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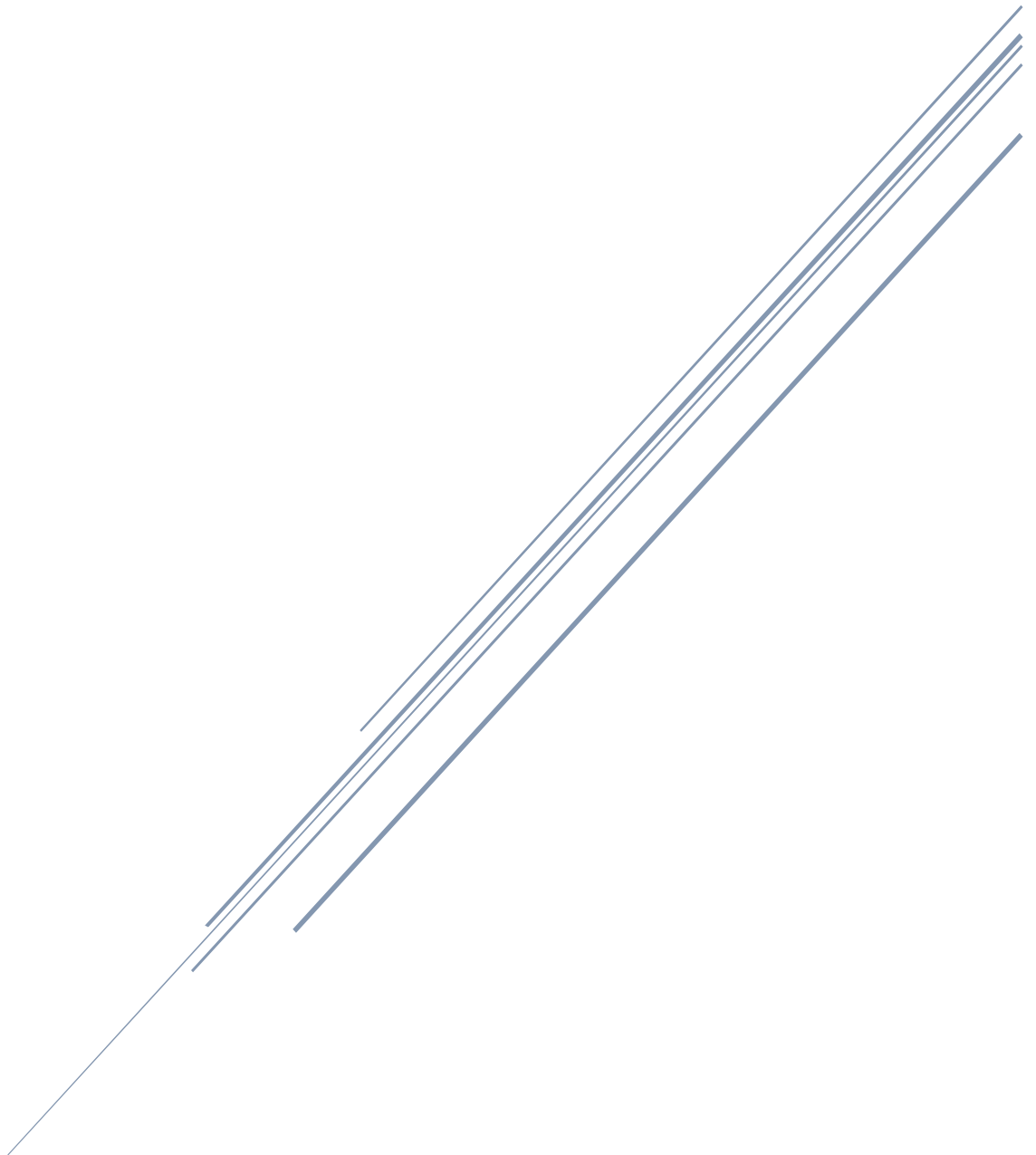
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Notes: The similarity might be high due to the use of my previous literature review sent on Applied Project 1.

What is the public opinion about using augmented reality in business?

Thesis Approved:

What is the public opinion about using augmented reality in business?



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First of all, I want to thank God, The only and one, for all the strength when I was weak.

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Abstract

Augmented reality is said to be the new disruptive technology, after the invention of mobile phones. The technology readiness of the population is being discreetly developed in order to diminish technology uncertainty levels. But a lot has to be improved, like a good internet connection, devices up to date to properly function the technology, and so on.

In this research, it will be discussed the several uses augmented reality has in the industries like retail, education, medical sector, and the improvements for the military. It will also discuss the involvement of social media, in an attempt to increase users' awareness about the technology, and that way increase the acceptance and technology readiness of the population.

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CHAPTER I

“What is the public opinion about using augmented reality in business?”

Introduction

Augmented Reality is a technology that allows people to connect the virtual world and reality in one experience. Through AR, people can have access to information in a more accurate and faster format, with the use of holograms, GPS, videos, sound, and even smell, but still, be connected to the real world. Big tech companies are improving the use of AR in different segments and industries, adapting the technology to be experienced through any device such as handheld devices and display systems. It is a multimodal interface, with the potential to gather data more efficiently. The market size expansion for AR/VR technology is expected to grow by \$162.71 billion by 2025 (Technavio, n.d.).

AR technology is also impacting other sectors like the military, medicine, entertainment, gaming, education, and communications. The advancements made in the mentioned areas are outstanding, such as the advancements in the medical sector, with the use of AR assisting surgeons during a very delicate spinal surgery, or the usage of AR to launch the movie *Into the Storm*, where film producers installed a big monitor in a very busy street of Sydney, Australia, through where pedestrians could see a tornado coming or a car crashing.

The focus of this research was from the consumers point of view, and their technology acceptance level to adopt augmented reality. It was asked about their awareness of augmented reality, taking into account many people never heard about this technology.

1.1 Objective of Study

Augmented Reality is so penetrated into peoples' routines, but still, some do not even realize the importance and convenience this experience brings into their lives. This is a vast field, and still has many discoveries to be made, such as the consequences of its use and consumers technological readiness to adopt AR in their daily routines. From communication to entertainment, AR makes things clear and somehow, real. This research aims to find out how feasible it is for a common business in Dublin to invest in such technology. What challenges

they still have to overcome in order to obtain the acceptance of consumers, enhance their experience before the purchase of a product/service, and how the use of this technology is affecting the buying decision process of consumers in Dublin. The diverse population in Ireland brought some challenges to the retail sector, and marketers have to excel in their abilities to reach this demanding audience. It is expected to clarify the negative and positive points that should be considered after the adoption of AR, from the consumer perspective. This study also has the objective to provide few information about potential consumers willing to adopt Augmented Reality to purchase products online. Taking into consideration the high cost of this disruptive technology, businesses located in Dublin would be able to use this research as a guidance to know if people are willing to use augmented reality for daily tasks, like purchase a product/service.

