

Quick View Mobile Application: Visualize 2d Dimension for Kids Sport Equipment

Siti Najihah Noor Razali and Natrah Abdullah

Faculty of Computer and Mathematical Sciences Universiti Teknologi MARA (UiTM), Shah Alam MALAYSIA

Corresponding Author Email: natrahadb@uitm.edu.my

To Link this Article: <http://dx.doi.org/10.6007/IJARPED/v11-i3/14897>

DOI:10.6007/IJARPED/v11-i3/14897

Published Online: 18 September 2022

Abstract

Online shopping has a lot of benefits. However, despite all these years and advancements in online shopping, online shopping still needs to be enhanced in a variety of ways in order to improve the current online shopping experience for the satisfaction of online customer. These days, online shopping is still inconvenience for product measurement for the product representations and body size chart, customer need to spend too much time on online reviews and product description. Therefore, the goal of this paper is to propose a mobile application that will visualize static 2D which focus on the kids' sport equipment products in order to increase customer satisfaction and quicken the time process of availability for product information. Quick View mobile application assists by providing quick access for product information. Mobile Application Development Life Cycle (MADLC) methodology is being used to develop Quick View mobile application which is only conducted from the identification phase up until to the testing phase. Quick View mobile application offers to the user the three main features which is height and size, body position and load capacity. These features also have been included a visual representation of a 2D kids' body size with the product chosen. The benefit for the user is that they get to easily and quickly to view the product and fine which product fit their kids' sizes with convenience. In accordance with the results of the SUS user testing, many users agreed that Quick View is convenient, user-friendly, not overly complicated, effectively integrated, and does not require technical assistance where 86.5 is the result score. Future recommendations include that this mobile application should provide 2D human body illustration for any kind of age and provide plenty of products and equipment for people to view without limitation of choices.

Keywords: Online Shopping, 2-Dimension, Mobile Application.

Introduction

Since the internet and smartphone has declared a takeover in human's lifestyle, online shopping has become a popular shopping method. The internet and smartphone have completely transformed the way people shop. Online shopping can be defined as the act of purchasing products or services over the Internet. According to global trends, there are over 2 billion people worldwide buying goods and services online in 2020 (Statista, 2021). Global retail e-commerce traffic reached a record 22 billion monthly visits in June 2020, with demand

exceedingly high for everyday items such as groceries, clothing, but also retail tech items. Smartphones contribute to approximately 70 percent of all retail website visits worldwide in 2020 (Coppola (2021). With, people would prefer online shopping rather than physical shopping which can be classified as traditional shopping. This is because people do not want to struggle with physical shopping environment when the internet and smartphones are so essential in people's daily lives.

The impact of Coronavirus (COVID-19) has brought major twist to people shopping behavior around the world. As millions of people stayed at home to prevent the spread of the virus in early 2020, digital channels have emerged as the most popular alternative to crowded stores and in-person shopping (Coppola, 2021). The pandemic has accelerated the shift towards a more digital world and triggered changes in online shopping habits that are likely to have long-term consequences (UNCTAD, 2020). It clearly shows that during and after the COVID-19 pandemic, people rely heavily on online shopping to avoid virus spread and to follow the standard operating procedure (SOP) by government. People may be using online shopping more after the pandemic COVID-19 because it is more convenient for them.

Online shopping is convenience in term of time, energy and money. People would grab the advantages and benefits of online shopping. The ability to shop from home enables many people, particularly the elderly or the parents who busy working to still purchase the products and services they require for their families. Then it is more comfortable to do it at home rather instead of running around in the store. Online shopping allows people to shop 24 hours a day and seven days a week. People can go shopping through the online stores at any time of the day. Not just the product of the country in which people live but from all over the world can be found and purchased. It proves how convenient online shopping is. The reason for choosing online shopping could vary from convenience to competitive prices. In addition to that, online businesses are trying their best to make sure that the experience of online shopping matches in-person shopping experiences.

