

Board 76: The Great Coffee Hunt: An Augmented Reality Scavenger Hunt

Ms. Kari Kozak, University of Iowa

Kari Kozak is the Head of the Lichtenberger Engineering Library at The University of Iowa. She provides instruction, reference, and consultation services to student, faculty, and staff within the departments and research centers in the College of Engineering as well as the Department of Computer Science. Kari holds bachelor's degrees in Meteorology and Environmental Studies from Iowa State and a master's degree in Library Science from the University of North Carolina – Chapel Hill. Before coming to the University of Iowa in November of 2008, she worked at Texas A & M University as a Science & Engineering Librarian.

The Great Coffee Hunt: An Augmented Reality Scavenger Hunt

Can you really use library resources to learn to make the perfect cup of coffee? Of course. The Lichtenberger Engineering Library at the University of Iowa designed an augmented reality scavenger hunt in which students help a cartoon detective make the perfect cup of coffee while learning about the library's resources in a fun, engaging way.

The scavenger hunt was created using video creation software (GoAnimate), a software app (HP Reveal) and text messaging triggers (SpringShare's LibChat). To begin the scavenger hunt, students downloaded the HP Reveal app and saved the library's text message number in their phones. They then helped the cartoon detective find a book about coffee beans and making the perfect cup of coffee, scanned a new coffee cup on the 3D scanners, searched for an article about optimum coffee temperature, and checked out a thermal imaging camera to monitor the coffee temperature. The last step was to stop by the librarian's office to pick up a travel coffee mug for completing the search.

The hunt was first used during 2018 fall orientation and again at the end of the semester as part of a class assignment. One major lesson learned was that managing 350 students all trying to do the same thing in less than two hours is difficult. Improvements have been made for future scavenger hunts.

This scavenger hunt walked the new students through all parts of the library, informed them of the library's text message number, services and resources, and gave them a chance to have a little fun along the way.

Introduction

The Lichtenberger Engineering Library at the University of Iowa is a small campus library located inside the engineering building. The library serves all six departments within the College of Engineering as well as the Department of Computer Science. There are approximately 2,500 undergraduate students and 400 graduate students in the college, with about 500 first-year students entering each fall.

The Lichtenberger Engineering Library has a variety of unique resources and services that the author hoped to introduce the first-year students to during orientation a few days before classes start in the fall. The library features a second-floor quiet area with over 45,000 physical books, an online collection of close to 3,000 engineering journals, as well as a room with 3D scanners, virtual reality glass, and a Tool Library consisting of close to 225 tools ranging from hand tools to measuring equipment to specialty technology kits. Students are able to check out these tools as needed, with some of the most popular items being digital calipers, thermal camera, 3D scanners, pH sensors, multi-meter and 25-foot tape measure. A more detailed description of a tool library can also be found in Kozak's 2017 paper, "Creating Ideas into Reality: Spaces and Programs that Open Up the Imagination." [1]

In addition to learning about available resources, the librarian also wanted students to be aware of a new text messaging system through which they could ask for help as well as where the librarian's office was located.

The library in the past was part of a larger paper scavenger hunt in which students would learn about all of the resources available through the College of Engineering. This hunt was time consuming, and many students lost interest and did not complete it. The author decided to add a bit more technology and fun to the project. For Fall 2018, it was decided that a small test run of the augmented reality scavenger hunt in the library would conclude the college-wide paper scavenger hunt. This scavenger hunt was voluntary for the 500 incoming engineering students to do the Thursday before classes started. Future plans call for creating a college-wide augmented reality scavenger hunt and to eliminate the paper version.

Literature Review

Scavenger hunts have been created in a variety of formats. For this scavenger hunt, the author decided to add another dimension with augmented reality, which has become especially popular in recent years with Pokémon Go and other augmented reality games.

Augmented reality (AR) has been around for some time in different forms and variations. "AR is a technology combining the virtual environment and the real world. Through this technology the real environment seen by the human eyes is integrated with the virtual information displayed and then human eyes are able to see a more diversified world" [2]. AR applications can play a significant role in the learning environment. It can draw people's attention, create a constructive learning environment for more sensory learning, develop an authentic learning system and provide realistic models [3].