1.2 Rationale for the Study

The retail sector has been reinventing itself throughout the years, and technology has widely impacted the industry, forcing businesses to reinvent itself in order to survive. The competition is more than fierce, and companies are adopting several strategies to fairly compete and maintain the lead. Augmented reality has arrived to transform this world, revolutionise the way people buy products, and has promised to engage consumers in the utmost way, delivering an immersive experience, reaching different audiences, enhancing not only customer experience, but mostly, win their loyalty.

The main objective of this study is to gather as much information from potential users as possible, in order identify opportunities within the retail market in Dublin, in the adoption of augmented reality for the sale of products. It will also include an examination of potential users and their main requirements and difficulties to adopt this disruptive technology.

1.3 Statement of Research Objectives

Because this research was developed through a mixed method, there are four sub-themes. The aims and objectives of this study are stated below.

1. Mental Imagery influence in the use of AR
2. The willingness of consumers in adopting AR
3. The diverse uses of augmented reality

4. The rise of technology

1.4 Information gathering and Data collection

The descriptive research method was the best option to answer the research question. Taking into account that a few studies were conducted, but none of them with emphasis in the same direction, and even though this theme is more than 50 years old, AR technology has evolved over the years, and in the retail industry, it has been used to improve services and enhance customer experiences. The sample to conduct this research was any person who owns a smartphone, tablet, laptop, or any other device that enables them to experience the AR technology.

1.5 Expected Outcomes of the Study

This research aims to assist businesses in Dublin, providing an overview of consumers' readiness and acceptance to adopt augmented reality in online shopping. At first, only products like furniture, clothing, shoes, makeup, and glasses will be the object of discussion.

1.6 Overview Chapters

A brief of each chapter will be shown in this section.

1.6.1 Chapter I – Introduction and a summary of the study, overview of the objective and rationale of the study, data collection and sample, and outcomes expected of the research.

1.6.2 Chapter II – Literature review and themes are discussed in detail in this chapter.

1.6.3 Chapter III – This part shows an overview of findings and sampling methods used to develop the research.

1.6.4 Chapter IV – Data analysis, findings, and a deep examination of each question from the survey appear in this section.

1.6.5 Chapter V – that is the final part of the study, comprising conclusion, recommendations and limitations faced during the development of this research.

CHAPTER II (2000)

“What is the public opinion about using augmented reality in business?”

Literature Review

2.1 Introduction

As stated in the book *The Case for Mental Imagery* (Stephen Michael Kosslyn, Thompson and Giorgio Ganis, 2006), some people do not have the ability to imagine the experience of using a product or service, considering that only 50% of the cerebral cortex is devoted to visual processing. According to UNSW Business School research, AR technology can greatly influence the customer decision-making process by producing a more tangible product (Heller, 2019). Jonas Heller is a former Research Student in the School of Marketing at UNSW Business School. Along with his supervisors Mathew Chylinski and Ko de Ruyter, he developed a study based on the impacts of mental imagery on the consumer decision-making process when buying online (Heller, 2019). The research was developed to assist companies in the implementation of AR technology in their business. During the research, Heller and his supervisors discovered that people's willingness of buying a product is directly connected to the way a product is presented. In one of the studies, they presented a 2D product vs. an AR hologram to a sample, and people chose the 3D product over the 2D product (Heller, 2019). The findings are crucial for businesses interested in the kind of AR applications they might create and deploy in their company.

Since the beginning of retail history, people are used to going to a physical store, touching the products, checking the functionality, and experiencing the service it provides, and after this analysis, they could decide if it was worth spending their money or not. And then e-Commerce happened, intending to expand the business's reach and increase sales. But something is still missing, considering that some people did not adapt to online shopping. AR technology has the potential to change it, based on the ‘real’ interaction it provides, the deeper insight of the product, which allows customers to try on and have the same experience they would have in store or maybe better, regardless of their location. Using IKEA as an example, that allows customers ‘to bring home’ any furniture they see displayed in the showroom, to check if it matches with the decoration, or fits in the room, everything through their AR app. Dulux on other hand, allows customers to test the colour of any painting in their home, making the

visualization better for the customers. According to another research, it is believed that online shopping increased consumers' uncertainty about a product and its features, but with the use of augmented reality, people are feeling more confident and even have access to enough information to purchase products through an eCommerce platform. (Chunhua, 2022)

Augmented Reality: reaching customers through retail

Through AR apps, consumers can test products in their homes, facilitating the decision process, enhancing customer experience, and reducing the return rate. This measure improves customer satisfaction, generating a good relationship between customers and the brand, and potentially increasing consumer loyalty.

The fashion industry is known for its highly customer-centred approach and is considered an early adopter due to its readiness to use technological advancements to improve its activities, always focusing on customer behaviour and demands. The haute couture and luxury brand Gucci partnership with Snapp Chat to allow consumers to 'wear' their shoes using Snapp Chats' AR try on the lens (Hobbs, 2020). The approach is the same used by other brands like Nike, L'Oréal, Ray-Ban, Lacoste, ASOS, and Burberry, engaging and attracting customers through augmented reality apps. Brands like L'Oréal and Sephora were early adopters and started offering this service a few years ago, facilitating for customers to try on make-up and even change the colour of their hair through the technology called 'Magic Mirror', an augmented reality app. This type of technology is time-saving, and also provides better visualization of the results, reducing the return rate of products, and increasing customer satisfaction with the purchase.

Augmented reality is the promise of disruptive innovation that will change our lives, the first one since the launching of Smartphones. During an interview, Apple's CEO Tim Cook said that in the near future, augmented reality will have the same importance in our lives as having 'three meals a day' (Leswing, 2016). Big companies like Google, Microsoft, Apple and Facebook are heavily investing in augmented reality technology (Watson, 2022).

AR technology is already impacting our daily routine, through face recognition that unlocks a device, or during sports broadcasting when holograms appear to the audience. The entertainment sector has been using AR technology for years but was through the launch of the

Pokémon Go AR app that people could experience this revolutionary technology, and it helped to improve AR acceptance by the public, placing the experience in the spotlight. According to the Guinness World Records website, Pokémon Go achieved five world records after just a month of its release and generated revenue growth of \$206.5 million only in its first month of use (Swatman, 2016).

