

Beneficence Augmented-Reality Experience: The Story of Lucina Ball as the 6th Pillar

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Part 1: Evaluation Plan

Research Questions

- Did the prototype look/feel interesting?
- Was the prototype easy to use?
- Does the prototype hold attention?
- How can empirical results (qualitative and quantitative) help to optimize our prototype for implementation?
- What are the strengths and weaknesses of the prototype?

Research Plan

The team will build a prototype that includes both an app landing website (Wix site) and AR (Adobe Aero) to demonstrate the experience of using the app conceptualized. Participants experience a demonstration of the AR app prototype on-site at the Beneficence statue that tells the “hidden story” of Lucina Ball. A short synopsis paragraph will be read outlining the concept at the start of the test. Users will be asked to think aloud and narrate their thoughts as they navigate. Participants will scan a printed QR code to access the app landing website. Upon reaching the AR-experience page of the site, a second phone will be used to demonstrate the “sixth pillar” augmented reality experience. Due to sizing and placement constraints with Adobe Aero, it will be necessary to use a separate phone provided to the user for this portion of the test. The AR pillar functionality of the user’s phone revealing a hidden pillar, an onscreen indicator that the pillar can be interacted with will be explained to the participant, and the content of the story will be accessed via the app landing website prototype.

Prototype Testing

Pre-test questionnaire

On-site test

- Synopsis will be read to participant
- Participants will open web prototype on mobile device using provided QR code
- Participants will navigate the website in a way that makes sense to them
- Once participants reach augmented reality portion of the site, test admin will offer second phone for the participant to demo the AR feature

- Participant will provide on-site feedback regarding the experience that will be recorded.

Pre-test Survey: <https://forms.clickup.com/36126104/f/12efcr-22/GAN2XTXJQ6SJKZBO9V>

Pre-test results + NEW TASK					SHOW CLOSED	
TO DO 5 TASKS						
TELL ME ABOUT YOUR PREVIOUS EXPERIENCE WITH... HAVE YOU USED GAMING APPS THAT HAV... HOW INTERESTED ARE YOU L... DO YOU THINK YOU WOULD USE AN ...						
✓ Joan Shellabarger	I used it on Amazon for a placement of a table.	No	Interested.	Yes		
✓ Nathan Stewart	Pokemon Go	Pokemon Go	Honestly not vary interest...	Maybe		
✓ Elliott DeRose	I used an augmented reality app at an art install...	I have! Pokemon GO.	I would love to learn more...	Totally. I love when classrooms a...		
✓ Dave Anderson	I have used it and created video for it in the past	Yes, pokemon is the most famous	Yes	Absolutely		
✓ Samantha Blankenship	I've used augmented reality a few times.	Pokemon Go.	Very! I love Ball State and ...	Definitely. I think it would be a w...		

Post-test questionnaire

Upon completing the test, users will indicate levels of comfort to statements using a Likert scale to capture sentiments. This portion of the post-test questionnaire will measure whether the prototype was intuitive to use with easy structure and navigation, and whether the idea of telling Ball State stories via AR experiences was of interest. In addition, users will complete some fill-in-the-blank answers that capture feedback on weaknesses with the prototype and ideas for future Participants include Ball State administrative staff, professional-level staff, and students with varying ages, genders, and professions.

Post-test Survey: <https://forms.clickup.com/36126104/f/12efcr-42/3D00MNFZWZB3KA06T5X>

Post-test results

1

+ NEW TASK

SHOW CLOSED

TO DO

5 TASKS

THE HANDLING ...

THE APP'S STRU...

THE NAVIGATIO...

I LIKE THE IDEA ...

THE APP WAS L...

WHAT WEAKNE...

WHAT FUTURE ...

HOW CAN THE ...

✓ Nathan Stewart	Agree	Strongly A...	Agree	Agree	Strongly A...	I didn't get a ...	It would be g...	I think just in...
✓ Elliott DeRose	Strongly A...	Agree	Agree	Strongly A...	Strongly A...	I wish that th...	I can see this ...	I think I have ...
✓ Joan Shellabarger	Agree	Strongly A...	Strong Agr...	Strongly A...	Agree	It was a neat ...	I would like t...	By using ani...
✓ Dave Anderson	Neutral	Neutral	Neutral	Agree	Agree	The fact that ...	Two ideas: fir...	I think if you ...
✓ Samantha Blankenship	Agree	Agree	Neutral	Agree	Strongly A...	I think using ...	I can definitel...	I'd like to see...

