AUGMENTED REALITY: INTEGRATING DESIGN THINKING AND USER CENTERED STRATEGIES TO CREATE AN EFFECTIVE DIGITAL SPORTING EXPERIENCE

A CREATIVE PROJECT

SUBMITTED TO THE GRADUATE SCHOOL

IN PARTIAL FULFILLMENT OF THE REQUIREMENTS

FOR THE DEGREE

MASTER OF ARTS

BY

PARKER SWARTZ

DR. ADAM J. KUBAN - ADVISOR

BALL STATE UNIVERSITY

MUNCIE, INDIANA

DECEMBER 2020
ACKNOWLEDGMENTS

I would like to acknowledge the people that supported me throughout my academic career. First of all, I want to thank God. It is through his grace that all things are done. He is my strength and my shield.

I also want to acknowledge my family and girlfriend. I would not be where I am today without their love and support. They challenge me to chase my dreams and to never settle for anything but my best.

Finally, I would like to acknowledge my committee members: Dr. Adam J. Kuban (Chair), Dr. Jennifer Palilonis and Dr. Tim Huang. Thank you for your dedication to my academic success and for all your support over the years.
# Table of Contents

- Introduction ........................................................................................................... 4
- Literature Review .................................................................................................. 6
  - Augmented Reality .............................................................................................. 6
  - Sports Marketing ................................................................................................. 10
  - Design Thinking + User Experience Design ...................................................... 14
- Methods .................................................................................................................. 16
  - Focus Group ....................................................................................................... 17
  - Survey .................................................................................................................. 18
  - Participant Recruitment ...................................................................................... 19
  - Focus Group/Ideation Session Procedure ......................................................... 20
  - Survey Procedure ............................................................................................... 24
- Results .................................................................................................................... 27
  - Augmented Reality Prototype ............................................................................ 33
- Discussion .............................................................................................................. 38
  - Augmented Reality Prototype and User-Experience Design ............................ 40
- Future Research .................................................................................................... 41
- Limitations ............................................................................................................. 42
- Conclusion ............................................................................................................. 43
- References ............................................................................................................ 44
- Appendix ............................................................................................................... 52
Introduction

Sports fans want to interact with their teams/sports in as many unique ways as possible to feel immersed in the action and engaged as a fan (Bashford, 2017). Fans want to know the players on a personal level, feel like they are at the stadium during a game, and use technology to get in on all the action. New technologies like virtual reality, augmented reality, and advanced smartphones are paving the way for sports fans to have access to the ultimate fan experiences at the click of a button.

ISPO, the world’s leading sports network, states that, “thanks to the passion of millions of sports fans around the globe and the advances in technology, fan engagement with AR (augmented reality) emerges as one of the most promising segments within the sports tech industry” (2019, para. 1).

AR is an “experience that utilizes a camera to change or enhance the user’s view of the world. AR experiences are a new way to create context and add experiences over physical world objects and attributes like location or a recognized image or object” (Borst, 2019, para. 2). AR technology is now included in all of the latest smart-phone and tablet software, which provides a ready audience for marketers who wish to make AR products and experiences successful.

“The mobile-first era has ushered in new forms of storytelling, and marketers are increasingly expressing interest in the possibilities that AR technology can provide to break through the clutter and engage with consumers in truly organic ways that drive engagement and affinity” (Borst, 2019, para. 2).

The MLB and NBA are both diving into this new technology in an effort to increase fan engagement with AR games, stadium tours, and real-time statistics (Joehnig, 2018). These leagues are bringing sports fans closer to the game than ever before with immersive experiences. However, there is little being done with AR in sports like gymnastics, lacrosse, and volleyball that have less money and media coverage, fewer stadiums, and no widely successful brand identities (Biddiscombe, 2018). These sports and brands don’t have the established platforms to launch this innovative technology. After
researching many databases such as Business Source Complete, Academic Source Premier, and EBSCOhost, there appears to be little to no strategic process that guides marketers for grassroots sports campaigns toward creating user-centered AR experiences. The implementation of design thinking strategies to create more personalized, user-centered products is growing in the field of marketing for some of the world’s most innovative companies such as IBM (Clark & Smith, 2008). Although design thinking strategies are being adopted by many of today’s innovators, including Apple, Volkswagen, and Coca-Cola (Tran, 2018), there were no documented cases of how design thinking strategies may be used to inspire development of AR products specifically designed to enhance a grassroots sports marketing campaign.

To address these concerns, this creative project seeks to integrate design thinking methods into the creation of a unique AR sporting experience. This AR experience will be added to a grassroots sports marketing campaign with an original sports documentary at the center. The documentary focuses on the growth of boys’ and men’s volleyball in the United States, which is driven by a grassroots effort to provide more athletic opportunities for young male athletes.

As such, this creative project makes the following contributions:

- provides strategic guidance for marketers who wish to incorporate augmented reality into grassroots sports marketing campaigns;
- highlights the value of design thinking methods as a tool for the development of audience-centered content.
Literature Review

This study strives to understand the connections among the four areas depicted in Figure 1 and show how they can work together to create effective augmented reality products. In order to make those contributions, this project needed to discuss the fundamentals and synthesize prior research surrounding augmented reality, augmented reality’s advertising effectiveness, sports marketing, augmented reality in sports, design thinking, and user-experience design.

Figure 1a

*Integrating Design Thinking Methods into Augmented Reality Development for Sports*

This map shows the relationship and flow between the researcher’s four main areas of study: a specific sport (in this case volleyball), sports marketing, design thinking, and augmented reality.

Augmented Reality

The term “augmented reality” was first coined in 1990 by Boeing scientists who were creating an augmented reality program for aircraft electricians (Caudell & Mizell, 1992). They integrated virtual graphics onto the physical work environment to help increase the efficiency of cable assembly for the
This technology was first used for industrial purposes, but it is highly applicable to so much more in today’s technologically driven society. Mobile augmented reality (MAR) (see Appendix) apps play on “the awareness of time, position, and user state context and dynamically overlay digital information on the natural environment, enhancing the interaction with space, natural or structured” (Markouzis & Fessakis, 2016). MAR technology is expanding the potential of augmented reality in our lives (Dirin & Laine, 2018). New MAR content development tools and software development kits are now built into most Google and Apple phones, which is allowing more programmers and companies to easily use this technology (Dirin & Laine, 2018).