Augmented Reality: education

Apart from the entertainment, gaming, tourism and fashion industries, augmented reality can be a useful tool assisting teachers and lectures for purposes of education. AR has been impacting the educational system, helping teachers in lectures with holograms, graphics, sounds and videos, enhancing the learning skills of students in an interactive way. In the medical field, students are able to see more details of a body, through a hologram, do not have to waste time dissecting corpses and have access to parts they could never reach before. According to an article from the Medical Education Online website (Dhar et al., 2021), Covid-19 harmed medical training/ education, with students unable to have practical lessons. Just imagine how different this scenario would be if the technology provided by AR was equally available to each student.

Nevertheless, a lot must be improved in terms of teachers' and students' readiness. Although the structure to provide this type of technology is very expensive at the moment, training is a crucial part of the process, in order to accomplish good results. Resistance to change has to be taken into consideration, given some people are technology averse and that could jeopardize the whole process of implementation of this new technology.

Augmented Reality: consumer decision-making process

Augmented reality has been used as a powerful tool by brands, to persuade consumers to buy more and faster. The consumer decision-making process has five steps, problem recognition, information search, alternatives evaluation, purchase decision, and post-purchasing evaluation. By using AR technology, brands are influencing customers to skip a few steps, providing a completely new and interactive experience during the purchasing of products.

Although AR is a useful tool and can help brands to manipulate consumer decisions, is still an

expensive technology that cannot be used by many. The readiness of consumers is another important factor to be taken into consideration because if consumers do not have access to the technology that is used by brands, there is no interaction between them.

Considering the information above, the research area is Augmented Reality technology and its influence on the consumer decision-making process. The objective of this research is to identify the technology readiness of the population, the acceptance of this new technology, the shopping preferences of consumers, and the impact augmented reality already have on people's purchasing habits.

2.2 Mental Imagery influence in the use of AR

According to Jonas Heller's study, mental imagery plays a fundamental role in a customer's experience (Heller, 2019). Most people do not have the ability to imagine products in their minds, so the use of augmented reality in the retail sector for online shopping enhances customer experience, assisting people in customer decision-making. His study is focused on the use of augmented reality in the retail sector, and the potential it has to make a product tangible to consumers. The author also highlights the lack of investment in this technology by retailers who had a bad experience in the early adoption. It is said that little research was conducted in this field, to measure the readiness of companies in adopting such technology.

Another factor is the engagement of customers while using the app through their mobile, which is called Mobile Augmented Reality (MAR). Research conducted by four students at Tampere University showed the relationship between users' expectations vs experience (Thomas Olsson, 2011). The research was conducted in 2009 when augmented reality was still unknown to most of the population. Results showed that users' expectations should be taken into consideration over experience.

A study was conducted in South Korea, where more than 300 people bought makeup products using augmented reality. The study showed that with the help of AR, mental imagery was activated, and the sample had more engagement with the products, making it easier to purchase the products. The research provided enough material to prove that retailers should invest in designing efficient channels for mobile shopping (Minjung Park, 2020).

Based on the studies above, it is right to say that an immersive online shopping experience using 3D images has a higher efficacy compared to a 2D shopping experience. Most people prefer to wear/ use services and products beforehand the purchase, and the possibility of having this experience regardless of location is amazing. So, customers do not have to queue or face traffic jams, and then parking issues to get to the retailer. Just from the comfort of its home, or during lunchtime at work, people can try on products and purchase anything they want and need, without having to dislocate.

2.3 The willingness of consumers in adopting AR

In order to make the technology popular among the population, big tech companies work hard to implement innovative ideas into peoples' daily routines. Augmented reality is no exception. Social media has been integrating this disruptive technology in a very discrete way, through filters and apps that allow people to learn how to use the technology interactively. But sometimes it does not depend on the service provider. Augmented technology requires a great internet connection as well, and the device used needs to have a certain degree of technical support to run the software properly.

According to the website Nilsen IQ, people are busier than ever, and as much as online shopping is a timesaver, alongside AR it can become an extraordinary tool, providing the in-store experience, regardless of the location. The research was conducted, and it was found that 51% of the participants said that they are willing to use AR to purchase products. (Nielsen IQ, 2019) Based on the previous statements, it is right to say that as long as augmented technology is reachable to the population, people would probably start using it, taking into consideration the convenience and experience.

2.4 The diverse uses of augmented reality

Education, medical purposes, retail, military, leisure, and augmented reality has multiple uses, and they can be adapted independently of their intent of use. During the pandemic, lectures from medical colleges said that a lot could be done if augmented reality was available for students. According to Pew Research Centre, mobile technology use has duplicated in the past decade, increasing from 35% in 2011 to 81% in 2019 (Maryville University, n.d.).

Another field that is growing fast with the support of AR is the retail sector. Augmented reality generates an immersive experience for consumers, improving online shopping. The medical sector has been helping with critical surgeries and training. Students now can analyse bodies with the support of AR.

In the military, soldiers have access to augmented reality through the Integrated Visual Augmentation System, which provides the enemy's location, maps, alternative routes, and others. According to an article from the website Popular Mechanics, the US Army is starting to receive thousands of AR equipment, being the largest improvement made since the body armour (Mizokami, 2022)

2.5 The rise of technology – AR in the future

“Throughout the last years, AR apps became transportable and generally available on various devices. Besides, AR begins to occupy its place in our audio-visual media and to be used in various fields in our life in tangible and exciting ways such as news, sports and is used in many domains in our life such as electronic commerce, promotion, design, and business.” (Abrar Omar Alkhamisi, 2013).

The statement above was extracted from research conducted in 2013, where the author had the objective of highlighting the uses of AR in the current time of the study and also forecasting the uses of augmented reality. Based on that information, it is possible to affirm that AR has been improving its features, and at this moment, it is much more tangible and reachable to the public.

Nowadays, consumers can purchase products using AR. Teachers and students can take advantage of the incredible features, and be transported to another world, still being in the real one. Although AR has been providing excellent results in several industries, a lot needs to be done in order to reach popularity within society. This is just the beginning of the use of augmented reality, and as soon as its technological characteristics evolve, a lot will be accomplished.

CHAPTER III

“What is the public opinion about using augmented reality in business?”

Methodology

It will be discussed in this chapter what methodology was adopted to conduct the research. That are several approaches, such as ontology, epistemology, inductive, deductive, and so on. They all encompass a range of different perspectives, and it takes into consideration if the research data will be collected by questionnaire, survey, interview, focus groups with emphasis on observational approach, etc. The type of question is another important factor, such as open-ended or close-ended, so the focus would be on the type of outcome expected from the author.

3.1 Theoretical Paradigm

This study was conducted based on an epistemology approach. The objective was to find out what people know about augmented reality, and the way it affects their lives, and then analyse the feasibility for businesses to invest in this technology. Considering this approach, it was implemented an online survey with close-ended questions only, using the deductive approach to interpret the results. A post-positivism approach was present during the development of the questionnaire, in order to diminish the bias that could be generated because of the complexity of the topic. It was also an attempt to avoid any deep answers and ideas, that could have led to a change of focus of the research. Taking into account the last statement, two interviews were also conducted, since a deductive approach did not provide a deeper understanding of what experts know about this technology. So, an inductive approach was also used as an attempt to answer the research question from an expert point of view.

