzying heights of 2019, they have certainly not disappeared. Escape rooms have evolved into a commonplace fixture of library programming in both public and academic library settings. As library escape rooms move beyond their early adopters, opportunities still remain to further develop and hone sustainable service models related to these gamified educational experiences.

Our pilot project explored different avenues for using escape room elements for learning. Our project's results demonstrated promise in incorporating escape room-based assignments into skills-oriented core courses in two different disciplines, but we encountered significant challenges in attempts to use an escape room to teach foundational library skills and information literacy concepts. We contend that the escape room framework remains a compelling idea that could find a home in academic libraries elsewhere. We encourage interested colleagues to push forward with the concept as part of both novel practice and scholarly research. More than just a fad, escape rooms are worthy of serious attention and would benefit from rigorous assessment to provide evidence of how best to leverage them to achieve positive educational outcomes.

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Appendix

This appendix walks through the ideal game players' experience of *Escape the Hilltop Conspiracy!*, an escape room collaboratively designed by Georgetown University librarians and students to orient incoming first-year students to the library and provide some foundational information literacy concepts. This document captures the road map of how the designers intended for players to flow from one task to the next, although game players' real experiences may have differed.

Welcome

The game was played with a team of 3-6 players. After all team members had arrived and checked in for their reserved start time, a game monitor welcomed them. The monitor then read aloud the following guidelines/instructions (which were also displayed in the game space):

FOLLOW THESE RULES TO ESCAPE!

- 1. Solving the puzzles requires critical thinking and not brute force. Nothing in the room should be pried open or broken apart.*
- 2. The puzzles you will use are fragile, so please treat them gently. Anything in the room meant to open will do so easily.*
- 3. Do not lift or move heavy objects, furniture, or rugs.*
- 4. Do not unplug any cords, and please be careful not to harm the display monitor (no puzzles involve the monitor).*
- 5. Escape will not require crawling or climbing anywhere.*
- 6. No outside knowledge is necessary to escape. Everything you need is already here in the room.*
- 7. Cell phone use is not allowed during the escape room.*
- 8. You will not need to open any additional tabs on the computer. If you accidentally close the tabs, you can reopen them through the bookmarks or by re-launching the browser.*
- 9. Always leave the library chat window open. Throughout the game you may use chat to seek help from a librarian to complete a puzzle. You are limited to three (3) hints, so use them wisely. Part of the game is knowing when to ask for help, so don't waste too much time if you're stuck.*
- 10. You may also use chat to ask for a time check as many times as you need.*
- 11. In case of an emergency, exit the room to speak to a game monitor.*

12. *Please keep the clues, solutions for puzzles, and combinations to yourself so that others can enjoy the game after you.*

Start

When the game players indicated they were ready to begin, the monitor ushered them into the library study room designated as the escape room space. Figure 4 documents the starting arrangement of the space.

As the players entered, the monitor handed them a piece of paper with the phrase “Where is Camila?” on it, and directed them to use the “Chat with Lauinger Library” application (already available on a laptop in the room) to receive further instructions. Their 45-minute time limit did not begin until after they received instructions through the chat.

The participants used the code phrase to initiate the chat, alerting whoever was staffing the primary library chat queue to immediately transfer the session to the escape room queue. The game monitor then used the chat program’s canned responses feature to share a script with the players. So as not to overwhelm the participants, the monitor sent responses in small sections (2-3 sentences), and the monitor allowed time (about 15-20 seconds) for them to read before sending the next section of the script. The script contained the following:

Hello! Welcome to Escape the Hilltop Conspiracy: A Library Escape Room.

Camila Rubio, an intrepid student journalist, has been missing since the end of the last school year. She inexplicably disappeared on Georgetown Day while studying on the second floor of Lauinger Library. Campus police have all but given up on her recovery.

According to her friends, Camila felt determined to investigate mysterious and troubling rumors about a secret campus organization. Whispers about the “Saxa Society” are as old as Georgetown itself, but no one can conclusively prove who belongs to it or even if it truly exists. Before she vanished, Camila suspected that her research into a powerful alum, William H. Wutherford, who attended Georgetown in the 1900s, could shed light on the Saxa Society’s purpose and origins.