However, despite all these years and advancements in online shopping, online shopping still needs to be improved in a variety of ways and for a variety of reasons in order to improve the current online shopping experience for the satisfaction of online customer. People were unable to enjoy the view of online shopping platform due to the limitation of product information available. The availability of product information is always limited for online customer to view. It shows that the product on the internet can be deceiving at times. The colors, sizes, descriptions and appearance in real life may differ from the product information provided. People prefer to visit physical stores and examine goods up close, even if it takes time. The top reason why consumers prefer to shop in physical stores is the ability to see, experience, and test products before purchasing them (Pezzini, 2021). As how the confusion of online customer toward the product that they want to select and purchase will lead to the interaction needed between buyers and seller. If it happened to many people, seller must be so busy have no time to reply to each one of the buyers to just let they know how the product looks like, sizes, measurement in details. Some sellers do not have the responsibility to look after their customers to just explain in detail on online chat, because all the description and images have been provided.

The preliminary study is carried out by observing and reviewing online customer experiences on the online shopping platform. With all the negative online shopping experiences written by online customers in the form of comment reviews, the problem statements are defined as follows: 1) Online shopping is still inconvenient for product

measurement; 2) Customer need to spend too much time on online reviews and product description; 3) Customer received a product that did not meet their expectations.

Therefore, the goal of this project is to improve the satisfaction of online shoppers. This project will concentrate on how product information should be available, and a quick viewing feature should be developed in order to transform product information availability to online customers.

Literature Review

Online Shopping: Product Review

The online shopping experience will undoubtedly lack any touch sense experience that the online customer will have. It is true that online shopping is easier and more convenient, but people are dissatisfied with the shopping experience because the element of reviewing the product is not comfortable. In the meantime, more than 70% of US consumers prefer to shop in physical stores because they like to touch and feel products before making a purchase decision (Trotter, 2017). This is due the fact that offline purchasing offers consumers richer experiences by allowing them to physically interact with products. Since people wanted to enjoy online shopping as how physical shopping could provide, human body illustration is where people could view how the product suits the best of human's height, size, position, and load capacity to fit the product. People could view themselves in the 2 Dimension (2D) images in digitally. Since this mobile application is being developing for kids' sport equipment as the product that being sell in online shopping mobile application, so the 2-D image will be design for kids' body.

Kids' body design and measurement consideration should be taken seriously in this project on how to view to the users. Whereas how the 2-D image will be produced on the mobile application. According to the Parent Guide website where they talk about the "Best Baby and Kiddie Pools: A Comprehensive Guide and Review", baby can start playing in the water at the age of 6 weeks. Since children has few stages where is starts with baby stage from children age 0 to 12 months, toddler stage from children age 1 to 3 years, preschool stage from children age 3 to 5 years and grade-schooler stage from children age 5 to 12 years (American Academy of Pediatrics).

Based on the stages, this paper takes into consideration of kids age from toddler to grade-schooler which is from age 1 year to 12 years old. Since inflatable swimming pool has variety sizes according to age and stage of children, kids body measurement consideration will be noted on how to design the 2 Dimension image for product measurement. Kid's body height will design from 27 to 64 inches or in centimeter from 68 cm to 163 cm for both genders. Meanwhile for kid's body size will design based on the weight from 15 pounds to 136 pounds or in kilogram from 6 kilogram to 61 kilograms for both genders in general (Children's Wisconsin).

93% of online customers read online reviews before purchasing a product (Kaemingk, 2020). Online reviews have influenced online consumer into purchase decisions. It shows that read and reviewing online reviews are one of the habit online customers should do before purchasing. In general, users who have more experience with online reviews are more confident in their accuracy and truthfulness (Smith & Anderson, 2016). This is because of how the product information availability is little bit tricky to view. People need to rely only on the product description or image provided in order to purchase the best and fit product. So, it must be a must to read the review to see is the product information provided are accurate

enough based on the experience of past customer. It indicates that online shopping experience is not easy and taking long time.