Augmented reality technology can be image-based and/or location-based. Image-based displays graphics on the physical environment that it is present with. An example of image-based augmented reality is the National Football League’s yellow first-down line that appears on their broadcasts (Fong, Caswell, & Barton, 2016). This line is not painted on the field or a laser on the sideline, rather it is virtually displayed on the broadcast as an image that interacts with the football field and game-play (Fong, Caswell, & Barton, 2016). Location-based projects the graphics based on a specific location that the user is attempting to use the augmented reality feature in (Chen & Tsai, 2012). An example of location-based augmented reality is Pokémon GO, which is a mobile gaming app that uses mobile location services to track your movement and display images into your surrounding area (Chamary, 2018). The fact that augmented reality is no longer technology that only the technologically elite have access to is opening up augmented reality solutions in many fields of work such as medicine, construction, teaching, sports, and so much more. The modern MAR kits and tools are giving people without programming skills the ability to design and create augmented reality programs (Dirin & Laine, 2018).

**AR Advertising Effectiveness**

The creation of more augmented reality products is allowing markers to witness its effectiveness
in professional studies. Augmented reality has a “significant impact on the audience’s visual and emotional levels of engagement” with the material being presented, which is highly valued in our current saturated content market (Jensen, 2013, p. 2). Augmented reality can engage people on levels that static pictures or videos cannot. In a study conducted on smartphone users in the United Kingdom, it found that augmented reality drives “higher levels of visual attention in the brain” and has “70% higher” memory encoding compared to normal ads (Andrew, 2018, para. 25). People can use this technology to interact directly with brands and engage more of their senses according to the Interactive Advertising Bureau (2019). With location-based augmented reality, people get to interact with their physical surroundings by combining physical movement, touch, and sight to interact with the product (Interactive Advertising Bureau, 2019). Augmented reality also has the ability to give out more information than static ads. This makes these ads more personalized and has thus been seen to lead to stimulated engagement and increase in sales (Sweta, 2019). Due to the success of this technology, the global retail market for augmented reality and virtual reality is projected to be at “USD 1.6 billion by 2025” (Bellini, 2016). Studies also show that augmented reality experiences increase “retention and consideration among consumers” (Interactive Advertising Bureau, 2019). The time spent is “opt-in and full-screen,” which gives consumers an immersive, physical, and direct interaction that creates more repeat users (Interactive Advertising Bureau, 2019). That time can be more cognitively impactful than any passive advertisements that a consumer might encounter (Interactive Advertising Bureau, 2019).

In a more recent application, augmented reality displayed its effectiveness in 2015 when Snapchat introduced their “Snap Lenses” (Interactive Advertising Bureau, 2019). These lenses allowed people to project graphics onto their faces that transformed their appearance. Snapchat users flocked to this new technology and in its first year, 30 million snapchats used the augmented reality lenses (Interactive Advertising Bureau, 2019).
However, augmented reality is still relatively new, and there is a lack of information about best practices within these integrated marketing campaigns (Scholz and Smith, 2016). Augmented reality components of marketing campaigns have shown to sometimes be “poor at communicating and engaging audiences at an information level” (Jensen, 2013). This could be due to augmented reality’s tendency to be used in a very visual and interactive way, such as gaming apps like *Pokémon GO* and *Zombies, Run!* which depend heavily on entertainment and visual stimulation (Chamary, 2018). Despite this, augmented reality technology has very high potential for providing in-depth information (Jensen, 2013).

The sports industry is catching onto the effectiveness of augmented reality, and major networks such as Fox and ESPN are already incorporating this into more and more of their sports broadcasts and promotional material with overlaying graphics on television and mobile gaming apps because they are seeing more engagement, which means more revenue (Scholz & Smith, 2016). The sports broadcasting market is already projected to earn “USD 78.5 billion in revenues by 2021 in the North American region alone” (Joshi, 2019, para. 7). Augmented reality can support that projection will be a valuable piece of these media giant’s integrated marketing campaigns (Scholz & Smith, 2016).

In 2017, augmented reality became very well-known with the release of Nintendo’s *Pokémon GO* mobile app. As previously mentioned, *Pokémon GO* takes users from around the world on the adventure of capturing creatures from the original Pokémon games in their physical environments. Users explored their neighborhoods, cities and more to find location-based items and characters (Chamary, 2018). This was truly a viral phenomenon that turned into a “unifying occasion” for users centered around the brand (Bashford, 2017, para. 19). This mobile game that focused on augmented reality created a social event that people were highly engaged in and encouraged physical activity. Within a year, the app had been downloaded 800 million times and generated over USD $2 billion in revenue through in-app purchases (Interactive Advertising Bureau, 2019). This is now the framework for all augmented reality based applications, and sports marketers are trying to now replicate that success (Bashford, 2017).
Sports Marketing

The American Marketing Association defines marketing as “the activity, set of institutions, and processes for creating, communicating, delivering, and exchanging offerings that have value for customers, clients, partners, and society at large” (Shanks & Lyberger, 2014, p. 5). Sports make their mark in the world of marketing because they offer people multiple, diverse media channels in regards to sporting matches, team memorabilia, and much more (Shanks & Lyberger, 2014). Traditional sports marketing focuses on getting as many audience exposures as possible and buying sponsorship packages that allow brands to be seen on televised broadcasts (Manjur, 2015). This is an oversimplified way of going about sports marketing in today’s digital age because today it has become more important for people to be engaging in a more personal relationship with the brand on media channels that inspire conversation and interaction (Manjur, 2015). There are so many content exposures in the current supersaturated marketplace that merely winning the exposure battle becomes not enough (Manjur, 2015). With that being said, “some experts stress that traditional TV will remain vital” (Bashford, 2017, para. 18). In 2018, “89 of the top 100 most watched programs on TV were live sporting events” (Glasspiegel, 2019, para. 8). In addition, 85% of the “programs that averaged over 15 million viewers were live sporting events” (Glasspiegel, 2019, para. 8). While there are many new, digital ways to market sports brands, the traditional television broadcast is holding steady.

Traditional, live-sports television broadcasts are staying strong, but the real problem that sports marketers are facing is the fact that fans under the “age of 25 make up less than 20% of the television market” (Bashford, 2017, para. 66). Young sports fans want to be engaged and are “demanding up-to-the minute platforms that provide exclusive content, statistics, and interactive forums based upon live, on the field, action” such as social media, YouTube channels, and interactive websites (Shanks & Lyberger, 2014). The digital age of mobile smartphones, tablets, and augmented/virtual reality devices “provides consumers with the opportunity to have real-time interaction enabling the procurement of exclusive
content and an aforementioned sense of belonging” (Shanks & Lyberger, 2014, p. 34). Sports fans are using their smartphones to access digital channels such as social media on-site at stadiums, sitting at home, and out in public to get a more comprehensive sports product (Shanks & Lyberger, 2014). Brands suddenly have so many more access points to reach consumers and be a part of authentic, exclusive, behind-the-scenes content (Bashford, 2017).