Today, while looking for an available group study room, your team has stumbled upon Wutherford’s secret office. In this room, you can follow the clues to uncover the truth hidden in plain sight. But hurry! Someone knows you’re here! If you don’t solve all the puzzles in time, you might be the next to disappear...

Remember, during the game, we ask that you follow the basic rules posted next to the laptop. From this point forward, you will have 45 minutes to solve all the puzzles and escape the room. Oh, and one last thing: I heard a rumor that Camila was fixated on some letters that Wutherford left behind. Good luck! The clock is ticking!

Figure 4*Photographs of Escape Room Mise-en-scène*

Note. The table, chairs, and LCD monitor belonged in the study room. The escape room team provided all other items necessary for the game.

Puzzle 1: Typewriter Lockbox

The chat script primed the players to begin by examining a series of handwritten letters, deliberately aged and distressed to look as though they originated in a bygone era. These prop letters represented correspondence to the Wutherford persona. The first character of each letter's message was written with exaggerated emphasis, and each letter ended with the phrase, "Write me back soon!" When put together, the bolded characters from all five missives formed the code, GTOWN. Players then typed this code using the keys of an antique typewriter, unlocking a connected wooden box.

Puzzle 2: Obtain Book Call Number

Within the first lockbox, players discovered a small bound journal with three entries (journal entries #1, #2, and #5) and two pages missing. A sticky note with distinctly different handwriting adhered to most of the journal entries, creating the impression that the journal belonged to Wutherford and the sticky notes came from Camila Rubio. Table 2 presents a recreation of the handwritten text of the journal entries and the sticky notes alongside planning memos used by the game designers to explain how the text relates to and sets up subsequent game play. The lockbox also contained four carved wooden shapes.

Table 2

Text from Handwritten Escape Room Props

Journal Entry #	Text from William Wutherford's journal	Text from Camila Rubio's sticky note	Game play objectives
1	<i>September 29, 1899. A good start. Worked and wrote letters in the morning. In the afternoon, joined everyone at the library for first official meeting since my recruitment. Directions to the rendezvous are devilishly hard to follow, but luckily J.M. showed me where to go on a map of the building. After business completed, played backgammon with D.F. and E.J.</i>	<i>Library = Saxa Society HQ Look for secret passages Shine a light on a dark path</i>	<ul style="list-style-type: none"> Establish that this is William Wutherford's journal. Draw players' attention to the library map on the wall. Cue players to use black light flashlight on the map once they find it.

- 2 *October 4, 1899. Attended Mass today. I'm learning more about **Christianity** in my classics lessons now, and it's interesting to view **Christianity** not just as the practicing faithful, but also from the perspective of a scholar. Benefits of a **Jesuit** college, I suppose. Tomorrow I visit the Library of Congress with my new colleagues.*
-- W.W.
- No sticky note.
- Mention the word Christianity repeatedly with text highlighted (this provides input for bookcase task).
 - Draw players' attention to the call number guide.
- 3 *January 15, 1900. Picked up a copy of the paper today. I noticed P.D. contributed several articles. I feel perpetually amazed by the power of the press to shape public discourse and opinions. Such a tool in the wrong hands could prove treacherous. Luckily, ours are the right hands...*
-- W.W.
- ~~Monitor Georgetown news coverage~~
Collect articles
Put articles in order - categories?
Think critically!
- Discuss evaluating news as a concept (to prepare for articles task).
 - Include note from Camila that cues players to put articles in the correct order.
- 4 *February 8, 1900. It was one of those fine, warm winter days that feels as though Spring knocks on the door. Strolling around campus on such a morning with the lovely C.T. at my side, one wishes time would stand still in that exact minute forever. Ah, but I will have to settle for finding a copy of the photograph I saw someone take just then.*
-- W.W.
- Check DigitalGeorgetown or [scribbled out]
- Reference the archival photo of the clock and instruct players to look for a specific time.
 - Include note from Camila that cues players to use the keywords from the articles to find the photo in DigitalGeorgetown.
- Time and tide wait for no man.*