Based on the past research about online shopping experience, quick view concept will be implemented in this project to improve online customer experience in terms of satisfaction of having the product information availability in quick way and time saving (Parise et al., 2016). One of the most significant advantages of how product view of online shopping platform is the real-time practice that they experience during physical shopping is the same as online shopping. It can be shown as example from virtual reality (VR) on online shopping website that has helped as how the consumer view the product is that it allows them to avoid going out in public while enjoying the simulated virtual world. As a result, consumers become desensitised to any concerns consumers may experience in the real world (Lavoie et al. 2021). If the online shopping application provides a pleasant and creative way to view the product, online consumers can experience the real-time practice of physical shopping. It is importance to provide the real time practice so that people could enjoy digitally at the same time having the feel and satisfaction of viewing the product as how physical shopping experience.

User's View and User Experience

The user's point of view on the online shopping platform had a significant impact on the experience that users gained. Online shopping should not only depend on online reviews to let the user view on deciding which product is the best to purchase. For instance, Amazon shopping website has long provided helpful online reviews to the online customers to the point that online review systems have now become a required feature for online retailers (Yiming et al., 2019). Users get confusion and wasting so much time to do research on online review in order to purchase. It can be said that most of the time, online review reduces consumers to switch among products also induce product fit uncertainty due to the wrong or confusion product fit stated on description. Although online reviews could reveal same fit information to all consumers, online reviews have different effects on retailers and manufacturers (Yiming et al., 2019).

Other than that, according to Yazdanparast & Spears (2012), the term "haptic" refers to the "active use of hands to retrieve the attributes of an object stimulus, using both cutaneous and kinesthetic inputs". Lee et al (2016) use Need for Touch (NFT) as "a preference for the extraction and utilisation of information obtained through the haptic system". It demonstrates that how the product is displayed on the user's screen to view is important for those consumers who have haptic traits. That is why having the Quick View mobile application that providing feature of adjustable 2D body illustration according to what user want to view will assist people especially haptic traits to enjoy online shopping experience.

All-In-Digital Shopping Environment

Based on Oxford UK English dictionary, the meaning of All-In-Digital is using or composed of only digital technology, systems, and graphics. Digital in the context of IT is the commitment to building networks that connect devices, objects, and people (Vermesan & Friess, 2022). The combination of All-In-Digital shopping environment is taking for the idea to improve the current shopping environment into All-In-Digital shopping environment. In particular, since people having difficulties to view their body size where they need to do an action by viewing their body on the mirror in order to determine which size of product will fit them before purchasing, they are considered to be in a physical shopping environment where they need to try view and fit physically, even if they shop online. By having All-In-Digital, people would

be making great and quick decision as they attracted to do everything digitally since the 2-D kids' bodies would aid them in viewing the product. Even if all happen in digitally, it would help them feel how accurately their body sizes will fit the product as if they were shopping physically. Online customer does not need to view their body by using any measuring tools and viewing in the mirror to at home just to see either their body fit into the product or else. Based on the current online shopping environment, people will take an action outside of their smartphone to view themselves which considered as action online shopping environment. Online customers will encounter a new shopping environment that takes place entirely digitally, with no physical action needed to do.

In this project, implementing All-In-Digital concept will help to improve online shopping experience in variety aspects such as quick in viewing the product, less time spent purchasing the product, accuracy in receiving the product information availability, and, of course, no action required outside of the digital. As a result, user may shop quickly, have high satisfaction from the product information availability and time saving to view the product.

Online Shopping Mobile Application

A mobile application is a type of software program designed to run on a mobile device such as a smartphone or tablet computers. Mobile applications are frequently used to provide users with services that are similar to those available on personal computer (PC). It is the result of recent developments in technology. Due to the obvious merging of media, information technology, the Internet, and advanced technologies in mobile applications have emerged (Szymkowiak et al., 2021). The process of creating software for smartphones and digital assistants, most commonly for Android and iOS, is known as mobile application development. The software can come pre-installed on the device, be downloaded from a mobile app store, or be accessed via a mobile web browser. Java, Swift, C#, and HTML5 are some of the programming and markup languages used in this type of software development.

A mobile application is a platform that greatly facilitates online shopping. Customers are actively utilizing their smartphones to explore and purchase for products. As a result, it is essential that investing in a mobile application to build connections between sellers and customers. Convenience is one of the valid reasons to always improve online shopping experience. Producing the online shopping experience more convenient for online customers through the use of mobile application not only improves the experience, but it also increases the likelihood that they will return to same online shopping platform for repeat orders (Ameen et al., 2022).