+ New task

Part 2: Implement Plan

Participants include Ball State administrative staff, professional-level staff, and students with varying ages, genders, and professions.

- Ball State employees
 - Joan Shellabarger, Administrative Professional
 - Dave Anderson, Account Strategist
 - Samantha Blakenship, Photographer
- Ball State Students
 - Nate Stewart, Undergraduate Student
 - Elliott DeRose, Graduate Student

These participants were chosen as a representative group for our target audience of Ball State students and individuals located in or around the Ball State campus community. Ball State staff may be interested in Ball State history and are on location and could do the experience easily. To include someone from the Muncie community without much connection to Ball State, one participant was a recent hire who was unfamiliar with both the Beneficence statue and the history of the Ball family.

Part 3: Summary of Findings

Affinity Map: <https://bit.ly/3xZ2qXh>

Overview

The group tested the prototype with five people who work or go to school at Ball State. Only one of the testers said they did not have previous experience with AR technology and four of the respondents said the only AR game they had played was Pokemon Go or while online shopping. During testing, the majority of comments indicated the app was neat and the concept was interesting. After testing, none of the users expressed usability issues, however they did have advice for improvements. The majority of the group claimed handling the prototype was intuitive, easy to use, clear and user-friendly, appealing, and informative. They thought our prototype's biggest weakness was in the looks because they wanted more visual content than just a pillar and listening to Lucina's story. One respondent wanted to see an augmented reality person tell the story instead. Then, some testers thought the app had greater potential in its reach and visual elements. Two comments said they would like to see it used across campus or even applied at other historical landmarks across the United States. They wanted either an additional video component or an animated person telling the

story. Lastly, the group thought the project could be more engaging or appealing if there were incentives for using the app, an FAQ application, and more video components or animations.

Overall, the biggest themes found amongst the results were extending our project's reach, building on visuals, and increasing engagement amongst our target audience. Additionally, there was an interest in expanding AR technology at historical locations and in education.

Here is what we learned after evaluating each question:

Pre-test Questionnaire

Pre-test Results: <https://sharing.clickup.com/36126104//h/6-174806343-1/022b164ab4fbb6b>

1. Previous Experience with AR

We learned that the majority of our test group has used some form of AR technology. Only one person said they had no experience, but four respondents said they had either used it for educational, gaming, shopping online, or personal purposes.

2. Previous Experience with gaming AR

The majority of the group said they had played Pokemon Go and two said they had never used AR technology in a game. This was not too surprising given the high traffic rate Pokemon Go had and still has for individuals of varying ages.

3. How interested are you in learning about Ball State's History?

Unsurprisingly, the majority of respondents were either very or moderately interested in learning about Ball State's History because almost all of the respondents work or study at Ball State. Only one of the respondents said they were not very interested, which was surprising because they were our student perspective for the test. This provides some perspective for our project because it tells us that interest may vary across community members, students, staff, etc. In response, we would have to conduct more testing with a larger pool of respondents.

4. Do you think you would use an AR app as an education tool?

None of the testers said they would not use AR tech as an education tool which is surprising since none of our respondents teach, unless they believed it would

benefit their own education endeavors. There were only three respondents who said they would maybe or possibly use the technology as an education tool, so this told us they seemed apprehensive about using the technology.

Post-test Questionnaire

Post-test Results: <https://sharing.clickup.com/36126104//h/6-174806346-1/5bdb6f2738a299>

1. Was using the prototype intuitive?

None of the testers said that handling the prototype was not intuitive. One participant was neutral, three agreed, and one strongly agreed that it was intuitive. This tells us that our prototype starting out was easy to use, but could always use more work. Thinking ahead, this is why we asked for more critiques later on in the questionnaire.

2. & 3. Was the app's structure easy to use and its navigation clear and user-friendly?

None of the testers said that the app's structure was difficult nor hard to navigate. One subject was neutral, two strongly agreed the app was easy to use, two agreed the app was clear and user-friendly. One person was neutral and one agreed the app was easy to use and one strongly agreed the app's navigation was clear and user-friendly. This indicates that our app is well structured, but could use some redesigning of the navigation.