3.2 Research Method

The research method used was multiple methods, more specifically the mixed methods simple. So, a concurrent mixed-method design was used for the purpose of this research. Due to the complexity of the subject of study, in qualitative research, closed-end questions were made to focus only on the topic asked. Taking into consideration through the quantitative method is not possible to have comprehensive answers, two interviews were conducted, with the objective to clarify some points.

It was clear during the course of the research that an inductive approach would be the best way to conduct this research. Probably a focus group with comparative testing, where people experience/purchase products using the website of a company with all the 2D features, and then another approach where people experience/purchase products using augmented reality. That would definitely be the right approach to get more accurate outcomes.

3.3 Sampling technique and sample size

In this research, it was used the nonprobability sampling technique, with an emphasis on convenience sampling and snowball sampling. The first group was attained through social media channels, work, and college. The second group was reached through word of mouth, using the first group as a reference.

For the quantitative method, the sample group did not separate digital natives from digital immigrants, and it comprised all four generations: Baby Boomers, Gen X, Millennials and Gen Z, with the range of ages between 18 to 57+. The reason all four generations were included in this research was to gather sufficient data from a small sample of the population, which contained as different individuals as possible, to show the way people have different perspectives about the use of AR technology. The survey counted 100 participants, all residents of Dublin.

In qualitative research, the interview counted two people participating, and they were called P1 (person 1) and P2 (person 2). The data was collected by convenience sampling and also based on the different technical levels of the participants. P1 works as an IT and has used augmented and virtual reality before. This person has the Oculus VR and has been using augmented reality for leisure purposes. P2, on other hand, does not work in the technological field and carries an average knowledge about the topic. So, a comparison could be made using these two individuals as a reference.

3.4 Data Collection Method

The data for this research was collected through an online survey, in which the link was shared among friends, acquaintances, peers, social media groups, and colleagues, using Facebook, Instagram, WhatsApp, and email. The survey was created using Google Forms, consisting of

14 closed-end questions, 13 of which were multiple choices and 1 checkbox grid.

The interviews were open-ended, contacting both participants via WhatsApp. The objective of open-ended interviews was to allow both people to express their opinion about the subject, providing in-depth answers and contrasting both points of view.

3.5 Thematic Table

| Questions | Interviews |
|--|---|
| 1. Occupation | IT, owner of a software company. Entrepreneur, food industry business. |
| 2. First access to technology | Had its first computer when 14 years old. Had access to video games and computer when was a teenager. |
| 3. Immersive shopping experience | Yes, it is important. Yes, it is important. |
| 4. Buying products using AR | Already bought products using VR. Never bought products using AR. |
| 5. Try-on/experience products before purchase | Yes, very important. More chances to make a sale. Not for all products/ services. Yes, very important. Reduce the chances of customer dissatisfaction. |

Table 1

3.6 Ethical section

For the purpose of this research, it was used common language, and when needed, a short explanation was provided to the sample. It was included in the survey's short explanatory video,

for example, to make sure people would understand exactly what augmented reality is, and that way, eliminating any miscommunication that could change the results. Pictures were also included, illustrating the questions.

A consent form was included in the survey, and people could only proceed to the questionnaire if they agreed with the clauses. It was not collected private information from the sample who answered the survey. In the interviews, the names and occupations of each participant were collected, but they will be saved only in case of enquiries from Independent College.

CHAPTER IV

“What is the public opinion about using augmented reality in business?”

Results/ Findings

4.1 Introduction

The research results and outcomes will be presented in this chapter. The objective of data collection was basically to determine what the public in general think of the adoption of Augmented reality in retail. This study has also the purpose of discovering the technology readiness of a sample of the population, although it was not conducted any study focusing on TRL (technology readiness level).

A questionnaire was developed using Google Forms, and its distribution was entirely online, through social media, email, and WhatsApp. Approximately 100 people answered the questionnaire, 50.5% women, 40.4% men, and 9.1% non-binary or others. The survey counted on a total of 14 questions, and only after gathering the first results, it was possible to determine that a few more questions could have been added, to get more information from the samples.

It was also possible to notice that few interviews would have to be made, in order to gather deeper understanding and information. As mentioned before in chapter III, section 3.7, for the matter of this study, a focus group with the application of the Technology Acceptance Model (TAM) would be the best approach, but the lack of time and resources was the main issue.

4.2 Data Analysis

All the information gathered for this study was a result of an online survey and two interviews made via WhatsApp. The interview transcription was made by hand, and the results gathered from Google Forms were extracted from the webpage.

4.3 Findings

The number of participants was around 100, but since the only mandatory question was the

electronic consent, where the 100 people agreed to participate, some questions had only 98, 99 answers.

4.3.1 Does an immersive shopping experience bring more value for you when considering the purchase of a product?

This question has an important context to the research, considering that augmented reality provides an immersive experience to its users. Around 35.7% of the sample said 'yes', 19.4% said 'no', and most people said that maybe, depending on the product, comprising 44.9% of the sample. Which means that most people probably consider the products' complexity to decide if an immersive experience is needed.

According to a study conducted to analyse the effects of augmented reality versus traditional advertising, it was proved that when people use AR for the purpose of purchasing a product, the technology enhances customer experience, facilitating the decision making. (Pozharliev, 2021)

4.3.2 Knowledge about Augmented Reality

A massive percentage of participants, around 71.7%, already know or heard about AR. Still, a considerable number of people are said that do not know or never heard about AR a total of 28.3% of the sample.

4.3.3 The importance of visualize products before purchasing

Another rating question, participants could choose between the same options mentioned in section 4.3.7, and the majority of people said that they consider important to envision a product in different colors, comprising a total of 44.4%, followed by 31.3% who said it is very important, and 14.1% who had a neutral opinion.

4.3.4 What are the factors that influence your decision before purchasing a product?

Another question where participants could choose more than one option. Among the alternatives was functionality, price, quality, status, design and previous positive experience with the brand. Most people chose price, with 62 votes. Followed by quality (61 votes), functionality (49 votes), and previous positive experience, with 38 votes.

4.4 Interview

Two interviews were conducted. The individuals were called Person 1 and Person 2. The interviews occurred via WhatsApp, and it was made by typing and voice message. Five questions were asked, and the results will be shown below.

The interviewees had a different occupation. P1 is an IT professional, enthusiastic about AR and VR technology, always following technological trends, and passionate about the subject. P2 is an entrepreneur and works in the food industry. This person does not have frequent engagement with technological advancements, so the result of their interviews was completely different. P1 has a specialist approach, while P2 is more like most of the population, and has very little understanding of the subject.