The 2018 NMC Horizon Report dedicated an entire section to mixed reality with an expected time-to-adoption horizon of four to five years. It discussed how it has grown exponentially and is expected to double in the next five years [4].

The implementation of augmented reality in libraries has been diverse. It has been piloted as a way to conduct shelf reading in the bookstacks [5]. In makerspaces, it has been used as a supplement learning tool for robot building [3]. In elementary libraries, AR has been used to integrate student artwork into digital stories [6]. The author's project is similar to the most common uses of AR: flipping library instruction and creating scavenger hunts to increase engagement and allow students to explore the library in real time [2][7][8][9].

Developing the Scavenger Hunt

The first step to designing the augmented reality tour was to choose software and decide on stops along the hunt. The main goal was to set up a good product with little money invested. The software chosen to manage the augmented reality was HP Reveal due to it being easy to use and free. There was no cost to set up the system nor for the students to use it.

The next step was to decide how to create the videos within the hunt. The author decided to use GoAnimate because the library already had a subscription and was using the software for other projects.

Goals for what the author wanted students to learn about the library's services and resources were then determined. Six main areas were identified: finding a book, learning about the 3D scanners, finding an online article, checking out tools, using the library's text messaging service and learning where the librarian's office was.

To make this more fun and interesting, it was decided that the scavenger hunt should help cartoon character Detective Jones make the perfect cup of coffee. Detective Jones also appears in other library projects, so students will encounter her throughout their time at the university.

Because the author wanted to teach about the new text messaging service available through SpringShare LibChat, trigger words were set up throughout the scavenger hunt. A student would text a certain word or phrase and an automated response would give them the answer.

Implementing the Scavenger Hunt

To begin the scavenger hunt, students are handed business cards when they enter the library or the classroom. The back of the business card explains how to install the HP Reveal app, create an account and follow the library's public account. The card also tells the students to save the library's text number in their phone. Students then flip the card over and hold their phone up to the image on the front to hear from Detective Jones and begin the scavenger hunt (see figure 1). Detective Jones explains that she is in desperate need for a cup of coffee and needs help to make it. She wants to learn how to make the perfect cup of coffee and asks the students to find "Uncommon Grounds" by Mark Pendergrast in the bookstacks.



Figure 1: Using HP Reveal with the Business Card



Figure 2: Using HP Reveal in the Bookstacks

The students then click on the image to get to the library catalog and search for the book. They go down to the bookstacks and hold their phone over the shelf, at which point Detective Jones appears to congratulate them on finding the book (see figure 2). She also tells them that her favorite coffee cup has broken and asks them to help her create a new one on the 3D scanners. They are told to text "3D Scanners" to the library text number to find out where they are located.


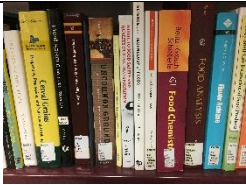

Once they arrive in the Creative Space, where the 3D scanner is located, Detective Jones appears again with a video showing a coffee mug being scanned. She asks the students to find out what

the optimum temperature of the coffee should be according to an article in the database PubMed. The students are to then text the name of the journal, “Burns,” to the library text number.

The text response tells the students that now they know what the temperature of the coffee should be, they should check out the thermal imaging camera from the Tool Library located behind the service desk to make sure the coffee temperature is OK to drink.

At the service desk, students were handed business cards with a photo of the thermal imaging camera. It was decided not to have the student take the real thermal camera in case the camera was checked out when the students were completing the scavenger hunt. The card shows the students a video of the thermal camera in use and provides more information on the back about what else is located behind the service desk, including course reserve books.

The last step of the great coffee hunt is for the students to stop by the librarian’s office to pick up their free coffee mug and get a link to a survey. (see table 1)

Stop	Image	Description	Trigger	Activity
Introduction	 <p>Business Card</p>	Introduce Detective Jones, who asks for helping making a cup of coffee. Learn about the book, “Uncommon Grounds,” in the library stacks.	Tap on screen to get to the Library Catalog.	Search the Library Catalog for the book.
Book Stacks	 <p>Leaning on the Books</p>	Detective Jones explains that her coffee cup is broken and she needs a new one.	Text “3D Scanners” to library text number.	Text and learn where the 3D scanners are located.
3D Scanner	 <p>Video of Scanner</p>	Detective Jones wants to know what the optimal temperature of coffee should be from an article in PubMed.	Tap on screen to link to PubMed.	Search PubMed for “Optimal Temperature” and find it in a journal called “Burns.” Text “Burns” to library text number.