This authentic content is now a top priority for marketers due to its demand by the Generation Z population. “Overly elaborate platforms or experiences are unable to match the immediacy” that they want to feel in regards to a connection with a brand (Bashford, 2017). Nike, along with many other brands, has responded to this generation’s requests with “Nike On Demand, a one-to-one messenger service via WhatsApp, which links fans directly with its vast network of athletes and coaches to inspire them to achieve their own personal sporting goals” (Bashford, 2017, para. 38). The goals of creating as many brand exposures as possible are evolving into brands needing to reach consumers on a more personal level with “share-worthy content which gets consumers involved” (Manjur, 2015).

Niche sports, such as gymnastics, surfing, and volleyball differ from traditionally mainstream sports due to the limited opportunities to promote their sport. They do not have access to the high-viewership, traditional communication channels that the top American sports have (Biddiscombe, 2018). Instead, they focus on alternative channels such as social media to market what their sport has to offer and reach fans across the country (Puchan, 2005). Niche sports have an opportunity to reach people using developing technology, such as augmented reality, and newly segmented media channels to their advantage (Puchan, 2005). Social broadcasting is becoming a viable option for these sports to get large audiences. These sports are starting to trend toward developing their own channels of communication, and it is an avenue of exposure that is expected to keep growing (Bashford, 2017). This appeals to smaller, niche sports that don’t get prioritized by the traditional broadcasters. “This is exactly what British Table Tennis did,” says Steve Martin, global CEO of M&C Saatchi Sports and Entertainment, as quoted in an
interview with Campaign Live in 2017. “Rather than thinking we must get this on Sky or the BBC, they took it into their own hands and 2.1 million watched their own live stream on Facebook” (Bashford, 2017, para. 16).

In the world of sports, “team fandom represents an engaging outlet for those looking for a group with which to connect” (Madrigal, 2001). Niche sports such as lacrosse and handball are no different in terms of team fandom. One’s desire for uniqueness is a fundamental personality trait used to determine one’s social identity, and certain products are attractive options to satisfy one’s desire for uniqueness (Amaldoss & Jain, 2005). According to a study that applied this to mainstream and niche sports, “niche-sport fans scored significantly higher than mainstream fans” in perceived sport uniqueness (Dwyer, Greenhalgh & Lecrom, 2016). There was a statistically significant difference in niche-sport fans’ perception of their sport as unique compared to mainstream-sport fans’ perception. This shows that there is an interest in niche sports in America and that sports markets are becoming more segmented. Not only are they segmented by the addition of more niche sports into the marketplace, they are becoming segmented based on the regions and cultures where the sports are played (Greenhalgh & Greenwell, 2013). For example, baseball is a popular mainstream sport in the United States; however, in Europe it is more of a niche sport market.

**AR in Sports**

Sports teams and organizations are already using augmented reality in recent marketing efforts. In 2018, The Football Association, i.e. soccer, developed a “virtual replacement technology on the LED perimeter signage” in the stadium (Gray, 2018, para. 2). In the stadium, you would see one advertisement, but you could see several others on television based on the broadcast and region you were watching in such as Asia, Europe, or the Americas. This allowed them to display different advertisements to targeted, worldwide broadcast markets (Gray, 2018). Not only are they getting more advertising partnerships, but
they are creating more revenue due to the targeted nature of the technology (Gray, 2018).

Major League Baseball (MLB) is integrating augmented reality into their team’s stadiums and in their newest mobile applications. Their MLB Ballparks app, which has been downloaded over 1 million times, creates an immersive fan experience by giving fans access to player and positional stats by just pointing their devices at the baseball field in front of them at the game (Joehnig, 2018). Their MLB At Bat app also creates an augmented reality experience by giving fans pitch-sequence videos, visuals of where baseballs are being pitched to hitters, in “realistic 3D renderings of MLB ballparks” for live and past played games (Joehnig, 2018, para. 2).

The National Basketball Association (NBA) is also taking notice of augmented reality and created its own NBA AR Basketball mobile application. The application has two augmented reality components that let fans experience the game in ways they never could (Joehnig, 2018). The first is a game that lets fans project a NBA basketball hoop on any walls in the user’s camera view. Users can then use their device to shoot virtual basketballs at the hoop overlaid on their physical environment and share photos and scores with friends (Joehnig, 2018). This is a highly engaging experience because it involves physical activity and opt-in engagement. The second component of the app — $6.99/month via Apple and Google stores — allows paying fans to walk through an augmented reality portal into “a 3D video recording from an earlier game” (Joehnig, 2018, para. 6). Fans can then watch their favorite team’s game from the first couple rows of their favorite area without having to pay for the game.

The largest sports provider in the United States, the National Football League (NFL), is integrating augmented reality into their latest marketing campaign that celebrates its 100-year anniversary of the League’s creation. They partnered with Snapchat to create an augmented reality “lens that lets people scan an NFL 100 logo and bring it to life inside the Snapchat app” (Alvarez, 2019, para. 1). The app was also geofenced (see Appendix) to the Greater Chicago area for the opening game of the NFL season, meaning that only people in the Greater Chicago area will see it “pop up on their lens carousel in
Snapchat” (Alvarez, 2019, para. 2). This display of location-based and image-based components created an interactive experience that allowed fans to celebrate the 100-year anniversary with the NFL.

Panasonic is now creating augmented reality technology specifically designed for sports fans in the stadium. They created a “window augmented reality projection” that applies a special film to a stadium suite window and then “overlays augmented reality effects on top of it” without hindering the view of fans (Harrison, 2017, para. 1). Fans can then control what is seen on the glass using a tablet that can display rosters, in-game statistics, and closer camera angle shots (Alvarez, 2019).

**Design Thinking + User Experience Design**

Design thinking is a technique that researchers and designers use to create user-centered solutions. Design thinking incorporates the structural components of empathizing, defining a problem, ideating, prototyping, and testing a solution with a focus on the customer or user of the final product (Plattner, 2016). Only until you initially empathize with the potential users and define the problem can you start to create potential solutions and prototype those solutions (Steinke, Al-Dee & LaBrie, 2017). The process creates a personal experience between future users and designers (Serrat, 2017), which comes from the design thinking assumption that products need to be designed from “the user’s perspective in order to be most effective” (Steinke, Al-Dee & LaBrie, 2017). Design thinking is also a non-linear strategy that allows researchers to hop back and forth from prototyping and testing to defining and empathizing, creating an experience based understanding of the users and potential solutions (Steinke, Al-Dee & LaBrie, 2017).