P1 has an Oculus and has bought games in the virtual world using this technology. This person has experienced augmented reality but has never made any purchasing. The opinion of P1 about augmented reality is that this technology is innovative and incredible, but only a few people have access still, so it might take some time until it gets popular among ordinary people.

P2 has no experience or knowledge about augmented reality, which gives us a notion of the reality of this business. Most people do not know what augmented reality is and what its use is. In the questionnaire, 28.3% of the sample still do not know or never heard about this technology. Maybe they have no access to technological devices or do not have an interest in the subject.

In order to make augmented reality popular, companies are investing in social media, like Gucci in partnership with TikTok. That is probably something we will see a lot in the future, a strategy to make the technology popular among all generations, especially Millennials, to reduce product uncertainty.

CHAPTER V

Conclusions

5.1 Summary of the Study

Augmented reality is a disruptive technology with the power of replacing mobile phones in the next 10 years or even less. Customers' demands and the super busy lifestyle of people nowadays are urging for a more convenient option while buying online, allowing users to buy any product regardless of their location or the time.

This innovative technology has several features and also can be an ally for people who suffer from depression or anxiety, for example, and cannot leave their houses. These people can buy an immersive experience, and do not have to be excluded anymore.

AR enables people to buy anything they want and need, they can study from home and still have access to practical classes. The medical segment can provide more accurate and efficient treatments and exams, and in some cases, people do not have to commute to try on a pair of shoes they saw on sale on a website, for example. A lot of research and studies have been conducted, spreading information about augmented reality, and that way, educating people about its usage and benefits.

Big tech companies are investing billions in this technology, and the feasibility to make it reachable to the public is getting closer year by year. People are already using AR, in games, social media, and retail. It is just a matter of time until this disruptive technology replaces mobile phones and surpasses virtual reality in terms of popularity.

5.2 Limitations

Although it was possible to come up with some interesting results from both methods, online survey and interviews, this study still lacks a practical method. Because of the complexity of the theme and the lack of time after narrowed the research focus, and it was not possible to conduct any of the methodologies needed to deliver a complete study.

5.3 Recommendations

Considering that augmented reality is a wide subject, with many uses, until the topic was finally narrowed, there was not enough time left to organise the focus groups. I would highly recommend that for the improvement of this research, another study should be conducted, and certainly include a focus group approach.

For example, in the online survey, question

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APPENDICES

Augmented Reality - technology readiness, acceptance of users and opportunities for businesses

This research aims to find out the level of technological readiness of the population in relation to the use of Augmented Reality, and how businesses can benefit themselves through the adoption of this disruptive innovation.

Your participation in this research study is voluntary. You may choose not to participate. If you decide to participate in this research survey, you may withdraw at any time.

The procedure involves filling an online survey. Your responses will be confidential, and we do not collect identifying information such as your name, email address or IP address. The survey questions will be about the readiness of people to adopt Augmented Reality technology, whether they already use it or not. This research project aims to identify the main reason that would make people start using Augmented Reality in their daily life.

We will do our best to keep your information confidential. All data is stored in a password protected electronic format. To help protect your confidentiality, the surveys will not contain information that will personally identify you. The results of this study will be used for scholarly purposes only and may be shared with academic staff in ICD.

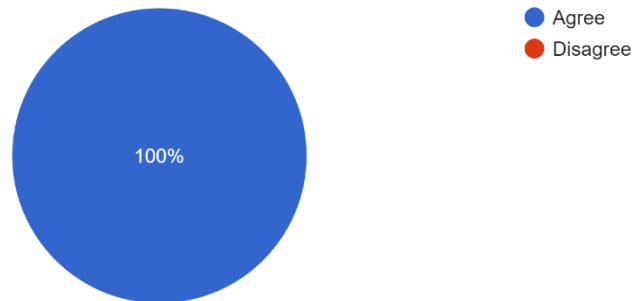
This research is being carried out by Daniele Mendes as part of a Degree in Business Studies in Independent College Dublin. The study is being conducted under the supervision of Professor Declan Faughey and Dr. Daniel O’Sullivan (School of Business ICD) and has been granted ethical approval by Independent College Dublin.

If you have any questions about the research study, please contact Dr. Daniel O’Sullivan

daniel.osullivan@independentcolleges.ie

This research has been reviewed according to Independent College Dublin procedures for research involving human subjects.

ELECTRONIC CONSENT: Please select your choice below. Clicking on the "agree" button below indicates that: • you have read the above informati... participation by clicking on the "disagree" button.
100 responses

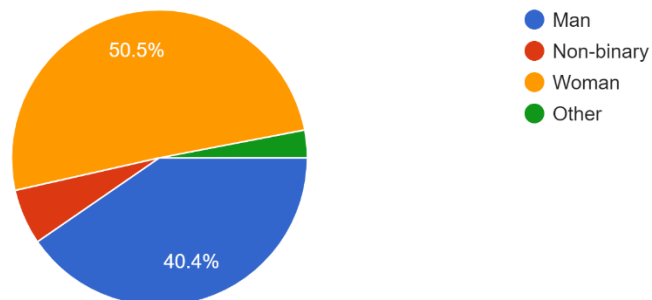


Appendix 2: Online Survey Questionnaire

QUESTION 1

How do you identify your gender?

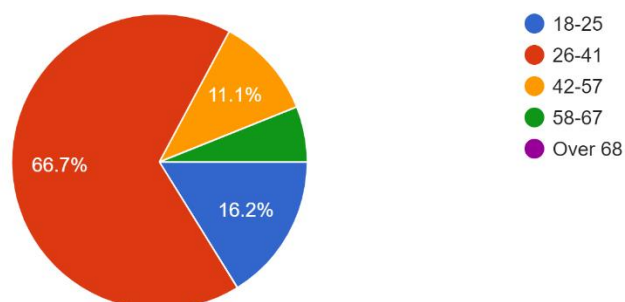
99 responses



QUESTION 2

What is your age range?

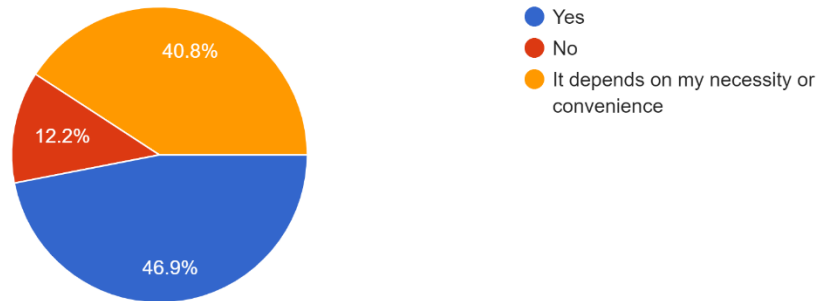
99 responses



QUESTION 3

Do you consider yourself a person interested in technological advancements?