Tool Library	No Image	Once they text "Burns," students get an automated response about checking the temperature with the thermal imaging camera in the Tool Library.	Tap on screen to link to Tool Library	Go to the Service Desk and ask for thermal imaging camera.
Thermal Imaging Camera	 Business Card	Students watch video of the camera showing the coffee at the correct temperature.		Visit librarian's office to be one of the first 150 to get a free coffee mug.
Librarian's Office	 Office Name Plate	Thank you and fill out survey.	Link to survey	Fill out survey.

Table 1: Stops and Actions.

Results

This scavenger hunt was used twice during fall 2018. The first time, during the College of Engineering orientation before classes, approximately 350 first-year engineering students were given the opportunity to complete the scavenger hunt during a two-hour window.

During the orientation, the library had a gate count of 398 people visiting the space, allowing us to estimate that about 350 students participated in the scavenger hunt. Because it was before classes started, a large majority of the visitors to the library were for this scavenger hunt. It sparked a lot of interest, but we learned that the program could be temperamental, and having so many people grouping around the same object was impossible and frustrating to the students. The text messaging required the words texted to be exactly right to get the automatic response.

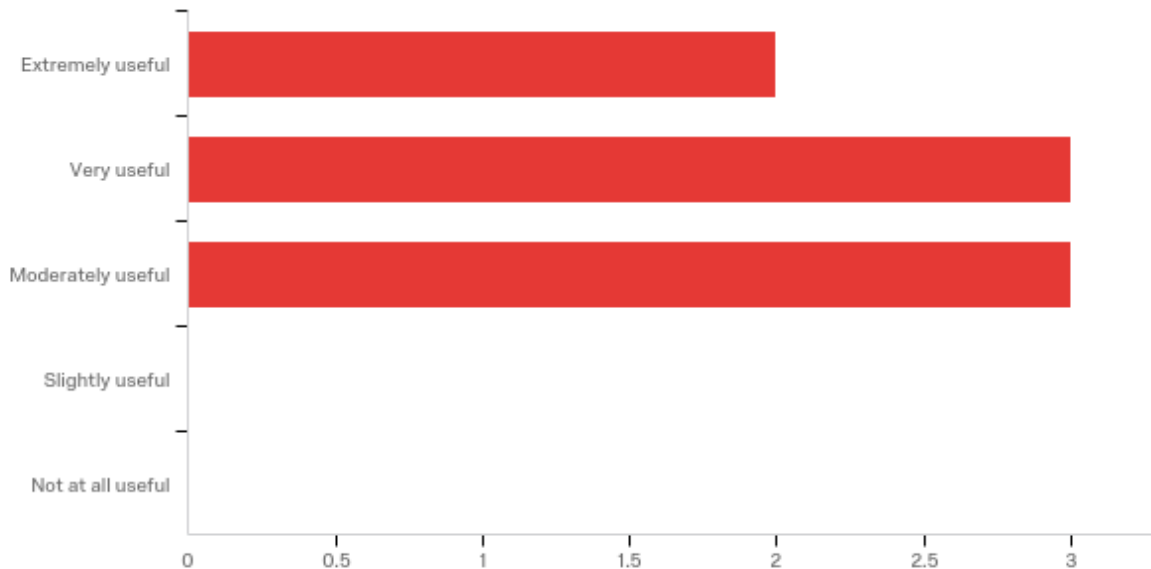
This project did not reduce the need for staff to be involved. There were two staff members whose sole responsibility during the event was to field questions from the texting. They responded to 42 text messages from students who had written in the wrong message and did not get the automated response. Another staff member remained near the book in the stacks because students often wanted to bring the book up to the service desk instead of scanning the area the book was in. The librarian handed out the business cards to start the hunt as well as gave out

coffee mugs to the first 150 students who completed the scavenger hunt. The coffee mugs were gone within the first hour.

Unfortunately, only eight students fill out the survey. The students found the scavenger hunt useful (see figure 1) but there were comments about how the program could be touchy and was hard to complete with so many other people.

One of the best comments was from a student who said it “made me feel welcomed. Thank you!”

Figure 1: How useful was the scavenger hunt?