3. & 4. Was the idea of the app appealing and informative?

None of the testers said the app was not appealing nor informative. In fact, the majority strongly agreed that it was appealing and informative. This tells us that our project will hopefully be able to attract users well and produce heightened engagement from those willing to learn about Lucina Ball. Additionally, it means our storytelling angle was well received and will continue to be if we can better support it within the app.

4. Were there any weaknesses found?

The majority of our testing group found visual weaknesses with our prototype. For example, one respondent wanted more of a visual element than just an additional pillar and another wanted to see a person telling Lucina's story. Other concerns were with usability and engagement. One tester wanted a "click here" button for people to start the story themselves and another was worried whether

the app would sustain itself without incentives and another wanted a homepage to allow easier entry into the AR space. This tells us that we may want to animate Benny to tell the story or have a video pop up on the screen that tells the story of Lucina and shows visual elements of her or her impact following her death in the Ball State/Muncie community and think about how to provide easier access to the AR feature.

5. Did you notice any further potential for the app?

There were a lot of critiques in the prototype's reachability and visual potential. One respondent said they would like to see the app used across campus at other statues and historical sites, and another said they would like to see the same technology used at other historical sites across the U.S. Visually, one tester said they would have liked to see an animated person tell the story and another said replacing the listening aspect with a video would be more engaging. Lastly, one respondent commented on the application of the prototype by stating the app could be used on tours for incoming students or increase user interaction through geotag commenting while at the site. This tells us that they see our project being applied beyond just Benny and used for more than just students and visitors; it can be used for advertisement and broad social communications purposes. Additionally, it tells us that we should focus on our visual elements more in the future and work to make the storytelling aspect more engaging for users by incorporating more video or animation features.

6. How can the experience be more engaging or appealing?

There were more critiques for our visual aspects than engagement. Four critiques on engagement were that we needed incentives, to make the app more interactive, add more historical points of interest, and that we should look into capturing the participants in the app with FAQ's. Then, three critiques on our visual features were that we should look into adding more video or photo elements instead of just audio, that it would be cool if the pillars were replaced at some point with a black background and the user had to "reveal" the sixth pillar, and that we should look into combining animation with audio. One really neat response suggested we create a virtual tour guide that appears at pillar and provides directions for users while using the application. This response further tells us that we would need to focus on our visual elements to where the app balances out its audio and visual aspects. Additionally, it may be beneficial to look into how incentives would help extend our reach and engagement levels.

Looking Forward

After looking at the themes and answers to the individual questions, it looks like the prototype would need work on its visual elements above anything else. The users reported the navigation and usability were great, but worried about retaining engagement beyond its initial release. We would also likely need to look into incentives and partnering with organizations on campus who would be able to make this happen. Partnering with Digital Corps or some other entity would help bring our prototype to greater fruition by including the elements suggested by our testers.

Project Team:

Spencer Ozbun:

Prototype website/app design and implementation using Wix, on-site prototype testing, development of QR code, writing, and editing.

Ruthie Grigoletti:

Research and implementation of pillar in Aero, development of pre and post testing forms in ClickUp for the ease of capturing responses and tester feedback, and on-site prototype testing and recording, and editing.

Kellyn Harrison:

Data analysis, affinity mapping, research and testing of 3D software, created pillar in Adobe Photoshop for use in Aero, extensive writing in product results phase, and editing.

Jen Criss:

Research and testing of 3D software, research on Lucina Ball and the Ball family, testing procedures and script, audio recording, on-site prototype testing, transcriptions, writing, and editing

Implementation-oriented: creating a non-linear and interactive narrative or narrative element using existing tools and technologies

Appendix A: Background, Idea & Framing

Our 'Beneficence as a Metaverse Object' project aims to focus Ball State's storytelling on its centerpiece icon: Beneficence. There is much about Ball State University's history that isn't widely known. One of those compelling stories involves Lucina. Surrounding Beneficence are five pillars that represent the five Ball brothers and their

accomplishments in business and education. But what about Lucina? She was actually the eldest and made many of the business decisions in the family - including moving to Indiana. Where is her pillar?