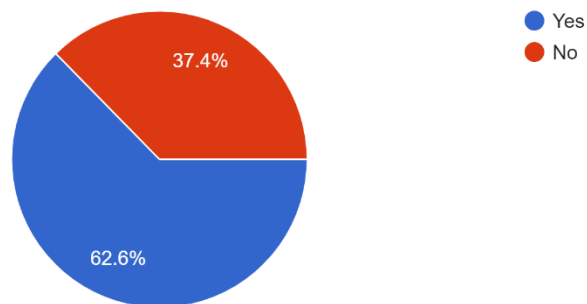
98 responses



QUESTION 4

Did you have access to technological devices such as computers and mobile phones, in your childhood?

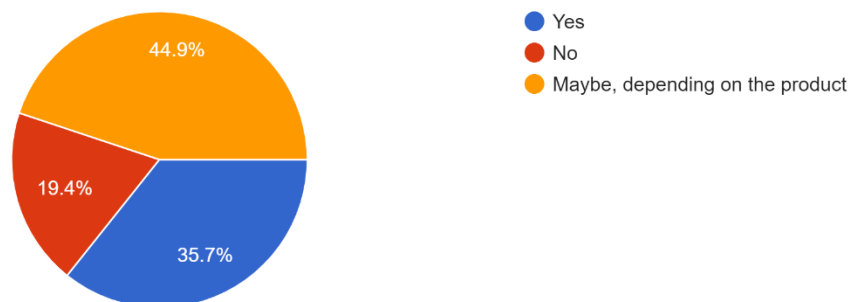
99 responses



QUESTION 5

Does an immersive shopping experience bring more value for you when considering the purchase of a product?

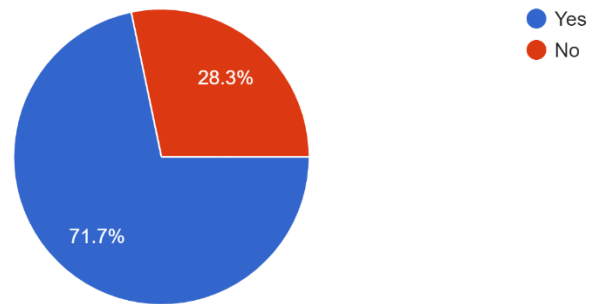
98 responses



QUESTION 6

Have you ever heard about Augmented Reality?

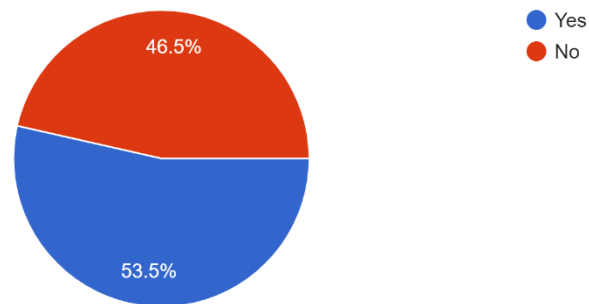
99 responses



QUESTION 7

Have you ever played any online game using Augmented Reality (i.e.: Pokémon Go)?

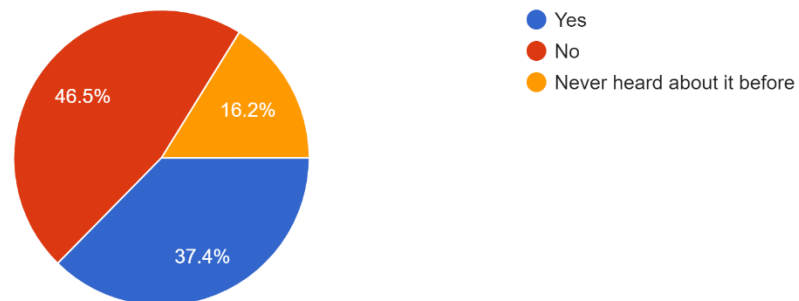
99 responses



QUESTION 8

Have you ever used any Augmented Reality app to buy products online (i.e., IKEA)?

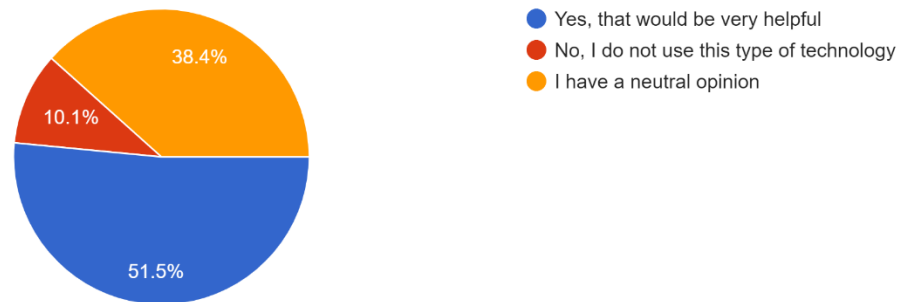
99 responses



QUESTION 9

Would you like to see more companies in Dublin adopting Augmented Reality technology?

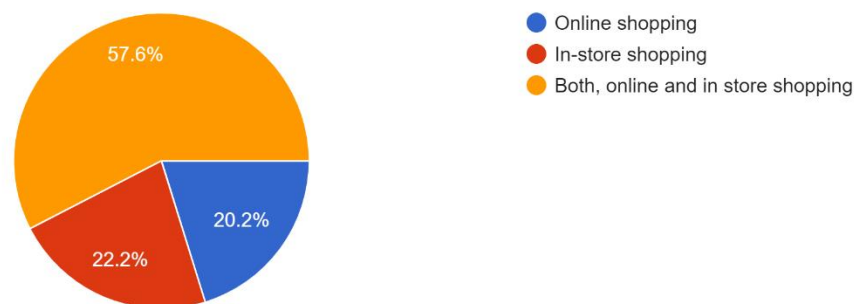
99 responses



QUESTION 10

How do you usually buy products such as clothing, accessories and technological devices?

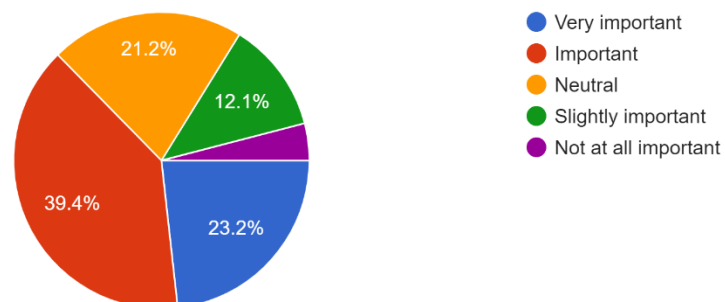
99 responses



QUESTION 11

How important is it for you to try-on/ use the products before purchasing?

