A study on technological change and content change to enhance customer experience in theme parks

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Abstract

Recently, theme parks are attempting various technological and content changes to give customers a new experience. The most representative technological change is actively introducing Virtual Reality, Augmented Reality and Mixed Reality technologies. Also, in terms of content, transition from standalone rides to immersive storytelling models and applying the game to the theme park interactive design elements are in progress. This paper examines the technological and content changes of the theme park, analyzes the impact of this change on the customer's experience, and suggests how the theme park will accommodate these changes.

Keywords: *Theme park, Virtual Reality, Augmented Reality, Mixed Reality, Customer's Experience, Game*

1. Introduction

By digital leisure enjoying leisure in the virtual world has emerged as a new leisure trend as the recent development of technology, a new future leisure culture space based on digital technology contents is attracting attention. In particular, many theme parks, which are representative facilities of out-of-home (OOH) entertainment, are also applying new technologies and customer experiences to theme park attractions.

With the rapid development of technology, a sense of presence that do not exist in reality, immersion in content and user-centered active content

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consumption are possible, and the core technologies to realize this are visual virtualization technologies such as Augmented Reality (AR), Virtual Reality (VR), and Mixed Reality (MR).

Virtual reality and augmented reality are already actively used in theme parks, and are used internally as design tools or used in attractions to maximize customer experience.

Also, with the rise of game culture, a new era of immersive entertainment is opening. In particular, advanced technology and game elements are integrated into popular fantasy play spaces such as rides and attractions in theme parks to deliver new experiences to customers(Richard Yao, 2019).

The purpose of this study is to investigate the current state of application of technologies such as virtual reality, augmented reality, and mixed reality that are used in various attractions in theme parks, as well as the trend of customer experience elements, and how to use them in future theme park design. The research method is based on domestic and international academic literature, various research reports, press releases, etc., and analyzes the technology introduced in the theme park (augmented reality, virtual reality, mixed reality, etc.) and customer experience trends of theme park attractions, and review actual application examples. Through this, we are trying to derive development plans that can contribute to improving the satisfaction of theme park customers and expanding the profitability of the theme park.

2. Theme park and theme park attractions

Out-Of-Home (OOH) entertainment is a major component of the leisure industry, and its representative facilities can be referred to as theme and amusement parks. According to the latest statistics from IAAPA, theme parks and amusement parks around the world entertain more than 1.15 billion people and generate revenues of $40.4 billion(Richard Yao, 2019).

In 1955, Disneyland introduced new themes, programs, facilities, and operating methods different from existing amusement parks, and opened the era of theme parks in earnest as an amusement space with complex functions. Since then, as various theme parks subdivided by theme and content appeared, theme parks are evolving into complex spaces that can function not only as a leisure space, but also for entertainment, education, and relaxation.

Theme park attraction, called 'ride' or 'play equipment', which is the most important factor in expanding the attraction capacity, guest price, and revisit rate of a theme park, provides a variety of experiences that visitors feel.

Types of 'rides' include 'dark ride', which rides a vehicle in an indoor space and passes through various sets, 'animal attraction' with the theme of animals, and 'production attractions' with a movie or broadcast in the background and 'thrill ride' with fast-moving. Ride systems include tracked ride with rail and trackless ride without rail. In addition, there are water ride using water or a waterway, roller coaster and flat ride, which can be found in many amusement parks, and show attraction using video(David Younger, 2016).

Recently, attractions that combine dark rides and show attractions using virtual reality or augmented reality technology have been introduced. These attractions utilize trackless ride or a robot arm used in the manufacturing industry as a system.

3. Visual virtualization technology applied to theme park attractions

3.1 Virtual Reality theme park attractions

Virtual Reality (VR) completely excludes the visual information provided from the real environment and enables an immersive, realistic experience in a new virtual world built through 3D computer graphics. Artificial visual and auditory information is provided through the HMD (Head Mounted Display) device, and a more realistic user experience is possible by performing human/computer interaction in a virtual environment using the mounted sensor.