We will focus on augmenting the physical monument through the creation of an interactive augmented-reality experience located at the site. When using their phones or other devices aimed at Beneficence, a sixth pillar would emerge, be visible in 3D on their device, and reveal the stories of Lucina and her contributions. Perhaps it could work similarly to the 19 Crimes wine bottle where the app points to the label and the label comes to life to tell a story. In this case Beneficence could do the talking. The pillar could then be a template for other ways to augment the site and honor other “hidden” stories of Ball State. Our purpose is to educate, inspire, and teach how the statue represents the beneficence and the core values.

This project will further the body of knowledge on digital storytelling by utilizing a University’s marketing and communications to create a ‘Metaverse object’ as its brand centerpoint: both a physical location and digital touchpoint for learning about and exploring the history of Ball State University.

Prototyping/Deliverables Plan

The team will prototype an augmented reality experience for users to interact with. The prototype will show an extra column designated for Lucina Ball so when revealed, users can eventually learn about the Ball sister’s story and involvement with the campus’ origin.

The team will use Adobe Aero to prototype the augmented experience by using a 3D column design the app provides. Ideally, this would be turned into a mobile app, but the team will focus on prototyping and receiving feedback on their product.

The prototype will be presented to about 10 Ball State students/staff members/ visitors or Muncie residents to interact with and provide feedback on in a survey or focus group format.

As a result, we hope to learn about making augmented applications through Adobe Aero and strengthening our design thinking skills.

In order to achieve all this and expand our knowledge on augmented design thinking and prototyping the team will remain faithful to completing the project to the best of our

ability. Discussions about partnering with organizations (such as Digital Corp.) or the campus, following the project, to apply the app and promote more campus interaction was discussed. It depends on the feedback received from our focus group and the success of our prototype.

Evaluation Plan

The goal is to allow our target audience to interact with the monument in ways they've never experienced before. This new engagement has a good chance of succeeding because the monument is such an icon in Ball State's history and even now. The success of this project would include gauging interest in the AR experience and educating people about the unknown history of Ball State's origin.

Our original thought on how this may work for this project (which could change) is that we would develop an augmented experience, most likely using Adobe Aero, featuring a 3D version of additional pillars at Benny's monument. We would also need to conduct additional research and develop biographies for Lucina. Additionally, we will need to ask ourselves a few design and follow up questions before getting started:

1. How will we develop an augmented reality monument? (Adobe Aero?)
2. How will we know users are interacting with the augmented monument? Will we have analytics?
3. What will make people want to interact with the augmented monument?
4. What are the benefits of this participatory narrative?

During the final phases of this project, we will need to test it. The prototype will be used and presented to 10 people, preferably members of our target audience (i.e. Ball State community and Muncie community members). In this presentation, the participants will be asked to interact with and provide feedback in a survey or focus group format.

Gauging Satisfaction with Augmented Benny Monument

1. User completes some interaction with a prototype we create
2. Complete survey and gauge what the users liked and disliked with their experience.

Example questions:

- *Was the prototype easy to use? Why or why not?*

- *How can the experience be more engaging or appealing for further continuous use?*

Lit Review Prep

While the idea of interactive artifacts and landmarks is not new, the idea of bringing this interactive history experience to Ball State and potentially into the metaverse is. Interactive history is becoming more popular in museums, memorials, and monuments all over the world, bringing history and education to people without them having to leave their homes.

Ball State University has a lot of fascinating history behind it; history that too many do not know exists. Bringing this kind of augmented reality experience to Ball State could really make an impact on students, faculty, staff, and the surrounding community. We would seek to discover how this type of experience has been done before and how to implement it here with Benny's monument. Research on other uses of augmented reality would be necessary. We'd explore if other institutions have done anything like this before and how they accomplished it. It is important as well, to research the Ball family, the Ball women's stories, to eventually incorporate it into the augmented experience.

Keywords

- Augmented reality and higher education
- Lucina Ball
- Ball State History
- 3D model development
- Interactive history
- Adobe Aero
- Gamified Learning

Course articles to review

Lee, (2021) [All One Needs to Know about Metaverse](#)

We would refer back to Lee and revisit that information since this article was a deep, deep dive into everything metaverse.

Ball, (2021) The Metaverse Primer - [Virtual Platforms in the Metaverse](#)

Many sections of the Metaverse Primer would be beneficial, but this one specifically goes into the development and operation of these virtual worlds to participate in a wide variety of experiences.