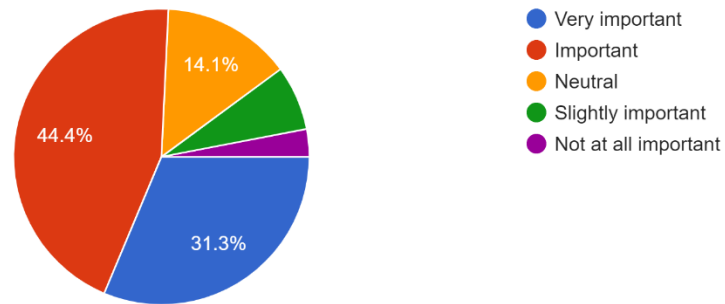
99 responses



QUESTION 12

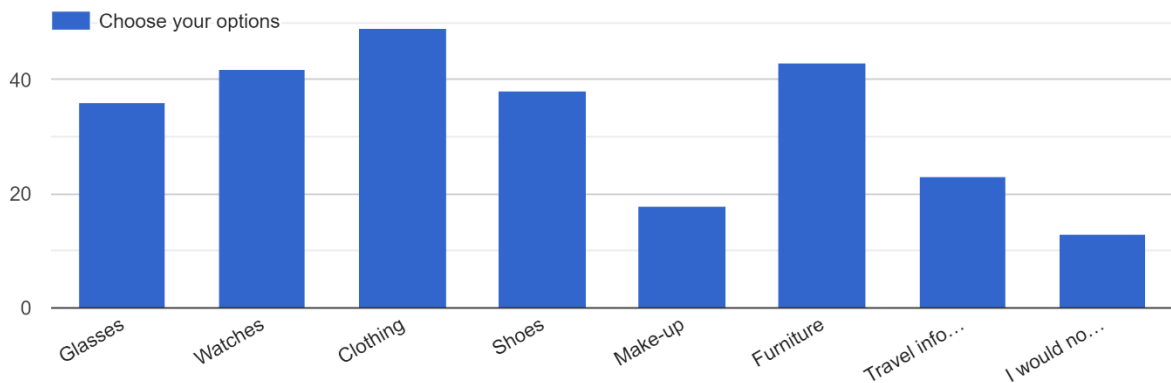
How important is it for you to visualise a product in different colours before purchasing?

99 responses



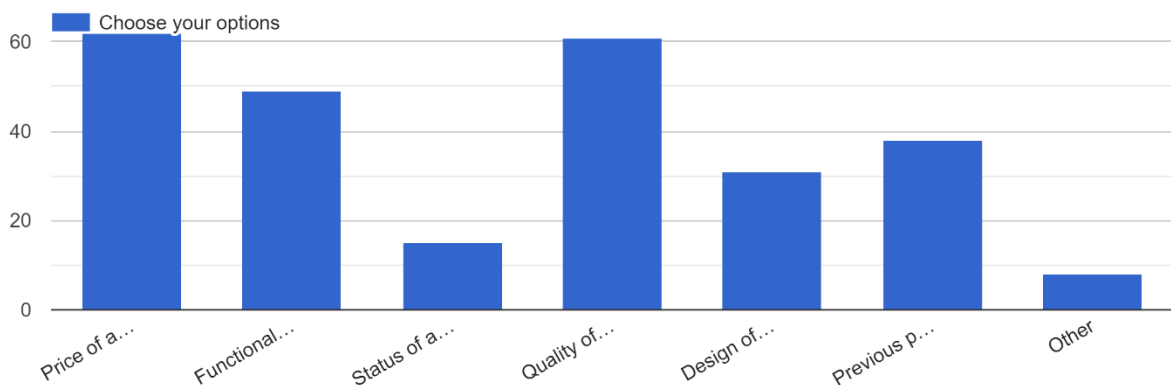
QUESTION 13

Which of the products listed below would you definitely buy online if you could try-on/ experience using Augmented Reality technology? (You can choose more than one option)



QUESTION 14

What are the factors that influence your decision before purchasing a product?



Link to access online survey:

https://docs.google.com/forms/d/e/1FAIpQLSdGpXd3HocN8J88imOqwHP1MzJZ4H0Pj1QYHf6lAG4-jodCKQ/viewform?usp=sf_link

Appendix 3: Interview Transcription

Person 1

Interviewer: What is your occupation?

Interviewee: My name is P1, product owner at Trimbo, international company that works with technology.

Also owner of a software company called Brain Legacy Tech, that develops SAS software. And also I am a VR/AR enthusiastic, I have one device, I use it, and I'm very passionate about it.

Did you have access to technology in your childhood?

I had access to my first computer when I was 14 (years old), so now I am 44, so I know about technology for 30 years, however, in relation to AR/VR I have bought my first OCULUS in 2020, when the Covid arrived.

Does an immersive shopping experience bring more value for you when considering the purchase of a product?

So I think an immersive shopping experience is important, yes, I think this is very new, a lot of people have never tried to shop inside one VR one immersive experience, I have

bought some games inside my Oculus. It is very interesting, however, I did not have a full experience in an immersive shopping like choosing clothes, or see a house. I have seen many many videos, but not actual buying after to see something in the virtual world. So yes, I consider a immersive shopping experience important, for people who are already in (inside) the AR/VR world.

Have you ever bought any products using AR? If yes, which one?

Yes, I have bought a product using VR, not AR. I have installed, not bought, Pokémon Go and other AR apps, and I have tested some AR engines to create some experiences, when I was teaching in Tallaght, I helped so many users there to use AR, to do more interactive classes for the students. So then I studied so many apps, but I did not buy anything. So the experience to buy something online was through my Oculus, and I bought one game called Vader, and this experience I bought inside my glass. However it was a printed catalogue in front of myself, and had a video that showed the experience of the Vader game, then I just pressed the button and click 'buy', and everything was set up and I have bought my first product in VR environment. But I think the experience was very weak, because I really would like to go inside the game first, and live (experience) in VR, and then buy something in VR. I did not really considered really a fully VR experience, immersive shopping, because is really a list of games I pressed click. I know we are inside the VR world, and then it is considered immersive shopping but I do not agree that it was a fully experience.

In your opinion, is it important to try on/ experience a product/ service before purchasing? Why?