Virtual reality technology is used in two main forms in theme parks. First, when designing theme parks and attractions, in the past it was planned on a 2D plane, but recently, it can be designed in three dimensions in advance using virtual reality technology. Second, it is used to create VR attractions to maximize the visitor's experience, and is made with VR ride, arena style VR game, or VR simulator(Kenneth Chi Ho Kim, 2017).

VR Coaster among VR Rides is an attraction where you can experience virtual reality by linking with real tracks by by wearing an HMD on a roller coaster. Six Flags, an american theme park famous for its VR coaster, achieved great success in 2017 as a virtual reality roller coaster called 'The New Revolution' that attached Samsung's Gear VR to the roller coaster. LEGOLAND Florida Resort's The Great LEGO Race also lets riders surf waves and soar over cliffs with a headset. In Korea, Everland has opened 'Robot VR', an attraction using a robot arm.

The reason why Samsung Gear VR (because it is a mobile-based HMD) is commonly used in VR roller coasters is that it does not require a computer like Oculus Rift, is excellent in performance, and can minimize cyber-sickness.

Figure 1 Six Flags: North America's First VR Roller Coaster (source:
https://news.samsung.com/global/six-flags-and-samsung-partner-to-la
unch-first-virtual-reality-roller-coasters-in-north-america)

Figure 2 The Great LEGO Race from LEGOLAND
(source: https://tripcarte.asia/blog/2020/09/06/legoland/)

Arena style VR games are being introduced more often at Location Based Center (LBC) or Family Entertainment Center (FEC), which are small entertainment facilities such as Sega Joypolis and Disney Quest, rather than theme parks. LBC operates various virtual facilities such as roller coasters, car races, and boats so that you can experience them in a narrow space. As a representative example, 'The Void', which is called the world's first VR theme park, carries and experiences an HMD headset, backpack, and plastic rifle.

Finally, VR Simulator is an attraction of this type of 'Derren Brown's Ghost Train Experience' of Thorpe Park in England. Everland's 'VR Adventure' is an attraction where you can virtually experience the rides while sitting in a 40-seat simulation chair.

Figure 3 DC SUPER HEROES Drop of Doom VR
(source:
https://www.dailynews.com/2018/03/26/six-flags-magic-mo
untains-drop-of-doom-adds-new-dc-super-heroes-vr-experi
ence/)

In the new DC SUPER HEROES Drop of Doom VR at Six Flags Magic Mountain in California, USA, users wear a virtual reality headset and become Wonder Woman fighting Superman or Super Villain Lex Luther on the world's fastest and tallest drop tower ride.

Six Flags' three new Superman virtual reality coasters allow users to sit down and put on a headset to immerse themselves in Metropolis, a 360-degree comic book world.

3.2 Augmented Reality theme park attractions

Augmented reality is a technology derived from a field of virtual reality and refers to a technology that combines the real world and virtual experiences. In virtual reality, all environments are created as virtual environments through a computer to interact with users, but augmented reality can provide an improved sense of reality by interacting with virtual objects based on the real world. According to Digi-Capital, a market research firm, the augmented reality market is expected to grow to USD 120 billion in 2020, and it has announced that it will spread rapidly, especially in games and entertainment(Nara Shin, 2016).

Disney prefers AR over VR in attraction parks, because AR can enhance the experience of traditional tourist attractions, while VR limits the experience of visitors with families in the park.

On the other hand, Universal is introducing both VR and AR as an immersive technology for expanding customer experience. Including the VR game hall, Universal is updating the park and integrating AR games into the field experience with the release of AR mobile games themed around Harry Potter(Carlos Flavián, 2019). Visitors experience "magic" such as swinging a magic wand to flip books and unlock keys in a fantastic world powered by IR reflective technology.

Figure 4 Harry Potter and the Forbidden Journey™ attractions at Universal Studios (source: https://www.usj.co.jp/)

3.3 Mixed Reality theme park attractions

If virtual reality is a digital environment that blocks the real world, and augmented reality is an environment in which virtual information is added to the real world, mixed reality is defined as a new environment in which information from the real world and the virtual world are combined by combining virtual reality and augmented reality(Kenneth Chi Ho Kim, 2017). In other words, it combines the advantages of augmented reality that

interacts with only necessary virtual information based on reality information and the advantages of virtual reality that can deliver a great sense of immersion.