Design thinking has been used by global brands such as Apple and Ikea to “develop intentional and human-centric products” (Tran, 2018, para. 1). Successful brands such as Apple and Ikea use design thinking methods because it is proving to have significant potential for “improving innovation outcomes” (Liedtka, 2017). The process also decreases risk through the implementation of empathy-based research, prototyping, and testing with potential users, which greatly diminish the possibility of major flaws and
oversights once the solution is launched for public use (Liedtka, 2017). All these benefits are shown to
have effects on personal, team, and organizational levels of research and design, which shows the
versatility of design thinking strategies in the world of business (Costa, 2019).

Design thinking techniques have already been used to create better fan experiences at large sports
arenas (Sun, May & Wang, 2017). User-experience at a sporting event incorporates an individual’s
interactions with the physical and digital environment within the stadium. Integrating mobile technology
into a fan’s experience gives them more information and a more personalized overall experience (Sun,
May & Wang, 2017). Overall, incorporating user-experience into the design of physical and digital spaces
allows fans to have more in-depth social experiences within a stadium (Sun, May & Wang, 2017).

**RQ1:** What do users identify as important details when creating effective, user-centered augmented
reality products?

**RQ2:** What do users identify as the perceived benefits of building user-centered augmented reality
products when applied to sports marketing campaigns?
Methods

Figure 1b has a marketed sparring point at “sport,” in this case volleyball, because without sports this case does not begin. RQ1 is placed between “design thinking” and “augmented reality” in Figure 1b because the design thinking methods used to study RQ1 were centered around the details of building an augmented reality product. RQ2 is placed between “augmented reality” and “sports marketing” because the methods used to understand perceived benefits of a completed augmented reality product were to help integrate the product into a sports marketing campaign. The design thinking process is of an iterative nature, which is why there are double sided arrows in Figure 1b. Multiple components have the ability to work back and forth with one another in this process. This study seeks to understand the connections between the four areas depicted in Figure 1b and show how they can work together to create an effective, user-centered augmented reality product.

Figure 1b

*Integrating Design Thinking Methods into Augmented Reality Development for Sports*
This map shows the relationship and flow between the researcher’s four main areas of study: a specific sport (in this case volleyball), sports marketing, design thinking, and augmented reality. In addition, it shows where the study’s research questions reside in that process.

In order to answer RQ1 and RQ2, the researcher conducted a focus group and an in-depth qualitative, descriptive survey with questions pertinent to ideating around sports, use of mobile technology, and the perceived benefits of user-centered, augmented reality products being integrated into modern marketing campaigns. Multiple methods of research were used to establish triangulation in the research methods. Triangulation is the use of more than one research method to understand a singular research question (Heale & Forbes, 2013). This technique offers high-quality results by providing “a more comprehensive picture of the results than either approach could do alone” (Heale & Forbes, 2013).

Focus Group

A focus group is a “carefully planned discussion, designed to obtain the perceptions of the group members on a defined area of interest” (Langford & McDonagh, 2003). A focus group method of research was deemed necessary to answer RQ1 and RQ2 due to the questions’ emphasis on subjects’ perceptions and specific experiences with technology. Focus groups are commonplace in the marketing industry because they allow marketers to get early feedback on ideas (Langford & McDonagh, 2003). Focus groups rely on flexible questioning and the encouragement of dialogue, which makes the researcher facilitating the focus group very important (Villard, 2003). The researcher conducting the focus group should encourage discussion, but they also have the added benefit to build off of interesting ideas and ask for extra reasoning behind responses (Langford & McDonagh, 2003). A disadvantage of focus groups that needs to be carefully watched for is the possibility of “group-think,” which is a form of collective decision-making where the group discussion is dominated by a few and other group members are unwilling to express unpopular opinions (Sunstein, 2006). To counteract this, researchers should strive to
be objective, encourage all responses, and give opportunities for all group members to share opinions (Langford & McDonagh, 2003).

**Ideation Sessions**

A strength of focus groups is stimulating new ideas (Langford & McDonagh, 2003), which is important to the researcher who created the augmented reality prototype from the results of these discussions. Specifically, the researcher designed ideation sessions within the focus-group setting to accomplish this goal. An ideation session is a process that allows a researcher to “generate ideas and solutions through sessions such as sketching, prototyping, brainstorming” and a host of other activities centered around idea creation (Dam & Siang, 2018). These activities are usually timed and give everyone a chance to express their ideas and solutions to the problem space posed by the interviewer (Stevens, 2019). Ideation sessions are useful because they create a large number of ideas that can then be discussed within the group and they have higher potential for the revealing of innovative solutions (Dam & Siang, 2018). Asking open-ended, ideation-centered questions focused on the problem space being researched creates a wealth of information and ideas outside of your perspective from a portion of the target audience that you are designing for (Stevens, 2019).

**Survey**

A survey is a common way of simply gathering information from people in a population (Moser & Kalton, 2016). A qualitative survey studies the diversity in a population, meaning that it does not quantify in statistics but rather measures meaningful variation (Jansen, 2010). A survey was used in order to generate more respondent data that could be analyzed with the focus group results.

It is important for the questions in a survey to be crafted to measure what the researcher is looking to measure (Fowler, 2006), which is otherwise known as validity. A good question needs to be consistently understood by the participants and consistently administered by the researcher in order to
hold validity in results (Fowler, 2006). Survey questions need to be consistently understood because the researcher is not always there to explain the expected answer format (Fowler, 2006).

**Qualitative Data**

Qualitative data emerges from the ideation sessions due to the data’s emphasis on the in-depth understanding of how people experience an issue being presented (Mack, Woodsong, MacQueen, Guest & Namey, 2005). Design thinking focuses on user empathy and fluid ideation, which is better served by guiding questions and discussion (Stevens, 2019). “Qualitative methods are also effective in identifying intangible factors, such as social norms, socioeconomic status” (Mack, Woodsong, MacQueen, Guest & Namey, 2005). Ideation sessions strive to allow the researcher to understand the human needs and desires behind product design in a technological field such as augmented reality (Dam and Siang, 2018).

**Participant Recruitment**

The people participating in the focus groups were chosen because they were easily accessible to the researcher. Due to this, the focus group represented a convenience sample. A convenience sample is a type of nonrandom sampling where participants are chosen based on “geographical proximity, availability at a given time, or the willingness to participate” (Etikan, 2016). When using a convenience sample, it is important to eliminate bias as much as possible to get a sampling closest to the population (Etikan, 2016). To eliminate bias, all survey participants were anonymous and focus group data was voted on by participants without the influence of the researcher. College students were identified as a particularly effective participant pool because students are used to group interactions due to their learning environment in classroom settings and group settings. As a result, these students will be “relatively at ease when the discussion is guided, their thoughts solicited, and diverging viewpoints are expected” (Billups, 2012).