Absolutely sure. For me is very very important to try a product before purchasing. So I think we can use experience (as an example) of going (when you go) to the supermarket and try (taste) a new cookie or butter, and then you like it and you buy it. So it works for the software as well, you can have access for free, and if you really like it you can pay after (you had tried), to keep using that same software. So I think is more than important, it's vital to have a good shopping experience before purchasing, and try before. I know that you cannot try some services like a doctor, how can you try its services if you are not sick. But if you are sick, you just want your medicine, and you do not care much about the experience, because you are sick. But there are so many things in tourism and clothing, and things that you can try virtually like, for example, to visit a living room or a hotel room, you can use virtual reality to go there and try to see your feelings, if you like, then you can rent that room. Or you can get a copy, digital copy for a product like a printer, a machine, and see the simulation of that and if you like the reality then you can buy that physical product, for example, you could simulate to do a coffee,

with a espresso machine. So online you put the capsule, you put your mug, then you see the coffee coming, then you have an experience before, to break your way to do coffee. This kind of disruptive possibilities in a virtual world is so good and so important to people that really move forward to buy things. So, in that perspective I think this kind of purchase (product) is very important to try before when this kind of purchase is disruptive. Then that's it, that;s my opinion about how important is to buy things. In relation to expensive product that you put as well, I think is the best thing is to go (in person), to buy a house, is better if you go, or to buy a car, go in person, to see the car, sit in the car. However if yoi cannot go, or the car store is too far from you (location), if you have a VR glass, and you can go there (virtually), and check the car or check the house, and you try to feel what you are feeling inside the house, inside the car, so is going to be a fantastic experience to purchase that real expensive product. That's my opinion.

Person 2

Interviewer: What is your occupation?

Interviewee: Hi, I'm P2 and I am an entrepreneur, business company owner, working in the food industry here in Dublin.

Did you have access to technological devices during your childhood?

When I was very young, I did not have access to any technology. But during my teenagerhood I was introduced to video games and computers with diskette drive.

Do you consider an immersive shopping experience important?

The experience, the shopping experience is very important, is immersive because is more accurate, you avoid mistake, and is very important because you are afraid of spend your money in everything, so you have to find the right choice.

Have you ever bought any products using AR? If yes, which one?

As far as I remember, no, I haven't bought any product with the AR, but I don't know if I had the chance to buy from the AR.

In your opinion, is it important to try on/ experience a product/ service before purchasing? Why?

Yes is very important, especially if you are very young, and you don't have enough cash, enough money. So if you can have a more accurate, a more precision in the buying. Yes, it is very important.

Appendix 5: Copy of Ethical Form A

Form A: Application for Ethical Approval

Undergraduate/Taught Postgraduate Research

This form should be submitted to the module leader for the relevant initial proposal and/or the relevant supervisor if the proposal has already been accepted.

Please save this file as **STUDENT NUMBER_AEA_FormA.docx**

| | |
|--------------------------|----------------------|
| Title of Project | Applied Project 2 |
| Name of Learner | Daniele Mendes Perez |
| Student Number | 51707292 |
| Name of Supervisor/Tutor | Declan Faughey |

Check the relevant boxes. All questions must be answered before submitting to the relevant lecturer / supervisor. Note: only one box per row should be selected.

| Item | Question | Yes | No | NA |
|------|---|-------------------------------------|--------------------------|-------------------------------------|
| 1 | Will you describe the main research procedures to participants in advance, so that they are informed about what to expect? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2 | Will you tell participants that their participation is voluntary? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 3 | Will you obtain written consent for participation (through a signed or 'ticked' consent form)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4 | If the research is observational, will you ask participants for their consent to being observed. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5 | Will you tell participants that they may withdraw from the research at any time and for any reason? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 6 | Will you give participants the option of not answering any question they do not want to answer? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7 | Will you ensure that participant data will be treated with full confidentiality and anonymity and, if published, will not be identifiable as any individual or group? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 8 | Will you debrief participants at the end of their participation (i.e., give them a brief explanation of the study)? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 9 | If your study involves people between 16 and 18 years, will you ensure that passive consent is obtained from parents/guardians, with active consent obtained from both the child and their school/organisation? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 10 | If your study involves people less than 16 years, will you ensure that <u>active</u> consent is obtained from parents/guardians <u>and</u> that a parent/guardian or their nominee (such as a teacher) will be present throughout the data collection period? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 11 | If your study requires evaluation by an ethics committee/board at an external agency, will you wait until you have approval from both the Independent College Dublin and the external ethics committee before starting data collection. | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

| Item | Question | Yes | No | NA |
|------|--|-------------------------------------|-------------------------------------|-------------------------------------|
| 12 | If you are in a position of authority over your participants (for example, if you are their instructor/tutor/manager/examiner etc.) will you inform participants in writing that their grades and/or evaluation will be in no way affected by their participation (or lack thereof) in your research? | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 13 | If you are in a position of authority over your participants (for example, if you are their instructor/tutor/manager/examiner etc.), does your study involve asking participants about their academic or professional achievements, motivations, abilities or philosophies? (please note that this does not apply to QA1 or QA3 forms, or questionnaires limited to market research, that do not require ethical approval from the IREC) | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 14 | Will your project involve deliberately misleading participants in any way? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 15 | Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 16 | Does your project involve work with animals? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 17 | Do you plan to give individual feedback to participants regarding their scores on any task or scale? | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 18 | Does your study examine any sensitive topics (such as, but not limited to, religion, sexuality, alcohol, crime, drugs, mental health, physical health, etc.) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 19 | Is your study designed to change the mental state of participants in any negative way (such as inducing aggression, frustration, etc?) | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 20 | Does your study involve an external agency (e.g. for recruitment)? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 21 | Do your participants fall into any of the following special groups? | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| | | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |

(except where one or more individuals with such characteristics may naturally occur within a general population, such as a sample of students)

| | |
|--|-------------------------------------|
| <p>If you have ticked any of the shaded boxes above, you should consult with your module leader / supervisor immediately. You will need to fill in Form B Ethical Approval and submit it to the Research & Ethics Committee instead of this form.</p> <p>There is an obligation on the researcher to bring to the attention of the Research & Ethics Committee any issues with ethical implications not clearly covered by the above checklist.</p> | |
| <p>I consider that this project has no significant ethical implications to be brought before the relevant Research & Ethics Committee. I have read and understood the specific guidelines for completion of Ethics Application Forms. I am familiar with the codes of professional ethics relevant to my discipline (and have discussed them with my supervisor).</p> | <input checked="" type="checkbox"/> |
| Name of Learner | Daniele Mendes Perez |
| Student Number | 51707292 |
| Date | 30/11/2022 |
| <p>I have discussed this project with the learner in question, and I agree that it has no significant ethical implications to be brought before the Research & Ethics Committee.</p> | <input checked="" type="checkbox"/> |
| Name of Supervisor/Lecturer | Declan Faughey |
| Date | 30/11/2022 |