Mixed reality attractions in theme parks have been operating since many years ago. An attraction that expresses a mixture of 3D images and a real set can also be called a mixed reality attraction.

Universal's 'The Wizarding World of Harry Potter', first opened in 2010, is a mixed reality ride attraction using a robot arm, and 'Pirates of the Caribbean: Battle for the Sunken Treasure', which opened in Shanghai Disneyland in 2016, is also a mixed reality dark ride.

Figure 5 Universal's Mixed Reality Attractions,
'The Wizarding World of Harry Potter'
(source: https://www.usj.co.jp/)

4. Customer experience in a theme park

The advent of virtual reality, augmented reality and mixed reality technologies is creating a new environment in which physical and virtual objects are integrated at different levels, and as a result, the customer experience environment is evolving into a new type of hybrid experience. In other words, by categorizing technologies based on technical (implementation), psychological (existence) and behavioral (interaction) perspectives, not only can you support or enhance the customer experience, but you can also create new experiences along the customer journey(Raet al., 2015).

Accordingly, the recent theme park attraction model is changing from an existing standalone ride to an immersive storytelling model, and in particular, the story and interactivity of game contents are becoming an important means to lead the immersion of visitors in a digital theme park(Raet al., 2015).

4.1 Transition from standalone rides to immersive storytelling models

Recently, the theme park attraction model is shifting to a model that prioritizes immersive storytelling over standalone rides. Theme park entrepreneurs, borrowing elements from video games and interactive theaters, are pushing the limits of what external entertainment experiences are and how they can be extended.

In addition to creating a new theme park specializing in virtual reality, there are also attempts to create new value by incorporating virtual reality into existing facilities. It is a great advantage in that users can enjoy the familiar play that has existed and experience a unique experience through new storytelling, and the operator can reduce costs and avoid the risk of large-scale new investments through the use of existing facilities.

In the case of Star Wars: Galaxy's Edge, newly opened by Disney, which is currently at the forefront of the theme park business, when entering the town of Black Spire Outpost, visitors will be completely immersed in a fantastic environment and feel like a character in the Star Wars universe. Visitors can craft their own lightsaber and engage in battles aboard the Millennium Falcon, surrounded by the sights, sounds and masses of the Star Wars world.

Figure 6 Star Wars: Galaxy's Edge based
on Disneyland Park movie
(source:
https://disneyparks.disney.go.com/blog/2017/0
8/the-voids-new-hyper-reality-experience-star-
wars-secrets-of-the-empire-coming-to-downto
wn-disney-disney-springs/)

The Guardians of the Galaxy: Cosmic Rewind roller coaster, a Marvel-themed attraction that will enter EPCOT, Florida's second theme park, will immerse the audience into the movie.

Storytelling is important when creating a virtual reality experience center using existing facilities. It can be said that the core value of the virtual reality experience field is not just providing an environment called virtual reality, but what kind of story to show attractively.

Figure 7 Theme Park EPCOT, Guardians of
the Galaxy Real Vehicle
(source:
https://disneyparks.disney.go.com/blog/2017/05/
meet-the-collector-at-guardians-of-the-galaxy-mi
ssion-breakout-coming-to-disney-california-adve
nture-park-may-27/)

The Guardians of the Galaxy attraction, currently under construction in Epcot, Florida, is designed as a 'storytelling coaster' and features an innovative vehicle that rotates to optimize passenger positioning for the show scene. It is expected that more interactive charms and experiences can be seen through narratives that support and improve overall immersion.
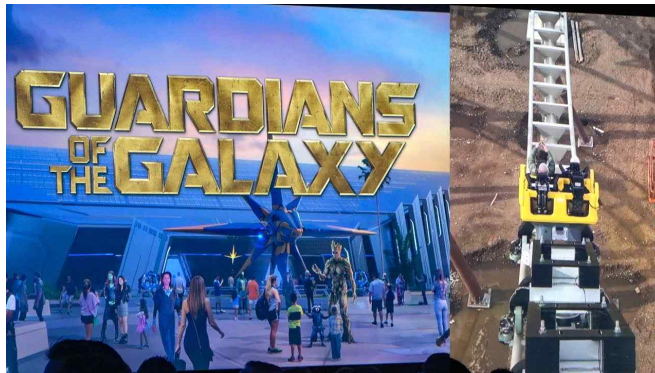