In this sample, there were three groups of people studied: **Group 1: Volleyball Fans; Group 2: NCAA Men’s Volleyball players; Group 3: College Marketing Students**. The first group was made up
of college club volleyball fans. After exploring literature, no quantitative criteria was found to identify the term “fan” based on the amount of a person’s consumption of specific sport content. Fans, in this case, are people who watch a volleyball game five or more times during a calendar year but are not or no longer players. This group was deemed necessary to include in the study because they can offer unique insights into a purely consumptional standpoint. The second was a group of NCAA men’s volleyball players. This group was chosen for the study because they are the most immersed in the culture and strategy of the sport. The third group was made up of college marketing students. This group was selected in order to offer more insight into RQ2 from a business and marketing perspective. There were a total of three groups to create a larger variety of opinions and ideas as well as to properly identify any patterns and/or inconsistencies in results (Langford & McDonagh, 2003).

Participants were contacted by an email sent out to NCAA Men’s Volleyball players, fans, and marketing students known to the researcher. Participants were required to be at least 18 years old and a volleyball player/fan for the first group. For the second group, participants were required to be 18 years old and a NCAA Men’s Volleyball player. Participants in the third group were required to be 18 years old and be enrolled as a college marketing student. All data collected is confidential and an informed consent document was signed by each participant. All written information from the participants was collected by the researcher and stored in a password-protected computer.

The first form of research conducted was an ideation session that included two new individuals from each of the three researched groups, a total of six participants. Due to the COVID-19 pandemic, the ideation session took place over a video conferencing app (zoom.com), and responses were recorded digitally on shared Google documents.

Focus Group/Ideation Session Procedure

To begin the focus group, the researcher conducted a short introduction to the topics being covered:
• Introduce the researcher

• Introduce the marketing campaign’s problem space: How might we bring awareness to the sport of boys’ and men’s volleyball in the United States through a multimedia marketing campaign?

• Introduce the creative project’s problem space

• Define augmented reality and user-centered design

• Describe their role and why they are here

• Prohibit inappropriate ideas. Let all participants know that ideas containing sexual material, excessive swearing, and other crude material will be taken out of the results by the researcher on his discretion. If any of these inappropriate ideas still come up during sharing, they will be categorized as “inappropriate” and taken out of the running for voting/discussion by the researcher.

• Take questions

  “Activity 1,” as seen in Table 2, incorporates a braindump, which is an ideation technique that is designed to create a large quantity of possible solutions through individual thinking (Dam & Siang, 2018). During the ideation brain dump session, individuals engaged in solo brainstorming and came up with as many ideas as possible based on a provided prompt and within a specified time. This allowed those participating in the activity to ideate without the influence of others around them and will produce a large number of possible solutions to a problem space. The second part of “Activity 1” was dot voting. In this voting process, individuals got three votes to distribute to the three ideas they liked the most. Once the top three choices were voted on, the group had a discussion to expand upon the ideas chosen (Dam & Siang, 2018).
### Table 1

**Focus Group Activity One: Brain Dump & Dot Voting**

<table>
<thead>
<tr>
<th><strong>Activity 1: Post-it Note Brain Dump &amp; Dot Voting (30 minutes)</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Structuring Invitation:</strong></td>
<td>How might we engage a wide sports audience with augmented reality?</td>
</tr>
<tr>
<td><strong>Materials needed</strong></td>
<td>Computer, access to the shared Google documents</td>
</tr>
<tr>
<td><strong>How Participation Is Distributed</strong></td>
<td>To begin, everyone participated individually. As a group, everyone shared their ideas. Individuals voted on their favorite three ideas. To avoid groupthink, participants voted in secret individually and the results will be recorded by the researcher.</td>
</tr>
<tr>
<td><strong>Sequence of Steps and Time Allocation</strong></td>
<td>Introduce the concept of ideation through brain dump with dot voting. Begin with an example prompt and visually show how the session will work. Next, start the activity with the first prompt. Give everyone five minutes, in accordance with ideation best practices (Dam and Teo, 2019), to come up with as many ideas as possible in response to the first prompt. Once the time is up, have everyone share their ideas in a common space. Finish this prompt with dot voting. They will be voting to narrow the choices down to their top three ideas generated for that prompt. Follow the same steps for all 3 prompts.</td>
</tr>
</tbody>
</table>
| **Prompts** | 1. What aspects of sporting events do you enjoy the most?  
2. How do you engage with volleyball/sports through the media?  
3. What augmented reality ideas do you have to engage people with sports/volleyball? |
All three of these prompts provided insight into RQ1 to inform the researcher’s augmented reality prototype. “Prompt 2” provided information into current media consumption habits, which can then be compared to participants' perceived benefits of implementing augmented reality in regards to RQ2.

“Activity 2,” as seen in Table 2, provided guiding questions that lead to more focused answers around the desired topic (Dam & Siang, 2018). The first prompt challenges participants to sketch their ideas, and the second prompt gives the participants a scenario to put themselves in.

### Table 2

*Focus Group Activity Two: Guiding Questions*

<table>
<thead>
<tr>
<th>Activity 2: Guiding Questions (30 minutes)</th>
<th>What insights do they have that can help inform the researcher on how to get people to engage with augmented reality?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structuring Invitation</td>
<td>What insights do they have that can help inform the researcher on how to get people to engage with augmented reality?</td>
</tr>
<tr>
<td>Materials Needed</td>
<td>Blank sheets of paper and writing utensils, computer, access to the shared Google documents</td>
</tr>
<tr>
<td>How Participation Is Distributed</td>
<td>To begin, everyone participated individually. As a group, everyone shared their ideas.</td>
</tr>
<tr>
<td>Sequence of Steps and Time Allocation</td>
<td>For the first prompt, give everyone five minutes, in accordance with ideation best practices (Dam and Teo, 2019), to come up with as many ideas as possible in response to the first prompt. Once the time is up, have everyone share their ideas in a common space. Finish this prompt with dot voting. They will be voting to narrow the choices down to their top three ideas generated for that prompt. For the second prompt, introduce the concept of ideation through sketching. Begin with an example prompt and visually show how the session will work. Next, start the activity with the prompt. Give everyone five minutes, in accordance with ideation best practices (Dam and Teo, 2019), to sketch their response to the first prompt. Once the time is up, have everyone share their ideas and discuss each other's ideas. At the end, all participants will upload a picture of their sketch to the shared Google document.</td>
</tr>
</tbody>
</table>
1. If there was a new men’s volleyball marketing campaign, what do you think some of the benefits of building a user-centered augmented reality product into that campaign would be? Give everyone five minutes to write down as many perceived benefits as they can.

2. Identify a sport or activity that you love, doesn’t need to be volleyball. Now, think about all the visuals that you like to see during a broadcast, a live event, or if you get updates after the game. Sketch the layout of your favorite sports visual and how you would like it on your mobile phone.