Egliston, B. & Carter, M. (2021). Critical questions for Facebook's virtual reality: data, power, and the metaverse. Internet Policy Review, 10(4)

It might be important to take some of these policy concerns into consideration when thinking about bringing a virtual or augmented reality experience into the public.

Dionosio et al, (2013). 3D Virtual Worlds and the Metaverse

To design and bring a 3D experience into the metaverse, you have to take into the consideration of immersive realism, interoperability, scalability, and access and identity. You have to acknowledge not only what is possible, but what constraints may exist in order to design to overcome those obstacles.

McCormick. (2021) Open the Interface Phase

McCormick speaks to many things in this article, but the sections that might be of use would be the design aspect of how you shape things shapes the experience and also evaluating what sorts of things increases adoption and gets people to use the technology.

Team Members and Justification

Kellyn, Ruthie, Jen, and Spencer make up our four-person team. We've organized our team in the manner of a marketing agency, but more particularly, in the manner of a Marketing and Communications division at Ball State University. An account strategist, digital strategist, creative strategist, and writer make up a cross functional team which is sort of what we are replicating here. Each of us brings a unique skill set that will work to our advantage in this implementation project. The assignments for each of our team members are shown below.

- Kellyn — design, data analytics, writing
- Ruthie — account strategy/project management, account strategist coordinates internal/external resources with external audience
- Jen — creative strategy, writing
- Spencer — digital strategy, Sitecore tree-dweller

Evidence of Brainstorming

1. **Digital twin:** Do we make a digital version of the beneficence monument? It can be something AR viewable at the site.
 - a. Interactive, click a pillar / info on each of the Ball brothers?
 - b. Lucina “6th pillar” (room to do creative things with the digital version)
2. **Scannable App:** Visitors can scan Benny with their phones and it can direct them to an app. The app can be a hub for the multiple features or ideas we list here in the brainstorming section.
3. **Storytelling:** We could share examples of beneficence. Make an interactive incentive story that encourages the user to be beneficent and explains how to be beneficent. The story can transpire over a metaversal application and provide incentives in the form of NFTs.
4. **No one ever mentions Ball sister/Ball women,** some of the surrounding stories that are not told as prominently as they should be. An interactive application would make this storytelling angle more unique to people on and off campus. It shows development in Ball State’s education.
5. **Testimonials:** Interview students, staff, alumni, etc. and ask them what it means to be beneficence and how they are achieving that now. These might take more of an interactive advertisement angle, but it is still something. Visitors can scan Benny with their phones and this video might pop up.
6. **Something about the 7 values:** Those can be large categories of a web presence. The values are listed:
 - a. Excellence
 - b. Innovation
 - c. Courage
 - d. Integrity
 - e. Inclusiveness
 - f. Social Responsibility
 - g. Gratitude
7. **Offering Leadership By Example** [needs description]
8. **Strengthening Our Community**
 - i. As a symbol of growth and academic achievement? This could be applied to how Ball State has acquired the surrounding public K-12 schools. Additionally, how these schools are used as an opportunity for education majors to get real-life experience before

graduation. Building a metaversal object can help further or achieve this initiative Ball State has going. Additionally, with an immersive application, more people can get aware and involved through the application. Applications can include NFTS, Augmented Reality educational applications, or artificial intelligence software.

9. Providing Economic and Social Benefits to our region and state:

- i. Are we viewing this as Benny becoming a greater symbol for economic development within the Muncie and central Indiana area? Is Benny being monetized? Similar to the idea above, this angle would focus more on further monetizing Benny through an NFT or Blockchain asset.

10. History of Beneficence Monument: This can be a storytelling angle as part of a metaversal project.

- i. About the bird woman sculpture
 - 1. Sculpture commissioned 1937
 - 2. Gift from the community to Ball State to recognize the beneficence of the Ball brothers. She symbolizes the generosity of the Ball brothers whose land donation allowed Ball State to succeed.
 - 3. Nickname - Benny
 - 4. Finished in 1937, Beneficence was the last commissioned work of sculptor Daniel Chester French, creator of the Abraham Lincoln statue in the Lincoln Memorial in Washington, DC.
 - 5. <https://www.bsu.edu/map/landmarks/beneficence>

11. Lore of Beneficence: This can be a storytelling aspect of a bigger metaversal application. [Design or Implementation orientated]

- i. If you meet your lover there at midnight and kiss, Benny will flap her wings with approval.
- ii. She is also believed to be the protector of the Ball brother's "urns" on top of each pillar.

