

THE AUGMENTED REALITY AS A SALES PROMOTION TOOL

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Abstract

This article addresses the use of augmented reality content as a part of the point of sale promotion strategy. The main research question is to determine whether the use of an application with augmented reality can facilitate the visualization and localization of the promotions available at the physical point of sale and, consequently, influence the shopping experience. To answer this question, an application was created with augmented reality content, so that it can measure the influence that this technology can have on the perception of promotions within stores. The general objective of the study is to identify whether the use of this application, in the context of supermarkets, could facilitate the visualization and localization of promotions in comparison with conventional disclosure approaches. Based on a literature review with authors from different areas, this article summarizes an ongoing investigation and at the end details the future steps of the research.

Keywords

Augmented reality; merchandising; promotion; interaction design; advertising; human-computer-interaction.

Introduction

The environment provided by the points of sale, usually called the shopping atmosphere, is strongly linked to consumer perceptions (Pizzi, Scarpi, Pichierra & Vannucci, 2019). In the purchasing process, the impulse is a strong internal stimulus that leads to action. Due to impulse purchases, the consumer is seen by the seller as an individual driven by perceptions. In this context, points of sale use promotion strategies to try to seduce and persuade people to consume the products on display (Friestad & Wright, 1994). This practice can encompass any technique, action, or promotional material used at the point of sale that provides better information and visibility to products and brands, to influence perceptions and induce purchase. Using information technology tools as a differential for the resulting decisions becomes more frequent in the market, and using them efficiently in the merchandising strategy can captivate and conquer the consumer, value the product or service, ensuring the marketer a better highlight of their promotional actions. Following this reasoning, it can be said that technologies such as augmented reality (AR), if properly applied to the commercial and marketing context, can generate a disruptive revolution in the way products are presented to the consumer in the shopping atmosphere. The flood of mobile devices in the market and the

abundance of information available to each individual have been completely reformulating communication, uses, and consumer attitudes (Vilkina & Klimovets, 2020). Due to these perspectives, this article addresses the use of content in AR as part of a promotion strategy. The main research question is to determine whether the use of an AR application can facilitate the viewing and location of promotions available at the physical point of sale and consequently influence positively the shopping experience. Due to the pandemic, it was not possible to conclude the empirical part of the study.

To answer this question, an AR application has been created so that the influence that this technology can have on the perception of promotions within the point of sale can be measured. Strategic points in the aisles of a supermarket of a large Portuguese chain will receive an AR marker. By pointing the device at those locations, the user will see the promotional content related to the products in highlight, with AR. In this survey, two homogeneous groups will be analyzed. The first group will receive the experimental condition, i.e., they will use the AR application developed for this project, while the second group will serve as a control and will walk the aisles of the supermarket and visualize the products without receiving this stimulus. The statistical analysis of questionnaires applied to the participating consumers will allow identifying possible behavioral differences between groups. Finally, questionnaires will also be used, exclusively with the experimental group, to evaluate the usability of the application to be developed.

Literature review

Augmented reality-based computer interfaces have been used in a variety of areas. Initially, AR was used at the points of sale for product advertising. As an example, we can mention the markers, or QR codes of AR printed on product packaging, where the consumer, to observe the manufacturer's message in three dimensions, could access the product page on the Internet by placing the marker in front of the computer camera or mobile device. But today, where the market trend is to become increasingly intelligent, the prospects of using AR are numerous.

According to Dacko (2017), the point-of-sale scenario is being challenged to become smarter and provide greater value to consumers and marketers. An increasingly recognized approach with the potential to enable the smart point of sale is AR applications for mobile devices. According to Javornik (2016), AR has emerged as a relevant interactive technology in the marketing environment and it is increasingly used in the point-of-sale context and often developed as smart device applications.

However, the literature on the use of this technology as a merchandising tool at the point of sale is not very extensive. Therefore, we combine several works from different areas of knowledge. According to Scholz and Smith (2016), the growing media coverage on AR reflects its emerging ubiquity. AR has been discussed in trade publications, business magazines, and national newspapers, but so far has received little attention from marketing academics.

According to Javornik (2016), AR technology has been extensively researched in the areas of information technology and human-computer interaction (HCI), where the

most relevant definitions have also been developed. Höllerer and Schmalstieg (2016, p.3) and Billingham, Clark, and Lee (2015, p.77), refer that the most widely accepted definition was proposed by Azuma (1997): AR is defined as any system that has the following three characteristics: combine real and virtual; be interactive in real-time; be registered in three dimensions.