User Interface (UI) Design for Online Shopping Mobile Application

The graphical or visual display on a mobile device such as on smartphones or tablets allows the user to interact with the device's apps, features, content, and functions are known as a mobile user interface (UI). The requirements for user interface (UI) design on mobile application differ significantly from those for desktop computers. UI design must take proper considerations to ensure usability, readability, and consistency. This is because the smaller screen size and touch screen controls. Perhaps, the importance of user interface (UI) design for the online shopping mobile application may be due to the need for interaction between two important parties in doing business, namely the seller and the customer. Visual appeal is defined as "a customer's perception of the extent to which visual elements presented on a site induce the customer's positive affection" (Prasanta et al., 2021).

According to Fling (2009), mobile application development necessitates a slightly different skill set and, without a doubt, different design principles. When creating a mobile application, the most important thing to keep in mind is that it is both useful and intuitive (Babich, 2016). Perhaps when it comes to online shopping application it should take it seriously on the mobile application design principle since it involves people spending their time to shop for their daily lives which is regular activity people will spend on the devices. Mobile application design principle that will be followed in this project is based on the summary and combination of mobile application design principles or guidelines found in the literature review by (Ramsay and Nielsen, 2000; Stark, 2012; Babich, 2016).

As one of the principles is make interface elements clearly visible. The importance of selecting primary, secondary, and accent colors for the application that will aid in usability. Make sure there is enough color contrast between elements so that users with low vision can see and use the app. Make sure there is enough contrast between the font color and the background so that the text can be read (Lupanda & Janse Van Rensburg, 2021). Since the implementation of 2D image attached as the product view for the quickness information availability of the product that the intention is to make online shopping experience improves. However, if the design controls based on hand position is not being applied for the mobile application design principle, it seems not help to improve the online shopping experience. Thus, by being said, design controls based on hand position should be applied on mobile application design principles.

Research Methodology

The Mobile Application Development Life Cycle (MADLC) proposed by Vithani and Kumar (2014) is a framework for developing mobile applications that includes seven (7) phases includes identification phase, design phase, development phase, prototyping phase, testing phase, deployment phase, and maintenance phase. The phases are the best methodology for developing a mobile application in this project, but only the first five (5) phases will be covered. It will only begin with identification phases and end with testing phase.

Identification phase is where it should be coming up with new ideas in order to solve a problem using a mobile application. The ideas must be thoroughly examined and the scope of application determined. In this project, both of functional and non-functional requirement of the mobile application project were identified. In identification phase, the user requirements were gathered through preliminary studies using variety of techniques, tools, and methods. An observation and review of online shopping experience on existing online shopping platform was conducted. Review from online customer on the same issue has been gathered and collected. Based on this technique, current problems and issues faced by online customers during their online shopping experience have been recognized. Moreover, research and review on existing or similar application as well as journal and academic articles has been carried out. The purpose is to collect research and survey information to be used as a support reference for this project's studies.

Design phase is where it must be decided whether to use a trial or premium version of the software in order to create the mobile application. A storyboard was created for the user interface design. The information gathered and obtained during the identification phase will be used to design the Quick View mobile application. The first activity in design phase is creating and designing Use Case Diagram (UCD) by using Visual Paradigm Software Application. The UCD shows interactions between the mobile application and the actors or users for the apps. The next process in design phase involves in this phase is to design the

User Interface (UI). During the design process, high-fidelity with non-functional prototyping will be created. Design will begin by designing high-fidelity prototype with non-functional prototyping by using Figma application software. It will show the very basic and important element of Quick View mobile application as well as the theme on how it will look like. Thus, this is where the design will begin to examine either suits the project and to view the details look of mobile application. A storyboard of User Interface (UI) design is the outcome of the design process that allows to view the layout and flow of content.