12. Research Hub: How and where the idea of beneficence originated, as well as how current metaversal technology is and can express this. Can we pull the original source quotations of the origins of this idea, Kant, Hume, Mill, Smith, etc.? [Evaluation orientated]



Beneficence

Campus Map > Beneficence

Get Directions



Campus Map

Beneficence, affectionately called “Benny,” is Ball State's institutional icon. She symbolizes the generosity of the five Ball brothers whose land donation to the State of Indiana allowed Ball State to flourish. Following Ball State's outdoor graduation ceremony, it is a tradition for students and families to have their pictures taken with Benny. Finished in 1937, Beneficence was the last commissioned work of sculptor Daniel Chester French, creator of the Abraham Lincoln statue in the Lincoln Memorial in Washington, DC.



- a. “Idea” of beneficence pre-dates the monument

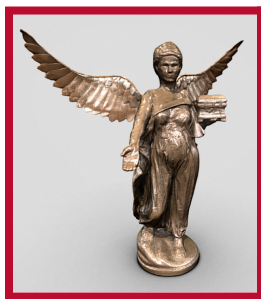
13. Photo Gallery ?

14. **Mixed reality** Students can interact with a virtual or augmented classroom through an avatar or their holographic self. Physical/Digital campus [Design orientated]

15. **NFT**: turning Benny into an NFT, so Ball State students can use it to receive access to events or perks. Access to events can include athletic games, speaker events, LateNite, extra curricular clubs. The Benny NFT design can shift according to what event it is for. This could be a mix of design and implementation. We might even be able to partner with Digital Corps because they usually implement and advertise the campus-wide applications. [Implementation orientated]

16. **VR**: build the campus and surrounding muncie area into a virtual landscape. Users can run around and complete tasks per Benny’s request. They can customize their avatar and build onto the landscape as they see fit. Basically they can add onto the campus or muncie area with new buildings, monuments, cultural spaces, etc. It allows the user to virtually explore and develop a greater community or campus. There may even be other users who can join the space and interact with the world you have built. Benny may want you to build connections or develop your skills per the values we listed above. [MinecraftxBallStatexFortnite??] [Design orientated]

17. **Web 3 avatar / navigation, Metaverse** not 'all in one place', benefits of having a Ball State account, Metaversal way to validate education achievements, excellence? [Design Orientated]
18. **Virtual Self-identification:** Some sort of 'virtual self-identification' is a potential area for further reaser, where the users have the power to build a comprehensive, self-created profile and then choose what to share with external parties. I would like to discuss how users could be incentivized to create persistent, accurate profiles of themselves and choose what/how much personal information to provide companies/platforms.This would make a great project for the last part of the course!
19. **Educational Institution Wallet/Blockchain:** How about we own our own information, carry it in 'wallets' and share it with companies if we want to? Should someone do a design thinking exercise on how a single wallet/profile/account/avatar that user builds and owns could be the interface of web3? That would be a very interesting final project for the course!
20. **Gamified AR Map:** A map similar to SnapChat's can be made of the Ball State or surrounding Muncie area. Benny can guide them throughout the area by taking them to discover historical/cultural places. Once they reach these places, they can receive an incentive and learn more about the location through a brief video or description. Once they reach the end, Benny will take them to her home spot and provide an overall story of her history and what she continues to do for Muncie or Central Indiana students and residents. There will be a huge prize at the end, too. [Design or Implementation orientated]
21. **AR Benny:** Creating an augmented reality Benny in Adobe Aero that when she does any action, it will provide the history of Ball State as proposed above. It may even be able to link to external content such as a website or an NFT. [Implementation orientated] 3D Model



22. **Educational Tool:** build an applicable educational tool that allows students to interact with one another as an avatar across multiple applications under Ball

State's my.bsu.edu page. Similar to Microsoft Teams, students will be able to interact "in-person" with one another over multiple applications including AdvisorTrac, Canvas, Zoom, Microsoft Outlook, Microsoft One Drive, Degree Works, etc. [Design orientated]

23. **Universal communication platform for students:** Similar for Slack and Discord, Ball State students can have access to one communication platform to spread over all other applications used in the institution. That way, there is only one form of web communication (minus texting and calling) instead of Microsoft Outlook, Webex, Zoom, Slack, Canvas email, etc.