*Time is of the essence.
In the right place at the right time.*

5 *March 23, 1900. Involved in important, time-sensitive research. Exhausted. Spent most of the night running up and down stairs at library, bringing books from stacks on every floor to office. Legs like jelly. When plans are finalized, will take an entire day to rest.*

Need to find info on President Johnson (Georgetown alum)

- Contribute to linking the bookcase and map in players' minds.
- Include note from Camila that mentions looking for information about President Johnson.

Both the journal and the wooden shapes paired with other props already openly available in the space. Journal entry #2 highlighted several mentions of Christianity. This connected to a paper located on a bookcase in the game space that presented a list of two-letter Library of Congress subject classifications, including the subclass of BX for Christianity. The wooden shapes were half numbers meant to interact with a mirror laid on top of the typewriter's lockbox. When players arranged the wooden shapes on top of the mirror, the reflection revealed a series of numbers, 8031. Combining BX with 8031 provided the first two parts of the call number for a book on the bookcase by an author with the surname Nelson.

Puzzle 3: Bookcase Model of Library

Figure 5 displays a photograph of the bookcase. It had five shelves. There were a number of books all on the top shelf, including the Nelson book. Five books had bookmarks slipped into them; each bookmark was a promotional piece describing a service area/point-of-interest in the library (e.g. Booth Center for Special Collections, Gelardin New Media Center). The bottom of each shelf bore a label that read "1st," "2nd," and so on rising from bottom to top. The labels were meant to convey to the players that the shelves represented the floors of the library building. There were also labels on the sides of the bookcase that were arrows pointing up, and an "Entrance" sticker was on the 3rd shelf (mimicking the real-life third-floor library entrance). Finally, on the bookcase rested a cipher, an index card with many small holes cut into it in a seemingly random pattern along with a few strategically placed letters to help players align the cipher.

Figure 5*Photograph of the Bookcase Task in Escape Room*

Note. This photo captures how the bookcase looked after players successfully completed the task.

Players had read Journal Entry #5, which mentioned looking for information about U.S. President Lyndon Johnson (a Georgetown alum). Players used the Nelson book's index to find a reference to Johnson on p. 232. On this page, the Nelson book had a footnote referencing p. 23 in one of the other books on the bookcase, one by an author named Fogel. A faint pencil underline drew the players' attention to the footnote. On p. 23 of the Fogel book, players held the cipher against the text to obscure all but the letters peeking out of the holes. These letters

spelled out a message that guided players to put the books in order on the bookcase and on the correct shelves according to the stacks' call number ranges on each floor of the library.

To complete this task successfully required them to consult a library map available in the space. The number of books on each shelf (starting at the bottom and going up) translated into the number required for a five-digit numerical code to unlock lockbox #2. When correctly positioned, only one book on each shelf carried a bookmark.

Puzzle 4: Library Map Code

Players were not yet finished with the library map. On the map, each of the library areas advertised with a bookmark had been marked with a letter in invisible ink. After players used the five numbers resulting from the bookcase task to open lockbox #2, they took possession of two loose journal pages with additional entries (#2 and #3) and a blacklight flashlight. The players used the light to make the letters marked on the map visible. These letters corresponded to the five-letter code needed to open lockbox #3. Similarly to the five-number code needed for lockbox #2, the arrangement of books (bottom to top) on the bookcase also alerted the players to the correct order to use the letters to open lockbox #3. Each bookmark was marked with an abbreviated title for its book in case the players took them out of the books and got them mixed up prior to completing this task.

Puzzle 5: Evaluate Credibility of News Articles

Players started this portion of the game with a collection of five news articles obtained from lockbox #3. The newly acquired journal entry #3 provided somewhat oblique instructions on how to use the articles, which were reinforced by a sticky note on journal entry #3 and an infographic poster about "Categories of Fake News" that appeared twice in the space. Figure 6 provides a detailed view of the infographic poster.