The development phase is the longest phase that the developer will go through because it requires a lot of focus on the development of the mobile application programming. There are three (3) activities involved in this phase which separated into the development or coding of the User Interface (UI) and functional requirements of Quick View mobile application. The tools that will be using will be Android Studio Software Application as the android application development tool in coding. Aside from that, the suitable hardware and software are required for the development of the mobile application which covering the specifications of hardware. The high hardware specifications needed to be taken seriously in order to build the coding smoothly for the developer.

Prototyping phase is the fourth phase throughout this project MADLC. The current of non-functional of High-fidelity prototyping will be improve into the functional of High-fidelity prototyping. Few features and function will be developed based on the focus feature of this project. At the same time, throughout the prototyping process some checking and testing of the Quick View mobile application will be tested by developer. It is to ensure the final product of Quick View mobile application is produced as proposed planned.

Testing phase is the phase to investigate and correct any technical flaws in the functionality and non-functionality of the project. In this phase, it will get an involvement with the target user. Cognitive Walkthrough method was used to get feedback on user experience. Online Interview session and provide tasks to go through the Quick View mobile application with the target user is one of list of CW method. Usability evaluation questionnaire and comment from target user will be collected. After completing the task, the respondents answered the survey using the System Usability Scale (SUS) questionnaires. Five public users were chosen to perform CW and give feedback via SUS questions with a scale of 1 to 5 ranging from Strongly Agree to Strongly Disagree.

Result and Discussion

Based on a review of the literature and research on the existing system's functional requirements, the most common special feature offered by the All-In-Digital Shopping Environment is a list of products to view and select from, as well as a special feature on the measuring or fitting product. Therefore, by having that for this Quick View mobile application, it will have the list of kids' sport equipment to be viewed by the users and user could proceed to read the specification product description with the very minimalist and important information in order for the user to gain fast of information availability of the selected product. Furthermore, the quick view has three (3) main features: height and size, body position, and load capacity. The user can quickly and easily try the product with these three quick view features to see how the product fits without having to do anything outside of the mobile phone. The non-functional requirements for this project are the constraints of the mobile application. This Quick View mobile application will necessitate the development of a set of appropriate standards. It must work on all Android devices since it was written in Java using the Android Studio Software Application, which is an Integrated Development

Environment (IDE) or a software application that aids programmers in software development. This Quick View mobile application is designed to work with Android versions 4.0 and higher, ensuring platform compatibility for all Android users.

A case diagram for the Quick View mobile application, which visualizes 2D dimensions for children's sports equipment, is created using the Star Unified Modelling Language alternative in online software (Visual Paradigm). Because this mobile application project will be developed for a single user, the use case diagram will only have one actor. The use case diagram in Figure 1 depicts the interactions between the actor and the process.

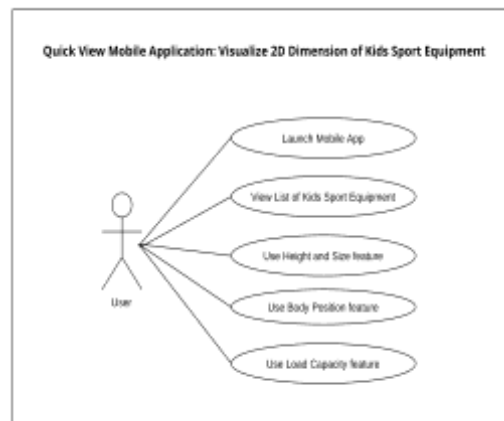
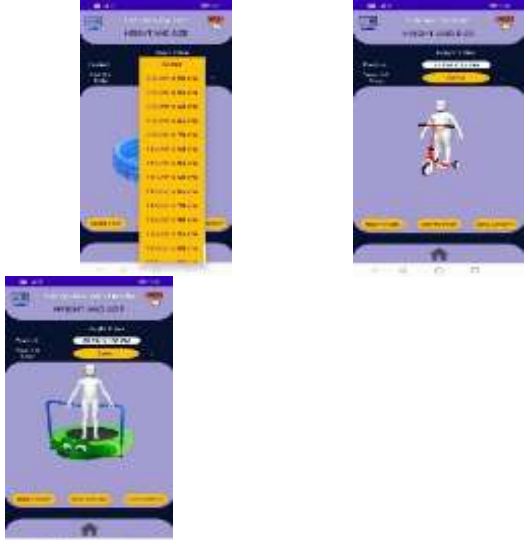
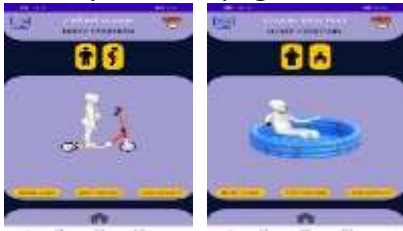