Appendix B: Annotated Bibliography

Getting Started with Adobe Aero. (n.d.). Retrieved April 7, 2022, from <https://www.youtube.com/watch?v=AyZPHZwBYIc&t=257s>

J. Stephen Lee is a graphic designer and educator who teaches Interactive/Experience Design at Portland State University and is skilled in UX/UI, motion graphics, animation, augmented and virtual reality, and projection mapping.

Getting Started with Adobe Aero is a YouTube video that offers viewers an overview of Adobe Aero and demonstrates to users how to use it. Lee shows how to create a new design with Adobe Aero's assets and triggers using the beta version on a desktop. Lee develops a scenario with Adobe Aero's starter assets and then previews it on his smartphone.

Because our project falls under the category of "implementation," We will be using Adobe Aero to develop our prototype. This source will be useful to our team because one of the primary components of our project is to create an AR experience at Beneficence where users will utilize Adobe Aero to add a sixth column representing Lucina Ball.

This source varies from others because it shows how to use and the features of Adobe Aero by giving an overview tutorial people can see and possibly replicate in tandem with on their own computer. Yet, it relates to our other source, "*Welcome to Aero User Guide*," because it provides context and direction in how to use the design application. This source just provides a visual aid where the user guide does not.

Klopfer, E., & Squire, K. (2008). Environmental Detectives—The Development of an Augmented Reality Platform for Environmental Simulations. *Educational Technology Research and Development*, 56(2), 203–228. <http://www.jstor.org/stable/25619918>

Klopfer and Squire are researchers through the University of North Texas and have written several research articles together pertaining to augmented reality and its impact on various professional landscapes, specifically education. They have written articles on

how augmented reality influences cognitive thinking in learning and how real-life scenarios (augmented reality) are important in developing skills for children.

Klopfer and Squire review augmented reality applications for both education and entertainment purposes. They describe their process in creating a development platform for prototyping augmented reality games, learner-centered software, and contemporary game design methodologies. During which, Klopfer and Squire learn how location-aware field guides provide new relationship opportunities by using spatial data, and how using a prototyping method in their development process allows the team to create a software design platform focused on optimizing development paths and creating reusable digital content. That way, the application allows the platform to be responsive to user's needs instead solely on the developer's vision. In the end, they identify how environment-focused games play a critical role in augmented reality games by creating an emotional resonance to the space through application of the students' prior knowledge of the location. Lastly, their results reminded them that determining how the game is played is not only the game mechanics, but the game-play practices the user uses.

This article is useful because we intend to turn a historical landmark into an educational opportunity for local students, staff, and visiting alumni. This article specifically talks about how the environment provides an opportunity for greater connection between the user and the location being augmented through the user's prior knowledge and connection to the site. There is an opportunity for greater entertainment at the location instead of mere lore and symbolism. Additionally, the article serves as an example of why prototyping is important for developing a user-focused game. It takes into consideration the user's usability needs. Lastly, it provided some tips, such as how the user will make the game their own through user-specific game-play practices, so leaving the door open for creativity will provide the most agency instead of specific directions detailing a path the users must take when using the app.

This source compares to others pertaining to augmented reality by diving into developer's successful usage of specific spaces for augmented reality applications. Most articles look at the social aspect or general development characteristics of augmented reality-focused applications. This article specifically details their prototyping methods and how the type of environment holds a significant impact on their results.

Verhulst, I., Woods, A., Whittaker, L., Bennett, J., & Dalton, P. (2021). Do VR and AR versions of an immersive cultural experience engender different user experiences? *Computers in Human Behavior*, 125, 106951. <https://doi.org/10.1016/j.chb.2021.106951>

Isabelle Verhulst is a psychology and marketing researcher at Royal Holloway, University of London researching creating presence in augmented reality at [StoryFutures](#), part of the Arts and Humanities Research Council.

