Edutainment Attraction: Project Proposal and Lit Review

Joshua Galang, Davina Wooley
jgalang3@gatech.edu, davinawooley@gatech.edu
Georgia Institute of Technology

Abstract: Most of the edutainment attractions at Walt Disney World's EPCOT are slow moving and outdated and are not gaining significant traction to the parks. By creating more modern attractions that are accessible and educational to family members of all ages more families will choose to attend the educational EPCOT theme parks. EPCOT theme park is considered by many experts and enthusiasts alike to be the innovative epicenter in the world or Edutainment Attractions. However; many of their attractions are outdated and unmemorable. EPCOT, The Experimental Prototype Community of Tomorrow, was created and opened by The Walt Disney Company in 1982 to create a human innovation and World-Fair-inspired theme park that exhibits innovative advancements and experiences relating to the fields of science, technology, and the arts. Today EPCOT attractions primarily explore space travel, world culture, and underwater attractions. EPCOT has two sections; Future World and World Showcase. Future World exhibits human innovation in the fields of science and technology, and the World Showcase is a World-Fair-themed attraction representing various cultures and architecture styles around the world. Our edutainment attraction will work well in the Land Pavilion in EPCOT, and it will improve upon some of the strengths and shortcomings of various EPCOT attractions. By innovatively pairing different technologies, and creating interactive, immersive, ever-changing, and current edutainment rides, park visitors will be more open to visiting the EPCOT Park as they will be able to learn and apply skills as they have fun and novel experiences.

Strengths and Weaknesses of Research and Related Technologies

It is interesting to obtain records of theme park attractions - in particular the statistics of various attractions. We decided to categorize various edutaining ride types, based on the experiences they provide and the technology each ride uses.

The Omnimover dark ride is a traditional slow-moving attraction commonly found in theme parks - think Disneyland's Haunted Mansion. Utilizing a single track and slow consistent speed, guests are ferried through ride scenes in the dark on this system which was introduced in 1964 at the New York World's Fair. Traditional EPCOT attractions - which were constructed in the 1980s - use this technology, ferrying visitors slowly through themed rooms to teach. While a simple attraction with high accessibility due to low speed and notable ride capacity of over 2000 guests per hour, the Omnimover is rapidly aging and less exciting, with breakdowns becoming more frequent Omnimover attractions also demand a large space to fit show scenes that tell the story. To enhance show scenes, the use of audio-animatronics and catchy tunes were added. These figures provide dialogue and bring life to the story. In addition, interactivity has been introduced in the form of simple shooting rides such as Buzz Lightyear's Space Ranger spin, where users aim at targets within the scenes to score points. In addition, a retired EPCOT attraction entitled Horizons gave riders the option of selecting their ride's ending, where a video screen would load in front of the ride vehicle to play the presented ending.

Motion simulator rides provide a cost-effective ride experience of sealing riders into a box and providing immersive visuals through the use of screens and interactive elements. Corresponding to the video screen, the actuated box pitches and tilts, giving the sensation of movement and forces. While considered less immersive than traditional omnimover dark rides, it is very easy to customize ride sequences with videos and motion sequences. There is no physical track, riders are limited by height and health conditions, while the possibility of interactivity can exist. This

corresponding EPCOT attraction is 2003's Mission: SPACE, a flight simulator that uses centrifuges and space capsules to give riders the sensation and forces of a flight to Mars, complete with roles assigned to each crew member. At different sections of the flight, each crew member has to press their buttons as they illuminate to trigger different sequences. If there is no rider there to press buttons, the sequences are then triggered on timer instead, with the same outcome for each ride. A modern version of this motion simulator cockpit attraction can be found in a nearby attraction, 2019's Millennium Falcon: Smuggler's Run. This experience is far more interactive by adding even more interactive elements in flying a spaceship, including the ability to fail missions. On Smuggler's Run, riders are given specific roles in the cockpit, complete with buttons and levers to push, swing, and pull. This massive amount of freedom requires a massive amount of rendering power, as the spaceship can swerve and collide with obstacles and shoot projectiles. Smuggler's Run also carries consequences that follow after the ride experience, where a good flight is rewarded with triumphant music and a bad flight results in flickering lights and a sparking cockpit.