Changing Technology

One of the biggest issues with the future of this project is the continuing evolution of the technology used. GoAnimate software was bought by Vyond in 2018. The library is currently working with the new company and will continue to make videos through Vyond.

In January 2019, HP Reveal announced that it is completely changing its platform and structure. At the time of this paper, it was still unknown exactly how this will affect the future of these scavenger hunts. The author will be investigating different software packages to see if there is something that is less temperamental and not require students to create accounts in order to use. The new software will hopefully allow for internal usage statistics to determine how long the students stay engaged in the scavenger hunt.

Future Adjustments and Improvements

The project was a great way to engage with new students with approximate 350 students starting the hunt, but there is some room for improvement. The first small adjustment will be to add a

step between finding the journal article and looking for the thermal imaging camera. There was a lot of confusion at this point. Once students got the card for the thermal camera, man asked, “Was that it” and “What do we do next?”

The author is working with the College of Engineering to create a college-wide scavenger hunt based on what worked and what didn’t from this smaller one. The library will be a part of this scavenger hunt.

For the larger scavenger hunt, the first goal will be to make the scavenger hunt less linear. With the current configuration, students need to do step 1 before step 2. The author would like to change this so a student can go on a mission to virtually collect items from places around the building. This would allow students to not all have to be at the same place at once, but to do it at their own pace. It also would add more of a gaming element, such as collecting items for a spell or potion to be revealed once all the items are collected. This will clear up some previous issues, such as multiple students surrounding one object.

Conclusion

Overall, this project seemed to anecdotally be a great success in engaging students. It is hard to tell from statistical analysis due to low survey participation and the inability of HP Reveal to capture analytics.

This project did allow the Lichtenberger Engineering Library at the University of Iowa to get close to 350 students in the library space and to teach about the library’s services in a fun and unique way. The author will take the lessons learned into consideration as this project continues to grow and evolve.

Bibliography

- [1] Kozak, Kari A. “Creating Ideas into Reality: Spaces and Programs that Open Up the Imagination.” Conference Proceedings T421A: Technical Session: The History & Future of Engineering Librarianship. *American Society of Engineering Education Annual Conference*, Columbus, OH, June 2017
- [2] T. Huang, Y. Shu, T. Yeh, & P. Zeng. “Get lost in the library? An innovative application of augmented reality and indoor positioning technologies,” *Electronic Library*, 34(1), 99-115. 2016
- [3] C. Own. “Making without Makerspace, Another Study of Authentic Learning with augmented Reality Technology,” in T. W. Chang & R. H. Kinshuk (Eds.), *Authentic Learning through Advances in Technologies*, pp. 189-201, 2018.
- [4] S. Adams Becker, M. Brown, E. Dahlstrom, A. Davis, K. DePaul, V. Diaz, & J. Pomerantz. “Time-to-Adoption Horizon: Four to Five Years: Mixed Reality,” *Horizon Report 2018 Higher Education Edition*. EDUCAUSE. pp. 46-47, 2018

- [5] B. Brinkman and S. Brinkman. "AR in the Library: A Pilot Study of Multi-Target Acquisitions Usability," in *Proceedings of the IEEE International Symposium on Mixed and Augmented Reality, Adelaide, SA, Australia, October 1-4, 2013*, pp. 241-242.
- [6] L. ChanLin. "Bridging Children's Reading with Augmented Reality Story Library," *Libri*. Vol 68-3, pp. 219-229, 2018
- [7] S. LeMire, S.J. Graves, M. Hawkins, and S. Kailani. "Libr-AR-y Tours: Increasing engagement and scalability of library tours using augmented reality," *College and Undergraduate Libraries*. vol 25-3, pp. 261-279, 2018
- [8] J.F. Santos and S.M. Esposito-Betan. "Advantages and challenges of using augmented reality for library orientations in an academic/research library setting," in *Proceedings of the 38th Annual IATUL Conferences, Bozen, Italy, June 18-22, 2017*. Paper 7.
- [9] Y. Wang, C. Chen, C. Hong, and Y. Tsai. "Interactive Augmented Reality Game for Enhancing Library Instruction in Elementary Schools," in *Proceedings of the IEEE 37th Annual Computer Software and Applications Conference Workshops*, pp. 391-396, 2013.