Verhulst et. al measure cognitive, emotional, and behavioral engagement among three AR / VR devices (Oculus Quest VR, Magic Leap AR, Mira Prism AR). The researchers found cognitive engagement and emotional engagement similar among the devices, and behavioral engagement high on all devices. Findings of the research show “that both VR and AR can be effective immersive storytelling tools in a cultural institution. [...] in line with earlier research suggesting that both VR and AR can create positive user experiences, in cultural and other settings.”

This source is useful in determining measures of cognitive engagement through questions based on relevant narrative questions, emotional engagement through level of agreement with certain statements, and behavioral engagement by asking for agreement with intention statements.

This source relates to our other most relevant sources by providing analysis and method of measuring differences in engagement across AR and VR hardware devices. This source contains examples of affinity narrative, affinity, and intention statements that can be used to measure our prototype with users.

Vincent, K. M. (2020, July 9). *Lucina Amelia Ball – a professional woman ahead of the Times*. Minnetrista. Retrieved April 10, 2022, from [Minnetrista Blog](#)

K. Vincent is a committed blog writer for Minnetrista’s website. Vincent has written many stories about the history of Ball State, Muncie, and the Ball family. Their knowledge of the campus and surrounding area is extensive in their writing and the amount they have written for the website. Minnetrista serves as a culture hub for Muncie because of the historical landmarks it holds (several of the Ball family’s homes) and the ‘museum’ exhibits it provides for visitors to explore.

In the article it states Lucina recommended in a letter sent in 1892 that the brothers “... get up a ‘syndicate’ to buy a whole square and build it all equally good, and so make your own surroundings.” They followed her advice and bought a 33-acre plot of land along the White River. Lucina not only counseled her brothers, but also Anthony J. Drexel, the founder of the Institute of Art, Science, and Industry (now Drexel University). Drexel recognized the significance of Lucina’s advice and gave her a position as the Institute’s first secretary. Lucina’s family praised her for her commitment and leadership. She worked at the Institute for the following ten years until resigning due to health issues. This source outlines the influence that Lucina had and her commitment and leadership skills.

Despite being similar to other blog posts on the website, the source is different from academic research accounts because it is a historical account of the Ball family’s upbringing and upstart of the university. It is more personable and can serve as an example of what our information in the prototype sounds like. Additionally, it can directly influence the information we provide regarding Lucina’s story.

Welcome to the Aero User Guide. Helpx.adobe.com. (2022). Retrieved 7 April 2022, from <https://helpx.adobe.com/aero/user-guide.html>.

Adobe is known to be an ideal application for workplace development of creative projects. Adobe has created applications such as the Creative Cloud for easy storage and the development of creative projects. As an additional asset to the cloud, Adobe added on Aero in order to turn 3D designs into augmented reality experiences.

With the user guide, developers are able to learn how to format digital assets for augmented reality; import, design, export, and share augmented reality assets; use Aero on desktop and Android; and gain inspiration for new projects. The user guide's introduction itself provides important information on 3D modeling concepts, in-app learning resources, and common AR terminologies.

This source will help our project by working as a hub of information just in case we need help getting started, need inspiration, or have some questions that need answered regarding the program. Since we will be making the augmented reality prototype on our desktop, looking under the desktop tab, and using "workspace basics" might be beneficial when starting out. Then, going to the export and share tab will be helpful in making sure our prototype exports to its highest quality and up to the expectations of the designers. This source is different than the video because it is a quick access area with all the information you need just in case there is an issue and a quick/easy fix is applicable. Whereas the video gives a visual step-by-step explanation, the user guide provides more context and direction for developers.

Explanation

The five sources above were chosen as the most relevant because each points to various critical pieces of our project. The first piece of the puzzle is the subject - the important background and history of Lucina Ball and her sometimes overlooked contributions to Ball State University. Incorporated are sources on the use of augmented reality and its importance in the academic environment and how it enhances the user experience. The list includes research methodology for measuring our prototype for user cognitive, emotional, and behavioral engagement before entering the focus group stage. These highlighted sources discuss ways to incorporate and implement augmented reality in marketing and cultural heritage settings, and the software used (Blender and/or Aero) to make it all come together. Many components are required to implement a project that features AR storytelling, and these sources touch on many (but certainly not all) of the critical pieces of this complex puzzle.