According to Javornik (2016), AR has emerged as new interactive technology and its unprecedented way of complementing the physical environment with virtual annotations offers innovative ways to access commercially relevant content. However, little is known about how consumers respond to its features. Based on these facts, which highlight the lack of understanding of consumer behavior regarding the technology of AR, this study sees how important it is to analyze the factors that influence the consumer in the decision to buy at the point of sale.

According to Solomon (2002, p.171), the choice of product in the normal purchasing decision process can be influenced by previous purchasing experience, tips from friends or acquaintances, and information that appears at the time of purchase. Dacko (2017) suggests that the trend is for applications with AR to become popular because user satisfaction is relatively high and its use provides systematic experimental benefits as well as advantages for traders. The author also states that its use is positively associated with multiple consequences at the point of sale. AR applications are seen as an element that is changing consumer behavior and are associated with ever-higher evaluations by the retailers who offer them.

For Javornik (2016), AR has the potential to change a large number of consumer activities, including information research and product experimentation. As its use increases, there is a growing need to better understand its impact on consumer behavior and the experience it provides. With this knowledge, marketing professionals can better understand how AR can be used as a tool in various shopping channels for specific purposes. Vilkina and Klimovets (2020) argue that AR expands and supports business efforts in promoting its products by providing contextual links between their offer to consumers, online resources, and points of sale. In the same line of thought, Phunsa (2019) argues that retail business owners are using AR technology for marketing their online shopping as a tool to help the customers simply make their buying decision in the future. For Mowen and Minor (2003, p. 7), consumer analysis should be the foundation of marketing management. It helps managers to: develop the marketing mix; segment the market; position and differentiate products; analyze the environment; develop market research.

To attract and persuade the consumer, within the point of sale, the use of marketing, and the tools that complement it, i.e. the marketing mix, is fundamental. According to Kotler (2000, p.37), marketers use several tools to get the desired responses from their target markets. These tools constitute the marketing mix. Among existing marketing and communication strategies, merchandising is the one that is closest to the audience and most directly interacts with them. Called by some authors as "point-of-sale advertising", merchandising has dynamic and lively characteristics making the product practically offer itself to the consumer. Merchandising is a marketing activity that is aimed at driving goods through the point of sale. According to Las Casas (1993, p.264), the American Marketing Association defines merchandising as "the planning operation

necessary to put the right product on the market, in the right place, at the right time, in the right quantity and at the right price”.

According to Blessa (2001, pp.2-4), the difference between merchandising and sales promotion is that the promotion is done for a certain time while merchandising is constant. According to the author, a sales promotion does not have to identify with the company's image; it has to sell the product at that time. However, a merchandising material has to be strictly following the philosophy and concept of the brand or company, so as not to break the unity in the communication elaborated. For Blessa (2001), merchandising can be understood as the sum of promotional actions and point of sale materials. For this author, it should be clear that merchandising is above sales promotion and uses it to accomplish her action. Merchandising actions, when well developed, constantly applied and correctly exploited, constitute the final stimulus necessary for the purchase to take place. Without a doubt, it is the effective weapon the product has so that the consumer decides for his brand and does not acquire the competing brand. According to Blessa (2001, p. 1-7), the practice of merchandising can encompass any technique, action, or promotional material used at the point of sale that provides better information and visibility to products and brands, to influence purchase decisions. Following the authors' reasoning above, it can be said that the use of techniques with the use of AR, if properly developed and executed, can generate an experience of innovative interactivity in the contact between the consumer and the product in the purchasing atmosphere.