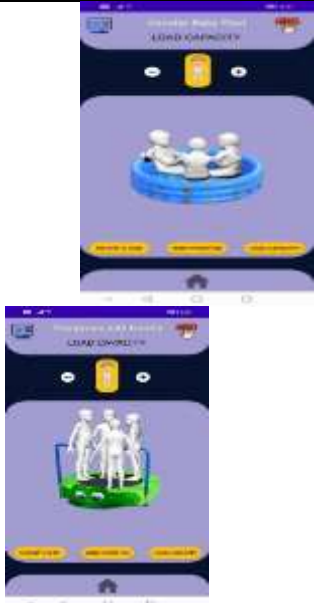
Figure 1. Use Case Diagram for Quick View Mobile Application

The development of the Quick View mobile application as shown in Table 1, which provide a visual representation of 2D for children's sports equipment, which is a critical step in ensuring that it meets the all-in-digital shopping environment.

Table 1
High-fidelity of Quick View Mobile Application

Page	Description
1. Splash Screen 	Once user click or launch the app icon where name "Quick View" and the logo. User can view the logo and name of Quick View mobile application and animation provided. Splash screen will be appeared within 5 seconds.
2. On Boarding Screen 	On Boarding Screen will automatically display after 5 seconds of splash screen. It displays the animation as well as text view to briefly explain to the user what is this app will assist or talk about with the visual animation provided.
3. Homepage	For the Homepage, user may go through the kids sport equipment product by scrolling

	down and up. User will be able to view and select all the product of kids sport equipment on the homepage. User can click to the More button at every product section, if user wanted to know more about the product. Once user click to the More button, it will bring the user to the product details of the product chosen.
4. Product Details page 	For the Product details page, user can view the product descriptions which the details are very straight forward, minimalist and information needed for user to know. User can click to the button Quick View, where the user can try on the product with the kids body illustration.
5. Height and Size page or feature 	For the Body Position feature, user can click to the Select dropdown for “Your Kid Body”. User will be able to choose and view the height and size which is for 3 years until 6 years old kids according to the user’s kid body to fit with the product chosen by selecting on the dropdown list of height and size.
6. Body Position page or feature 	For the Body Position feature, user can click to the any 2 icons on the top to which body position that they want to view for the visualization position of 2d kids body with product. User will be able to choose and view the body position according to the user’s kid body to fit with the product chosen. There will be a suitable and expected position when the kids use the product. The position will be standing, side standing and sitting for user to have a better look on the product.
7. Load Capacity page or feature	For the Load Capacity feature, user can click to the any 2 icon on the top which is ‘+’ or ‘-’ icon button in order to add or remove person to view for the visualization capacity of 2d kids body fit in with the product. User will be able to view on how many kids could fit with the product

	chosen by click to the add button or remove button for removing person from using the product. Visualize the capacity of 2D kid body with product will be displayed according to the how many person user's click to. Once the capacity has reached limit, user can be notified.
---	---

The testing phase shows 60% of the user respondents strongly agreed that they will use this Quick View mobile application frequently. Also, another 40% of the user respondents agreed they will use this Quick View mobile application frequently in their daily life. 60% of the user respondents completely disagreed that Quick View mobile application is unnecessarily complex. Meanwhile another 20% of the user respondents disagreed that Quick View mobile application is complex shared the same percentage as being neutral in this question voted for the statement this system is unnecessarily complex. 60% of user respondents have voted strongly agreed that this Quick View mobile was easy to use. Meanwhile, the other 40% voted for the agreed to the statement.