“Prompt 2” provided insight into RQ1 to inform the researcher’s augmented reality prototype. “Prompt 1” provided information on the perceived benefits of user-centered augmented reality in regards to RQ2.

During each activity in the focus group, efforts were made to eliminate response and confirmation bias, which is when information is being specifically searched for and then interpreted in a way that systematically impedes unbiased result gathering (Pohl, Oswald & Grosjean, 2017). When discussing the initial ideas of participants, all ideas were shared and available to vote for without suggestions from the researcher. The results of the focus group’s “Activity 1” were all based on participant voting, and the results were taken directly from that voting. In the focus group’s “Activity 2”, the first prompt used the same procedure. All sketches from the second prompt of “Activity 2” were collected for analysis using a common qualitative data-coding strategy: thematic analysis (Vicsek, 2007). The researcher took all the sketches and created an initial coding of possible categories, such as “interactive features” and “statistics”, followed by more detailed and defined categories, such as “up close highlights” and “statistics on players”, for data to be finally placed in (Billups, 2012). These thematic groupings were based on similarities in the individual sketches from all participants to create a cohesive review of all individual viewpoints (Vicsek, 2007).

Survey Procedure
The second form of research used was an in-depth survey. Before the COVID-19 pandemic, three focus groups of eight to 10 participants were going to be conducted in accordance with ideation session best practices (Stevens, 2019). Instead, the qualitative survey collected responses from those who did not participate in the singular focus group session of six participants. The survey, as seen in Table 3 collected the ideas of 33 participants in total, 11 from each of the three researched groups.

The first three prompts provided insight into RQ1 to inform the researcher’s augmented reality prototype. “Prompt 2” provided information into current media consumption habits, which can then be compared to participants' perceived benefits of implementing augmented reality in regards to RQ2. Prompt 4 provided insight into RQ1 to inform the researcher’s augmented reality prototype. Prompt 5 provided information on the perceived benefits of user-centered augmented reality in regards to RQ2.

Table 3

Survey Procedure and Prompts

<table>
<thead>
<tr>
<th>Survey (10-15 minutes)</th>
<th>Procedure</th>
</tr>
</thead>
</table>
| Procedure              | · Introduce the researcher  
                          | · Introduce the marketing campaign’s problem space: how might we bring awareness to the sport of boys’ and men’s volleyball in the United States through a multimedia marketing campaign.  
                          | · Introduce the creative project’s problem space  
                          | · Define augmented reality  
                          | · Describe their role and why they are here  
<pre><code>                      | · Prohibit inappropriate ideas. Let all participants know that ideas containing sexual material, excessive swearing, and other crude material will be taken out of the results by the researcher on his discretion. If any of these inappropriate ideas still come up during sharing, they will be categorized as “inappropriate” and taken out of the running for voting/discussion by the researcher. |
</code></pre>
<table>
<thead>
<tr>
<th>Prompts</th>
<th>Have participants choose the research group they identify with (Group 1, 2, or 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What aspects of sporting events do you enjoy the most? (please list at least 2)</td>
<td></td>
</tr>
<tr>
<td>2. With what media sources do you engage with volleyball/sports content? (please list at least 2)</td>
<td></td>
</tr>
<tr>
<td>3. What augmented reality ideas do you have for people to engage with sports/volleyball? (please list at least 2)</td>
<td></td>
</tr>
<tr>
<td>4. Identify a sport or activity that you love, doesn’t need to be volleyball. Now, think about all the visuals that you like to see during a broadcast, a live event, or if you get updates after the game. What are some of the details that you like to see? (please list at least 2)</td>
<td></td>
</tr>
<tr>
<td>5. If there was a new men’s volleyball marketing campaign, what do you think some of the benefits of building a user-centered augmented reality product into that campaign would be? (please list at least 2)</td>
<td></td>
</tr>
</tbody>
</table>

The responses to the survey were collected for analysis using a common qualitative data coding strategy: thematic analysis (Vicsek, 2007). The researcher took all responses and created an initial coding of possible categories, such as “engagement” and “gameplay”, followed by more detailed and defined categories, such as “engaging youth” and “atmosphere”, for data to be finally placed in (Billups, 2012). These thematic groupings were based on similarities in the individual responses from all participants to create a cohesive review of all individual viewpoints (Vicsek, 2007).
Results

The following results pertain to RQ1: What do users identify as important details when creating effective, user-centered augmented reality products? According to Figures 2 and 3, the sample valued the “atmosphere” and “community of fans” as the most important aspects of their sporting experience. According to Figure 6 and Figure 7, the sample values “up-close highlights,” “exciting announcers,” and “interesting statistics” when it comes to specific details that enhance their experience. According to Figures 4 and 5, research participants thought that “watching a game on any surface,” “training with coaches,” “in-game statistics,” and “sideline experiences” were some of the most interesting augmented reality possibilities.

Figure 2

Data from Focus Group: Activity 1, Prompt 1
Figure 3

Data from Survey: Prompt 1

![Survey chart]

Figure 4

Data from Focus Group: Activity 1, Prompt 3

![Focus Group chart]
Figure 5

Data from Survey: Prompt 3

![Survey chart]

Top 6 Categories of Ideas

- Game, play volleyball with a national team member
- Jump test measure
- Training session with a big coach
- Sideline experience
- In-game statistics
- Watching a game/play on any surface

Number of Responses

Figure 6

Data from Focus Group: Activity 2, Prompt 2

![Focus Group chart]

Top 6 Categories of Ideas

- Live chat
- Pause and play buttons
- Scoreboard
- Different camera angles
- Up-close highlights
- Statistics on players

Number of Responses
The following results pertain to RQ2: What do users identify as the perceived benefits of building user-centered augmented reality products when applied to sports marketing campaigns? Figure 8 and Figure 9 showed that “social media” is the top way participants engage with sports through media. Figure 10 and 11 found that “engaging youth” and “builds a personal connection” were some of the top benefits identified by participants when it comes to integrating user-centered augmented reality into a sports marketing campaign.
Figure 8

*Data from Focus Group: Activity 1, Prompt 2*

![Focus Group Bar Chart]

Question: How do you engage with volleyball/sports through the media?

- Reading Online Blogs
- YouTube Videos
- Watching live events on television
- Following players/teams on social media

Number of Votes Received

Figure 9

*Data from Survey: Prompt 2*

![Survey Bar Chart]

Question: How do you engage with volleyball/sports through the media?

- Following players on social media
- Mobile Phone
- Online news articles
- Live television
- YouTube Videos
- Social Media

Number of Responses
Figure 10

Data from Focus Group: Activity 2, Prompt 1

Focus Group
If there was a new men’s volleyball marketing campaign, what do you think some of the benefits of building a user-centered augmented reality product into that campaign would be?