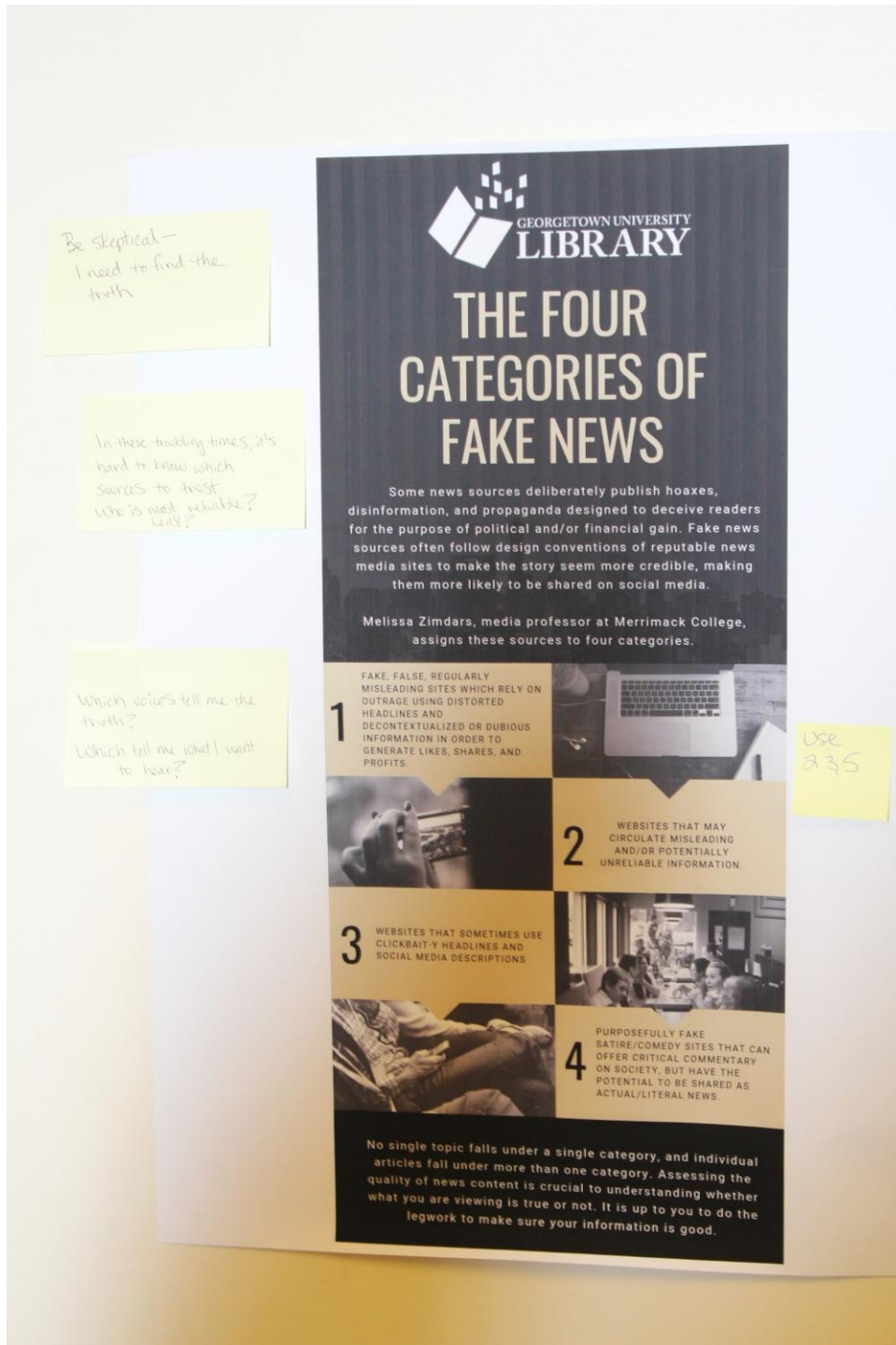
Each article came from a real publication and connected to Georgetown, and in each article, one word was highlighted. The players read the articles so they could decide how to assign them categories (1-5 with five representing an article with no obvious problematic issues) based on the descriptions presented in the infographic. Sticky notes posted throughout the space indicated that players should use the words highlighted in the second and fifth articles – "Healy" and "clock" – as search terms in DigitalGeorgetown, the university's digital repository.