There are 80% out of the 5 user respondents rated that they strongly disagreed to the statement that they do not need the help of a technical person while using this Quick View mobile application, that would make the highest percentage for this statement. 37.5% strongly disagree on the statement of requiring a technical person and another 25% feels neutral.

User testing results were analysed to determine the SUS Usability Score. Based on the user testing, the SUS Usability Score the Quick View mobile application has been obtained a score of 86.5 on the SUS Scale. According to the SUS adjective rating, a product's quality is excellent if it has a score above 80.1. As a result, the Quick View mobile application is functioning significantly better than average.

Conclusion

The proposed application was accepted as a solution to view product while shopping product using mobile devices. Despite the effort made to improving to provide better shopping experience to the users with this project, Quick View mobile application as the solution also does have its limitations. Limitation allows improvement and enhancement. Several limitations have been identified throughout the project, which are: 1) This mobile application will only cover for the scope of kids' sport equipment since the product considered as large product which found has the critical in viewing product details based on research of customer online reviews. 2) This mobile application will only be allowed to quick view for the product with static 2D Dimension human body illustration for kids' body only. 3) This mobile

application only performing until viewing the product with features given but not until add to cart and payment method. 4) The primary and the only language that is used for Quick View mobile application is English only. 5) This mobile application only be available on Android OS (Operating System) platform.

Although this project provides numerous benefits to users, several suggestions can be made to improve the project's outcome. The following are the recommendations: 1) This mobile application should provide plenty of product and equipment for people to use and comparing with their body without limit of choices product; 2) This mobile application should allow user to quick view for the product with adjustable 2D or 3D Dimension human body illustration for any kind of age rating for better view and comparing; 3) This mobile application should providing add to cart and payment method since this is for user to use as shopping platform ; 4) This mobile application should allow users to choose any kind of language that they are comfortable with since users can come from any kind of country to use this platform; and 5) This mobile application should also allow Apple iOS and not only be available on Android OS (Operating System) platform since majority of people user iOS.

Using the Quick View mobile application is extremely beneficial for busy parents who want to quickly and easily shop for their children's sport equipment, which is a large or huge product to purchase but still allows them to quickly view and compare the product. Furthermore, as a mobile designer and developer, it can transform their online shopping experience into an All-In-Digital shopping experience where they do not need to imagine and measure whether they fit or not. Thus, it is hoped that this mobile application will achieve the project's goal of developing a mobile application for busy parents by providing and visualizing 2D Dimensions of their children's bodies with the product.

References

- Coppola, D. (2021). E-commerce worldwide - statistics & facts. *Statista*. https://www.statista.com/topics/871/online-shopping/#topicHeader__wrapper
- United Nations Conference on Trade and Development. (2020). COVID-19 has changed online shopping forever, survey shows. *UNCTAD.org*. <https://unctad.org/news/covid-19-has-changed-online-shopping-forever-survey-shows>
- Oktium. (2018). How online shopping is inconvenient. <https://medium.com/oktium/how-online-shopping-is-inconvenient-1619c5c264fa>
- The UK Measurement Specialist. (2021). Tape Accuracy. *The Tape Store*. <https://www.thetapestore.co.uk/tapes-rules/tape-measures/tape-accuracy>
- Pezzini, G. (2021). Why physical stores are still vital for retail. *LS Retail*. <https://www.l retail.com/resources/why-physical-stores-are-still-vital-for-retail>
- Trotter, C. (2017). Retail Trends Factfile 2017: Physical Retail. *Insider Trends*. <https://www.insider-trends.com/retail-trends-factfile-2017-physical-retail/>
- Parent Guide Team. (2021). Best Baby and Kiddie Pools: A Comprehensive Guide and Review. *Parent Guide*. <https://parent.guide/best-baby-and-kiddie-pools/>
- American Academy of Pediatrics. (2021). Ages & Stages. *Healthy Children.org*. <https://www.healthychildren.org/English/ages-stages/Pages/default.aspx>
- Kaemingk, D. (2020). Customer Experience Online reviews statistics to know in 2022. *Qualtrics*. <https://www.qualtrics.com/blog/online-review-stats/>
- Yim, M. Y. C., & Park, S. Y. (2019). "I am not satisfied with my body, so I like augmented reality (AR)": Consumer responses to AR-based product presentations. *Journal of Business Research*, 100, 581-589.