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Votes Received</th>
</tr>
</thead>
<tbody>
<tr>
<td>Takes the people using the technology into account</td>
<td>3</td>
</tr>
<tr>
<td>Profitable with many different sponsored options</td>
<td>4</td>
</tr>
<tr>
<td>Increased engagement</td>
<td>3</td>
</tr>
<tr>
<td>Makes interaction memorable</td>
<td>5</td>
</tr>
<tr>
<td>Builds a personal connection</td>
<td>4</td>
</tr>
<tr>
<td>Engaging youth</td>
<td>3</td>
</tr>
</tbody>
</table>

Figure 11

Data from Survey: Prompt 5

Survey
If there was a new men’s volleyball marketing campaign, what do you think some of the benefits of building a user-centered augmented reality product into that campaign would be?

<table>
<thead>
<tr>
<th>Benefit</th>
<th>Number of Responses</th>
</tr>
</thead>
<tbody>
<tr>
<td>Word of mouth awareness</td>
<td>2</td>
</tr>
<tr>
<td>Increase exposure to the sport</td>
<td>4</td>
</tr>
<tr>
<td>Builds a personal connection</td>
<td>6</td>
</tr>
<tr>
<td>Mobile access to the game</td>
<td>8</td>
</tr>
<tr>
<td>Increased engagement</td>
<td>15</td>
</tr>
<tr>
<td>Engaging youth</td>
<td>22</td>
</tr>
</tbody>
</table>
Augmented Reality Prototype

This augmented reality prototype was constructed by the researcher based on the results of the focus group and survey, which suggest that the audiences want an augmented reality product because it will create more access to the game and increase engagement. Therefore, a prototype using augmented reality was not only designed to entertain users but also used as a learning tool for users who want to study game play. Specifically, the prototype features a stadium setting where users can watch a match on any flat surface was developed to fulfill their need.

Researchers from the University of Washington have created an algorithm that allows creators to transform two-dimensional video into three-dimensional constructions (Dormehl, 2018). The idea for this prototype is to film a USA Men’s Volleyball match. As seen in Figures 2 and 3, the game atmosphere is very important to people’s enjoyment of sports. When the match is filmed, users will get a real stadium feel with fans filling the seats, live sound, and play-by-play announcers on their device’s speakers. Integrating these specific elements will create that exciting atmosphere wherever users want to take this product. The prototype was designed using an online application (app.wiarframe.com). The technology allows users to zoom in and out, pause, play, and look at team statistics throughout the match. This creates an opportunity for users to learn and study the game by watching the very best players in the world.

Users can interact with the scoreboard by tapping it, as seen in Figure 14, which will cause the scoreboard to grow and show more detailed statistics on the match. Some of those statistics include team attacking percentage, blocks, digs, side-out percentage and aces. These statistics will give people that are unfamiliar with the game, casual fans and young players a better understanding of the important aspects of a volleyball game. As seen in Figure 15, users can also interact with individual athletes by tapping them, which will cause a player profile box to appear with the athlete’s personal information and their game statistics. Player information includes player height, position, hometown and college. This
information will allow people to get to know the superstar players that represent the United States. Their
game statistics include individual hitting percentage, digs, blocks and aces. These statistics will give
people that are unfamiliar with the game, casual fans and young players an opportunity to understand how
each player is performing during the game. As seen in Figures 12 13, 16 and 17; users can move around
to get any view on the court, from the bench, from the stands, and an aerial view. A pause/play button is
in the bottom center of the screen for users to control the action of the match. Social media buttons appear
in the upper-right corner, which allows users to share the augmented reality product on their social media
feeds.

Figure 12

*Stadium Prototype Example 1: Aerial View of Court*
Figure 13

*Stadium Prototype Example 2: Aerial View of Court*

![Aerial View of Court](image)

Figure 14

*Fully Extended Scoreboard On Court After User Accesses With Touch*

![Scoreboard On Court](image)
Figure 15

Athlete Information and Statistics On Court After User Accesses With Touch

Figure 16

Stadium Prototype Example 3: View from Stands
Figure 17

Stadium Prototype Example 4: View From Behind Bench
Discussion

Figure 1b reiterates the flow between the researcher’s four main areas of study: a specific sport (in this case volleyball), sports marketing, design thinking, and augmented reality. This study strived to provide a strategic process that guides marketers for grassroots sports campaigns toward creating user-centered AR experiences. The design and results of this study show how to effectively connect the four components in Figure 1b.

Figure 1b

*Integrating Design Thinking Methods into Augmented Reality Development for Sports*

When using design-thinking ideation strategies to build an augmented reality product, in an attempt to answer RQ1, specific questions were asked to target details in the sample’s preferred media and sports consumption. According to Figures 2 and 3, the participants valued the “atmosphere” and “community of fans” as the most important aspects of their sporting experience. In the responses placed in those categories, users specifically identified the crowd noise, sitting with friends, and overall “stadium
buzz” as important aspects of sporting events for them. These responses had a strong majority and showed a real connection to the ceremony of the event for participants. Figures 6 and 7 show that the sample values “up-close highlights,” “exciting announcers,” and “interesting statistics” when it comes to specific details that enhance their experience. These details may seem small to some, but they are important aspects of users’ experiences that make a difference in their interest level with the content they consume. Figures 4 and 5 illustrate that research participants thought that “watching a game on any surface,” “training with coaches,” “in-game statistics,” and “sideline experiences” were some of the most interesting augmented reality possibilities. Understanding these preferences and ideas of the future users is one of the benefits of using user-centered design strategies when developing augmented reality products. Augmented reality by itself drives higher levels of visual attention in the brain and creates “70% higher” memory coding (Andrew, 2018, para. 25). However, when that technology is paired with user-centered design strategies, the process creates a personal experience between future users and designers (Serrat, 2017). This then translates to the design thinking assumption that products need to be designed from “the user’s perspective in order to be most effective” (Steinke, Al-Dee & LaBrie, 2017). This study successfully paired user-centered design strategies with augmented reality to develop a prototype based on the personal experiences and opinions of future users.

When the user-centered augmented reality product is integrated into the sports marketing campaign, in an attempt to answer RQ2, specific questions were asked to target the perceived benefits of the product. Research participants thought (Figures 10 and Figure 11) that the product would “engage youth,” “increase engagement,” “make the interaction memorable,” and “create a personal connection.” These are the future users’ perceived benefits, which reiterates the importance that people place on being engaging in a more personal relationship with the brand on media channels that inspire conversation and interaction (Manjur, 2015). The research participants gave responses that suggest augmented reality
benefits are amplified when creating an experience based understanding of the users and potential solutions through user-centered design strategies (Steinke, Al-Dee & LaBrie, 2017).