Figure 8 Guardians of the Galaxy Roller Coaster
SNEAK PEEK Walt Disney World Epcot (source:
https://www.youtube.com/watch?v=JZyJ71MKshA)

4.2 Applying the game to the theme park interactive design elements

The recent trend of video games being applied to interactive design elements of theme parks reflects the important cultural power that games

have achieved over the past decade. In particular, the popularity of augmented reality games following the success of Pokemon Go is reshaping consumer experiences for entertainment outside the home. In other words, the consumer's game experience is moving out of the controlled game environment of the existing limited space, and is expanding the realm of existence or interaction based on technology.

Accordingly, theme parks are providing customer experiences through interactions experienced in games by introducing game elements to rides and attractions as a new way to encourage audience participation. BumpArcade, an immersive bumper car of C. and S., a bumper car manufacturer of a famous theme park, projected an image of a rider driving to score points to make a bumper car into a game. This interactive ride does not contain a story, but it tries to make the theme park experience more gamified and provide a personalized experience through interaction.
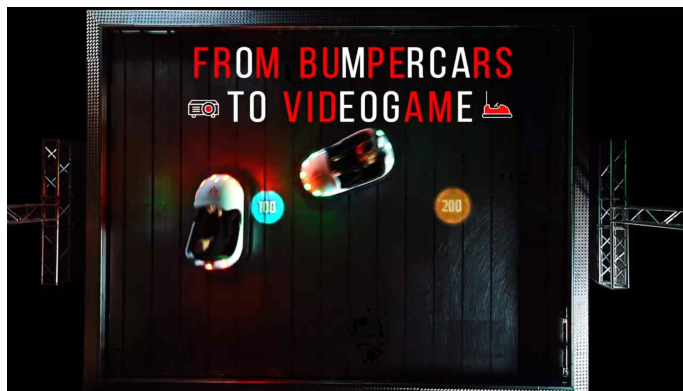

Figure 9 BumpArcade providing an immersive gaming experience (source: https://www.candsrides.biz/en/product/bumparcade/)

Universal Studios Japan's Super Nintendo World is itself an immersive game. Visitors can become players and compete with other players, and by touching blocks, they can collect virtual coins. Visitors can also record coins and scores obtained by wearing a band called 'Power Band' and connecting it to a smartphone app. In particular, the video game-themed Mario Kart: Koopa's Challenge is a ride-type attraction where visitors can actually experience Mario Kart, while wearing a headset and watching other characters or course videos in augmented reality (AR), earning coins and throwing items.

Figure 10 Universal Studios Japan's "Super Nintendo World" (https://www.usj.co.jp/kr/)

5. Conclusion

Theme parks are spaces with specific themes and stories, and are composed of various technical and non-technical elements to provide visitors with extraordinary and fantastic experiences. Based on the results of research and analysis on experiential elements that are currently applied to theme park attractions, technical implementation for immersion and fun, psychological presence and interaction behavior elements, new experiences are delivered to customers through future theme park design.

For the technical elements of virtual reality, augmented reality, and mixed reality that are being applied for customer immersion, many experts say that virtual reality is not suitable as a technology to be used for theme park attractions, and mixed reality is more scalable than virtual reality and augmented reality in theme parks in the future.

In particular, the development of attractions in theme parks in which movie and game-based storytelling elements and technologies are appropriately applied will improve customer satisfaction and contribute to the expansion of the theme park's profitability. In addition, even if it doesn't cost a lot, the way to provide attractive services by giving new value to

existing facilities depends on storytelling. Accordingly, the game can be said to be the optimal content that can satisfy the customer experience pursued by the theme park.

In the entertainment field, the use of technology is only an auxiliary means, and it is storytelling that attracts users after all. Therefore, depending on how storytelling-based content is incorporated into virtual reality devices and existing facilities, users experience new pleasures that they have not experienced before.

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