- Smith, A., & Anderson, M. (2016). Online Shopping and E-Commerce. *PewResearchCenter*.
https://assets.pewresearch.org/wpcontent/uploads/sites/14/2016/12/16113209/PI_2016.12.19_Online-Shopping_FINAL.pdf
- Deborah, B. M., & Stephen, M. N. (2003). The Effect of Examining Actual Products or Product Descriptions on Consumer Preference. *Journal of Consumer Psychology*.
- Yiming, L., Gang, L., & Giri, K.T. (2019). Try-Before-You-Buy: Online retailing strategy with customer self-mending. *Journal Electronic Commerce Research and Applications*.
- Prasanta, K. C., Paul, J., Korfiatis, N., Lytras, D. M. (2021). Examining the role of consumer impulsiveness in multiple app usage behavior among mobile shoppers. *Journal of Business Research*.
- Lupanda, S. I., & Rensburg, J. T. V. J. (2021). Design Guidelines For Mobile Applications. *International Conferences Interfaces and Human Computer Interaction*.
- Babich, N. (2016). Mobile UX Design: Key Principles. *UX Planet*.
- Azham, H., Emmanuel O. C., Mkpojiogu, Hassan, A., & Hassan, M, H. (2019). A Mobile Test Assestment of Online Shopping Aplication. *Journal of Computational and Theoretical Nanoscience*.
- Leigh, T. A. (2020). The Inside Scoop on Ecommerce Reviews: Why They Matter and How to Make the Most of Them. *Big Commerce*. <https://www.bigcommerce.com/blog/online-reviews/#who-is-reading-online-reviews>
- Rimma, K. (2020). How Are Consumers Spending Some of Their Time? Reading Reviews. Lots of Reviews. *eMarketer*. <https://www.emarketer.com/content/how-are-consumers-spending-some-of-their-time-reading-reviews-lots-of-reviews>
- Lavoie, R., Main, K., King, C., & King, D. (2021). Virtual experience, real consequences: the potential negative emotional consequences of virtual reality gameplay. *Virtual Reality*, 25(1), 69-81.
- Yazdanparast, A., & Spears, N. (2012). Need for touch and information processing strategies: An empirical examination. *Journal of Consumer Behaviour*, 11(5), 415-421.
- Lee, Y. K., Chang, C. T., Cheng, Z. H., & Lin, Y. (2016). Helpful-stressful cycle? Psychological links between type of mobile phone user and stress. *Behaviour & Information Technology*, 35(1), 75-86.
- Ameen, N., Hosany, S., & Paul, J. (2022). The personalisation-privacy paradox: Consumer interaction with smart technologies and shopping mall loyalty. *Computers in Human Behavior*, 126, 106976.
- Szymkowiak, A., Melovic, B., Dabic, M., Jeganathan, K., & Kundi, G. S. (2021). Information technology and Gen Z: The role of teachers, the internet, and technology in the education of young people. *Technology in Society*, 65, 101565.
- Vermesan, O., & Friess, P. (Eds.). (2022). Digitising the Industry Internet of Things Connecting the Physical, Digital and Virtual Worlds. CRC Press.
- Fling, B. (2009). Mobile design and development: Practical concepts and techniques for creating mobile sites and Web apps. " O'Reilly Media, Inc."
- Lupanda, I., & Rensburg, J. V. J. (2021). DESIGN GUIDELINES FOR MOBILE APPLICATIONS.
- Vithani, T., & Kumar, A. (2014, March). Modeling the mobile application development lifecycle. In *Proceedings of the International MultiConference of Engineers and Computer Scientists* (Vol. 1, pp. 596-600).
- Parise, S., Guinan, P. J., & Kafka, R. (2016). Solving the crisis of immediacy: How digital technology can transform the customer experience. *Business Horizons*, 59(4), 411-420.