According to Poushneh and Vasquez-Parraga (2017), AR significantly shapes user interactivity, interfering with various characteristics of product quality, and that interactivity subsequently influences user satisfaction and willingness to buy. Martins (1995, p. 17) states that "people go shopping after emotion, not that they are irrational, but it is an emotion that gives meaning to the purchasing decision". According to Poushneh (2018), applications with AR focused on commerce, allow customers to become intelligent buyers, having access to product information, available promotions, coupons, etc. Thus, these applications help buyers make their purchasing decisions. For Dacko (2017), although they receive less attention in the literature and industry studies, applications with AR can add value to store marketers due to the applications' ability to demonstrate the marketer's promotions through the content created and thus support the customer's purchasing decisions; interactively offering customers elements of surprise to entertain and encourage additional interaction; creating experiences that shoppers will share in their networks as a result of the novelty of the AR application, where the viral outcome would be a major attraction in the market; gathering information about customer preferences; supporting multi-channel shopping; and providing a higher level of perceived service. Qiao, Ren, Nan, Liu, Dustdar, and Chen (2019) argue that, due to the newly emerging 5G cellular networks, the mobile AR technologies will have the potential to become a practical and pervasive solution that can effectively scale to millions of end-users. Therefore, the importance of this subject will increase in the future. According to Kotler and Armstrong (2012, p.392), point of sale technologies has become extremely important as competitive tools. Progressive merchants are using advanced IT systems and software to produce better forecasts, control inventory costs, interact electronically with suppliers, send information between stores, and even sell to customers within stores. According to Scholz and Smith (2016), major business companies like Coca-Cola, McDonald's, and General Electric have

already adopted the AR in their marketing programs. They have used AR to create interactive packaging and advertising, enhance the physical point of sale experiences, and develop attractive games. These types of initiatives, using AR, already allow marketers to create immersive narratives and enable consumers to experiment with products and spaces in new ways. According to Martins (1995, p.14), the company has two distinct functions, one is to communicate the advantages of its product (rational marketing), the other is to create an atmosphere of enchantment, the soul, which stimulates imagination and identification with the consumer. For Aaker and Joachimsthaler (2000, pp.9-21), the dissemination of extensive information, especially through media advertising, is unable to reproduce the impact of the client's personal experience with the brand. This author states that consumer experiences related to the brand, generally experienced in the store or at sponsored events, create a relationship that goes beyond loyalty.

Traditional media induce a purchase, but the decision is made in contact with the product at the point of sale. Therefore, all the support materials available to compose the promotional strategy at the point of sale should be seen as attractive to the consumer's perception, consequently, they become sales drivers for the entire trajectory of this product at the point of sale. According to Blessa (2001, p.11), "visual perception is the foundation of any marketing effort to position a brand". These data seem to confirm the Law of Perception, established by the authors Ries and Trout (1993, p.18): "Marketing is not a battle of products. It is a battle of perceptions". For these authors, just as nature and physics have laws, so does marketing. The Law of Perception says that all truth is relative and that people have a sense of personal infallibility. This law states that truth and perception merge in the mind so that there is no difference between the two. "There is no objective reality, there are no facts, there are no products. All that exists in the world of marketing, are the perceptions in the minds of customers, the rest is an illusion".

The consumer, due to impulse purchases, is seen by commerce as an individual driven by perceptions. For this reason, this article suggests that point-of-sale merchandising tactics would be strengthened by the interactivity of applications with AR, creating an innovative way to attract consumer attention. "This technology should have a great impact on people's relationships, through new ways of performing visualization, communication, and interaction with people and information" (Kirner & Siscoutto, 2007, p.11). More recently, Chylinski, Hilken, Heller, Keeling, de Ruyter, and Mahr (2020) point out that recent advances in AR technologies have led to a growing interest in their application for marketing strategy and practice. Nevertheless, according to these authors, managers and academics struggle to articulate how these technologies deliver experiences that are valuable to customers. This is the main investigation question of this research: see if an app using AR can improve the buying experience to consumers.

Methodology

The rapid evolution in the development of new technologies, substantially with regard to smart mobile devices, ended up generating an abundance of available information that has been changing consumer attitudes. These behavioral changes are making the public increasingly demanding with regard to the shopping experience. Thus, new technologies bring challenges to solve new problems generated by these new

requirements. In the context of supermarkets, this research aimed to identify such problems, which involves the difficulties that people have in finding and viewing products with promotions at points of sale. Such problems occur due to several factors, such as:

- Due to a large number of products and promotions available in the store.
- Inadequate display of products and promotions on the shelves.
- Visual pollution in the presentation of prices and promotions.
- Lack of standardization in the layout of supermarket chain points of sale.

To solve these issues, this investigation proposes the hypothesis that an application with content in augmented reality could provide easier to find and view promotional information compared to conventional approaches used in the market, such as printed price tags and promotional posters, and consequently influence positively the shopping experience.