High speed thrill rides, such as Disney's 1999 attraction Test Track, are fast-paced educational experiences that provide a lesson in rapid visual storytelling. Park visitors enter the Chevrolet-sponsored attraction as amateur car designers who can create their own vehicles while waiting in line, then can test their creations along a digital track in a gamified scoring experience with four major disciplines: Capability, Responsiveness, Power, and Efficiency. As a massive slot car attraction, Test Track can speed up to 64 miles per hour while winding around digital roads, curves, and a large outdoor section that wraps around the building, combining interactive design with thrills. However, as a thrill ride, Test Track is also subject to height requirements and a lowered ride capacity. In addition, high speed thrill rides require large tracts of land - Test Track takes up 150,000 square feet of space.

Trackless dark rides are the next generation of omnimover attractions. Controlled by computers instead of limited to a single track, ride vehicles can now swerve, spin, and wiggle free around show scenes. Introduced in 2000, this technology allows for immersive scenery while also straying from a preset path, allowing for a more unpredictable experience. Modern iterations of this ride have combined trackless vehicles with other elements of a high speed thrill ride and motion simulator, such as Star Wars: Rise of the Resistance, a 2020 trackless attraction at the Disneyland park in California as well as Hollywood Studios in Florida. While providing this thrilling varied experience - complete with 65 animatronics - trackless attractions are plagued by downtime from the sheer complicated symphony of dozens of ride elements working in sync throughout the massive ride and riders do not have so much of an interactive element.

The final interactive attraction is the gamified ride experience, such as Universal's Men in Black: Alien Attack! Or Hollywood Studios' Toy Story Mania. In these experiences, guests are loaded onto a ride vehicle and equipped with a projectile shooter, flinging them straight into a target shooting experience. Guests are told to aim at various targets which can either be animatronics, figurines, or projected on screens. The modular nature of this attraction means that various game elements can easily be swapped out as new levels can be added or removed. Rider vehicles are tightly controlled through the use of networked computers. There is no height limit and a high ride capacity of 1900 people per hour, requiring smaller space. Despite these, the use of screens may be off-putting to those craving a more immersive and more educational experience.

These various ride technologies have been introduced throughout the years and will aid our team in developing a modern, reliable attraction that not only remains exciting, but also includes interactivity and teaching moments along the way. The statistics of each ride type are enumerated below.

5 Storytelling Interactive Attractions

Ride Type	Top Speed mph	Accessibility (height)	Interactivity/ Novelty	Reliability (breakdowns from 2016-2018)	Capacity p/h	Space sq ft	Year Opened

Omnimover	1.24	None	Moderate	15	2000	109,000	1982
Motion Simulators	35, 2.5Gs	40”-44”	High	<15	1600	45,000	1987, 2019
High Speed Thrill	64.5	40”	Moderate	<15	1200	150,000	1999
Trackless	Varying	40”	Low	New, 3.6/day	1500	160,000	2000, 2020
Game Ride	Varying	None	High	16	1900	70,000	2008

Design Context and Learning Audience

1. Participants will be visitors to an educational theme park similar to Walt Disney World’s EPCOT, where themes of science and technology combine with attractions and experiences around the world to inspire youth in the future.

2. Participants will not be required to possess background knowledge of the attraction’s educational material and will therefore need to be presented with learning material beforehand

3. Participants will need to get in the mindset of the attraction through themed instructional preshows.

4. Participants will not be required to possess background knowledge of the attraction’s educational material and will therefore need to be presented with learning material beforehand

While brainstorming the design context for our project, we took ride technology into consideration based on factors such as speed, height requirements, breakdowns, square footage, and ride capacity, as well as the manufacturing year. Amusement park ride technology is crucial to us in determining which systems are readily available to create an interactive experience for a wide variety of amusement park visitors. What we discovered is that there are tradeoffs and benefits for each ride type.