Puzzle 6: Archival Photograph Task

With DigitalGeorgetown already open in a tab on the provided laptop, the players conducted a search using the phrase gained from the articles task. The top search result was a photograph with the famous campus clock tower in the background. In the photograph, Healy Clock displayed a time of 8:35.

Figure 6

Photograph of Categories of Fake News Infographic Poster

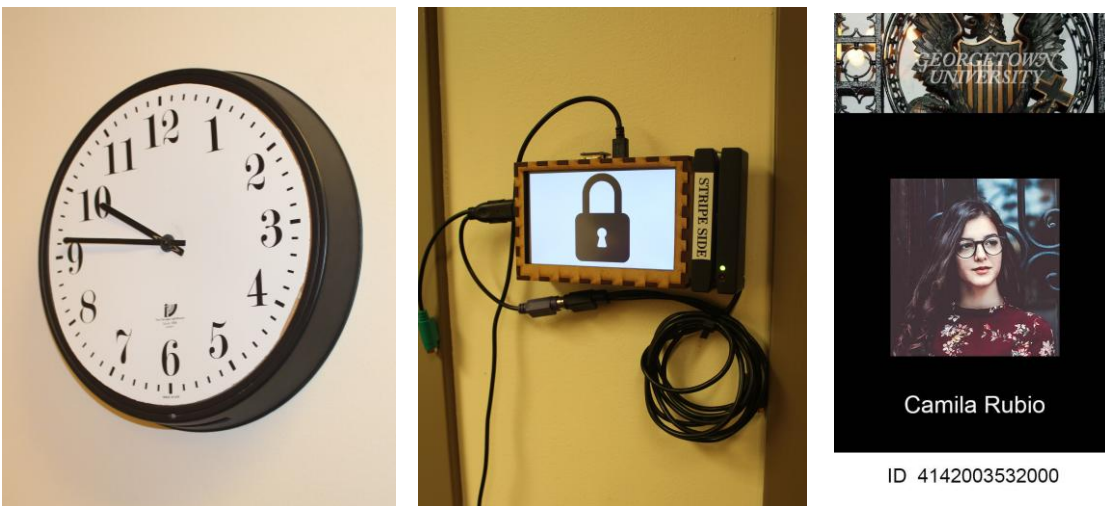


Puzzle 7: Retrieve Hidden Item from Clock

Mounted on the wall in the game space is a clock. When players set the clock's time to match the time presented in the photograph, Camila's student ID drops out of a secret compartment. The players can swipe the card on a card reader mounted to the door to "unlock" it and escape. Figure 7 shows the clock, the card reader, and the imitation Georgetown student ID for Camila.

Figure 7

Additional Escape Room Props



The End

Because the players successfully solved all the puzzles and exited before time ran out, the game monitor read aloud the following message:

Congratulations! Just like Camila Rubio before you, you have impressed the Saxa Society with your cleverness and bravery. And just like Camila (who has become one of our top agents), you are invited to join our fellowship. If you accept, take a pin, and wear it so that all Saxa Society members can recognize you as one of us.

In the event that the players did not win, they would have received an alternate final statement to conclude the escape room narrative:

Unfortunately, before you have a chance to complete your investigation, a shadowy figure emerges from a hidden passage and chases you out of Wutherford's office. By the time you summon help and return to the scene, not a trace of the evidence remains. The Saxa Society will keep its secrets for another day.

Winning teams were invited to take a group photo in front of a thematically appropriate banner, and all players (win or lose) could select custom-made souvenir buttons from a variety of fun designs (see Figure 8).

Figure 8

Photographs of the Escape Room Banner and Souvenir Buttons