**Augmented Reality Prototype and User-Experience Design**

The augmented reality prototype was built off of the results of both the focus group and survey results. Figures 4 and 5 identify “watching a game/play on any surface” as the top response for augmented reality ideas from the research participants. Other top ideas such as “in-game statistics” and “sideline experience” were also integrated into the design. Thus, the design features a live game that you can watch from anywhere on or off the court, and it integrates interactions with athlete and team statistics. Furthermore, results from Figures 6 and 7 were taken into account in regards to visual details that research participants enjoy seeing. Top responses such as “interesting/important statistics,” “up-close highlights,” “exciting play-by-play announcers,” “pause/play buttons,” and “scoreboard” were all integrated into the stadium and user-experience design.

In Figures 8 and 9, “social media” was the top response to how research participants engage with sports/volleyball through media. This was taken into consideration in the design by adding social media buttons that allows users to share the augmented reality product on their social media feeds.

All of these responses generated by the focus group and survey participants were specifically designed, user-centered strategies that “develop intentional and human-centric products” (Tran, 2018, para. 1). These ideas were driven by research on future users and marketing specialists, which greatly diminish the possibility of major flaws and oversights once the solution is launched (Liedtka, 2017). Three-dimensional augmented reality takes longer to design than traditional marketing materials. Diminishing the possibilities of major flaws and redesigns means that the design-thinking process can make the creative process of building augmented reality products more efficient for marketers.

As previously mentioned, researchers from the University of Washington have created an algorithm that allows creators to transform two-dimensional video into three-dimensional constructions.
If this algorithm was invested in to create a high-fidelity version of this prototype, this would allow people to have access to men’s volleyball anywhere in the world using a smartphone or tablet. That creates the media coverage and access that the niche sport of volleyball lacks in the current market (Biddiscombe, 2018). Having a cutting edge augmented reality product creates a modern brand identity that resonates with the technologically adept youth of the modern world. Integrating cutting edge technology, creating more access, and acquiring young audiences are the adjustments that niche sports need to make in order to stay relevant, create a modern identity, and break into the mainstream sports market.

**Future Research**

The last stage in the design-thinking process is testing. Testing is used to “rule out problem solutions and derive as deep an understanding of the product and its users as possible” (Dam & Siang, 2020). The testing process gives users a chance to use the latest prototypes, which often leads to redefining one or more problems and “informing the understanding of the users, the conditions of use, how people think, behave, and feel, and to empathize” (Dam & Siang, 2020). In future research, the researcher would conduct a series of comprehensive testing that would further refine the augmented reality prototype until it is ready to become a final product.

When testing a prototype, design-thinking best practices call for researchers to “remember that you are testing the prototype, not the user” (Dam & Siang, 2019). Design-thinking best practices also encourage researchers to not give too much information on how the prototype works and observe how their users interact with the design as if they were interacting with the product in their normal environment (Dam & Siang, 2019). Once the researcher finds the points of interaction where users struggle to understand or use different components, he/she can return to the prototyping process, make adjustments, and test again (Dam & Siang, 2019).
For other researchers, this model (Figure 1a-b) is transferable to other niche sports such as lacrosse or gymnastics. In order to develop a user-centered augmented reality product, one would use the activities and prompts in Table 1, 2 and 3 apply those to the sport of choice, and analyze the results. The user-centered augmented reality product would then be built off of the results of the focus group and survey results.

**Limitations**

The participants in this study represented a convenience sample, which is a type of nonrandom sampling where participants are chosen based on “geographical proximity, availability at a given time, or the willingness to participate” (Etikan, 2016). These participant parameters, coupled with qualitative research questions, generate non-generalizable data for the population. In other words, these strict parameters of sampling and questioning limit the study’s generalizability for the broader population. Time was also a limitation for this study. In total, there were 39 participants in this study; however, with more time, a larger sample size could have been obtained through the survey and additional focus group sessions. A larger sample size would make the data more generalizable. This study was not funded, but with funding, more participants could have been reached for the survey and additional focus groups. Funding would also allow for comprehensive testing of the augmented reality product, as previously outlined. Finally, the COVID-19 pandemic limited this study’s ability to have face-to-face interactions with the participants during focus groups. The pandemic halted all face-to-face research, which forced the researcher to have virtual focus groups and create an online survey to reach participants. More face-to-face research could improve overall clarity, give opportunities for questions, and allow for more discussion between the researcher and participants.
Conclusion

After assessing the results of this study, the researcher concluded that the relationship flow in Figure 1b demonstrates an effective way of integrating augmented reality into sports-marketing campaigns through design thinking strategies. The study documents a case on how design thinking strategies may be used to inspire development of AR products specifically designed to enhance a grassroots sports-marketing campaign.

The design thinking methods and prototype development based off of the results of this study provide strategic guidance for marketers looking to incorporate augmented reality into sports marketing campaigns. The user-centered focus group and qualitative survey producers provide future researchers the tools to integrate design thinking techniques into their own campaign designs. The development of the augmented reality prototype showcases a product that is built off the results of individual and group ideation sessions.

Sports marketing is changing, and there is more demand for products that “provide consumers with the opportunity to have real-time interaction” (Shanks and Lyberger, 2014). Augmented reality products fulfill that need, and design thinking strategies enhance the efficiency and effectiveness of those products.
References


Borst, S. (2019, June 5). From hype to the rise of augmented reality in marketing as an engaging, effective and measurable tactic: IAB - empowering the marketing and media industries to thrive in the digital economy. https://www.iab.com/blog/ar-for-marketing/.


http://dx.doi.org/10.4135/9781483348858.n12


https://www.semanticscholar.org/paper/The-effective-use-of-augmented-reality-in-Jensen/03f2f3c46a33270be6e7b9cae5bd5f01d96cd2d.


London: Taylor & Francis.


Villard, J. (n.d.). Use of focus groups: an effective tool for involving people in measuring quality and impact (pp. 1-11). (ERIC Document Reproduction Service No. ED 482 279)
Appendix

Glossary of Terms

*Mobile augmented reality (MAR):* refers to augmented reality use, either indoor or outdoor, where users are able to use the system in unauthored environments either by carrying the augmented reality equipment or by remotely accessing the virtual information (Ford & Höllerer, 2008)

*Geofencing:* the practice of using global positioning (GPS) or radio frequency identification (RFID) to define a geographic boundary. Then, once this “virtual barrier” is established, the administrator can set up triggers that send a text message, email alert, or app notification when a mobile device enters (or exits) the specified area (Chamberlain, 2016)