A more reliable ride can be deemed more boring or less accessible to the entire family, more thrilling rides and experiences face reduced capacity, and scenery based attractions can take up huge swaths of land but can create an incredibly immersive experience beyond any screen. Our learning audience consists of individuals of all ages and backgrounds, ranging from families to strangers. Taking this into account, we need to accommodate those with no previous existing knowledge of the subject material and making the ride accessible to this learning audience - and make this ride enjoyable and unique for re-ridability. Given this and the various types of theme park attraction types, our team has decided to begin with the concept of an interactive game ride that is fun for families and highly interactive, while also adding the immersive scenery of dark rides to solidify concepts and make them tangible. Finally, for another interactive element, the ride will be varied and random so that visitors will want to ride again and again and test out different location combinations. Keeping in line with EPCOT’s dedication to teach about futuristic technologies and immersive experiences, our experience will be educational and dedicated to programming a tour of the world’s ecosystems with a sense of urgency. In order to vary ride experiences, visitors will also be given a different outcome depending on ride performance.

To develop and iterate this attraction, we intend on using Imagineering techniques in order to create a cohesive themed land and an attraction with engaging experiences and characters, using the Imagineering in a Box sponsored process on Khan Academy.

Learning Goals and Design Context

Learning Goals

Overall our goal is to create a ride that will assist participants in learning core critical thinking skills. Participants will be presented with a mission and will need to utilize the tools available to them to successfully complete the mission. Participants will receive feedback in the form of pain points or success whether or not their design decision was effective.

This attraction was designed to teach and develop core skills to individuals of all ages and offer randomized and varied missions that will teach participants the effect that each decision has within environments. This activity mirrors the iterative process that many engineers must undergo as they design and test their concepts. This activity helps teach users to draw connections between the physical environment needs, what design features will be effective in certain environments, and how to use the tools at your disposal to successfully accomplish your goals.

1. Participants will be able to articulate their understanding regarding the relationship that environmental factors and mission requirements play in making informed design decisions that yield successful end results.

2. Participants will be able to reflect and analyze their design decisions and actions across various experiences or design possibilities to determine why certain decisions lead to the experienced results.

3. Participants will understand the complexity of designing technical solutions given constraints and environmental conditions. They will be able to recognize the necessary problem-solving skills required that they see exhibited by their favorite characters and idols.

4. Participants will be able to build upon and apply their knowledge and mental models to think critically and design effective solutions given certain goals and constraints.

Design Context

The before mentioned Learning Goals apply to the Design Context in a variety of ways. The first design goal, regarding participant comprehension, applies to the design context because we are developing an immersive experience that will provide educational value to all individuals that choose to ride. Regardless of a participant's age, education, or experiences, or levels of expertise all participants will learn something upon the conclusion of the ride. Our attraction will allow participants to develop design decisions given an objective and the ride itself will test their logic in a fun and interactive way. Throughout the experience, participants will gain subliminal feedback regarding the effectiveness of certain choices given various objectives or environments. Users will test their designs in a fun way and depending on how successful their results are upon the completion of the ride they will draw conclusions during the ride and recognize how they could have made more informed decisions. Participants will discuss the ride upon its completion, they will be able to share what they've learned with others.

The second design goal, regarding participant reflection and analysis, applies to the design context as participants will naturally analyze their decisions throughout the ride and following the ride's completion. They will think about the effective and ineffective design choices that they made. Participants will understand why certain results occurred and this will allow them to make more informed decisions moving forward. The level of analysis will depend on the user's interest and attention regarding the experience and the user's age. Likely, a young child will not draw as many conclusions as an individual in their 20's or 30's. Some design impacts will be more obvious and other more subtle and will require more thought. This will provide value to the user depending on their level of understanding and they will each get value from their problem-solving skills.

The third design goal, regarding participant synthesis, applies to the participants gaining an understanding of the many contingencies and factors that they must take into account to develop viable solutions. They will also need to make design trade-offs as you can not implement every design feature possible. By assessing their own experience, thought process, and shortcomings or success they will gain an appreciation of the expertise needed in industry. This can be understood through the context of a character that portrays completing this task, or industry examples. Regardless of the participant's background, by allowing participants to test theories and assumptions they will learn about what does and does not work. They will gain insight regarding their assumptions and the various experiences will allow participants to understand the role that choices influence results and their needed features during the game.

The fourth, and final design goal, regarding applying knowledge to design context to accomplish a goal, will assist users in their lives. Any life experiences gained and various levels of reasoning skills can assist a group gain success in their mission. Regardless of whether or not this is a participant's first time experiencing a ride or their twentieth through randomization participants will be able to continue to gain insight relating to how different features or decisions influence the outcome of the game. Reusing features can assist users in isolating the impact that certain features have. Re-riding this game will teach important iteration techniques as the design features between missions can overlap. Participants can apply knowledge gained from outlet personal experience or from riding the attraction. Both will allow participants to iterate, adjust their mental models, and ideally improve their likelihood of success. This design is also accessible to individuals of all ages,

riders can track their process and cognitive evolution as it pertains to how they approach missions from different ages or life stages.

References

[1] A. Chen and G. Russon, “Epcot's Frozen Ever After ride leads Disney list for most evacuation calls,” *orlandosentinel.com*, 23-Aug-2018. [Online]. Available: https://www.orlandosentinel.com/business/tourism/os-bz-s4-ride-evacs-disney-20180816-story.html. [Accessed: 27-Oct-2020].

[2] A. T. Lam, J. Ma, C. Barr, S. A. Lee, A. K. White, K. Yu, and I. H. Riedel-Kruse, “First-hand, immersive full-body experiences with living cells through interactive museum exhibits,” *Nature News*, 02-Oct-2019. [Online]. Available: https://www.nature.com/articles/s41587-019-0272-2. [Accessed: 27-Oct-2020].

[3] C. Wisel February 12, “Disney Epcot Guide: Everything You Need to Know About Visiting,” *Travel + Leisure*, 12-Feb-2019. [Online]. Available: https://www.travelandleisure.com/trip-ideas/disney-vacations/disney-epcot-orlando-guide. [Accessed: 27-Oct-2020].

[4] “Hourly Capacity Numbers,” *WDW Theme Parks*, 04-Mar-2020. [Online]. Available: https://wdwthemeparks.com/hourly-capacity-numbers/. [Accessed: 27-Oct-2020].

[5] K. Antlej, M. Mortimer, Robert Leen, M. Allaman, P. Vickers-Rich, and T. Rich, “Mixed Reality for Museum Experiences: A Co-Creative Tactile-immersive Virtual Coloring Serious Game,” *2018 3rd Digital Heritage International Congress (DigitalHERITAGE)*, 2018.

[6] L. J. Prosperi, B. McLain, and J. Surrell, *The Imagineering Process: Using the Disney Theme Park Design Process to Bring Your Creative Ideas to Life*, vol. 2. Theme Park Press, 2018.

[7] M. Guzdial and A. E. Tew, “Imagineering inauthentic legitimate peripheral participation: an instructional design approach for motivating computing education,” *Imagineering inauthentic legitimate peripheral participation | Proceedings of the second international workshop on Computing education research*, 01-Sep-2006. [Online]. Available: https://dl.acm.org/doi/abs/10.1145/1151588.1151597. [Accessed: 27-Oct-2020].

[8] P. Weishar, “Themed experience education: Study notes,” *InPark Magazine*, 22-Oct-2019. [Online]. Available: http://www.inparkmagazine.com/themed-experience-education-study-notes/. [Accessed: 27-Oct-2020].

[9] “Parks & Destinations,” *Walt Disney World Resort Destinations*. [Online]. Available: https://disneyworld.disney.go.com/destinations/. [Accessed: 27-Oct-2020].

[10] R. J. Chenail, “When Disney meets the research park: Metaphors and models for engineering an online learning community of tomorrow,” 2004.

[11] Teach Secondary Magazine, “An educational theme park trip? Absolutely!: Outdoor Learning,” *Teach Secondary*, 20-Apr-2016. [Online]. Available: https://www.teachsecondary.com/outdoor-learning/view/an-educational-theme-park-trip-absolutely. [Accessed: 27-Oct-2020].