Based on specific methods of the areas of human-computer interaction and interaction design, the persona-based scenario methodology was used to formulate this hypothesis. The concept of personas consists of the use of fictional characters, created from the analysis of the behavior of the target audience. According to Cooper et al (2014, p. 46), the persona hypothesis is a first attempt to define the different types of users and consumers of a product. This is because designers and developers must capture a variety of user behavior in relation to a product, and it is essential to identify a specific and diverse range of users and types of users. For these authors, the persona hypothesis tries to address, at a high level, these three issues:

- What different types of people can use this product?
- How can your needs and behavior vary?
- What ranges of behavior and types of environments need to be explored?

Therefore, to raise the hypothesis of this research, and subsequently validate it, there was a preliminary study that served to outline the personas profile and support the elaborated interaction design proposal.

The data gathering of the preliminary study was made with 26 people, with two groups in different contexts, where 14 consumers answered a questionnaire inside a large supermarket, in the city of Santa Maria da Feira, and the other 12 people answered the same questionnaire on the streets of the city of Braga. The main highlights raised were important to characterize the personas and direct this investigation.

When asked about which product information is the most interesting, most participants considered the price to be the most relevant information, according to 53.8% of the total (Table 1). Another data that drew attention is the fact that all 14 people, who answered the questionnaire inside the supermarket, would like to see the promotions better, that is, 100% of the participants in the survey within the supermarket (Table 2).

In addition, in the questions regarding the possible functionalities of the application, was found that 100% of the participants considered reasonable or very important to have a tool in the application that makes possible to find promotions more easily within the supermarket (Table 3). Eight of these participants, a percentage of 30.7%, consider it

reasonable and 18 people, or 69.2% of the total, consider the existence of such a tool as very important.

Table 1. Consumer habits - Product information

Regarding product information, which of the following are of your greatest interest?	Street		Supermarket		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Origin	2	16,6%	-	-	2	7,6%
Nutritional info	4	33,3%	6	42,8%	10	38,4%
Ingredients	-	-	4	28,5%	4	15,3%
Price	6	50%	8	57,1%	14	53,8%
Brand	-	-	6	42,8%	6	23%
Production Methods	-	-	2	14,2%	2	7,6%

Table 2. Consumer habits - Promotions

Would you like to see promotions in the supermarket better?	Street		Supermarket		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Yes	4	33,3%	14	100%	18	69,2%
No	8	66,6%	-	-	8	30,7%

Table 3. Assessment of the relevance level of the app's features - Promotions

Find promotions more easily inside the supermarket.	Street		Supermarket		Total	
	<i>n</i>	%	<i>n</i>	%	<i>N</i>	%
Nothing important	-	-	-	-	-	-
Reasonable	8	66,6%	-	-	8	30,7%
Very important	4	33,3%	14	100%	18	69,2%

Notwithstanding, it was also found that of these 18 people, 14 of them were part of the group of participants in the survey within the supermarket. In other words, again 100% of the participants in the survey realized inside the supermarket showed that they were extremely interested in the promotions. This suggests that the consumer really has a lot of interest in the promotions, wants to view it in a better way, and thinks that is important, or very important, the existence of a tool that makes it easier to find them.

The fact raised within the supermarket, which indicates consumer great interest in promotions, was one of the determining factors to direct the research specifically

towards prices and promotions, thus collaborating not only to formulate but also to validate the main hypothesis raised by this investigation.

After the qualitative and preliminary study, the focus of the investigation becomes an experimental and quantitative survey, where two homogeneous groups of consumers will be evaluated. The first group will receive the experimental condition, i.e., they will use the AR application developed for this research, as shown in Figure 1, while the second group will walk the aisles of the supermarket and visualize the products without receiving this stimulus. In the end, the results obtained with the two groups will be compared to evaluate the behavioral differences in relation to the promotional strategy of the products. The context of the research will involve a supermarket of a large Portuguese chain.



Figure 1. Viewing the promotions on the shelves when using the application

Participants in the study will be the consumers present at the observed points of sale. The selection of participating consumers will not be made randomly. To identify the target audience, an initial survey was conducted to stipulate personas who have a favorable acceptance profile for the use of the technology and who are frequent buyers in supermarkets.

The questionnaires elaborated will be the main instruments of this research and will be applied to consumers participating in the study. Initially to identify the target audience and select the participants and later to collect the necessary data to make the comparative analysis between the experimental group and the control group. Finally, questionnaires will also be used, exclusively with the experimental group, to evaluate the usability of the application developed.

To collect the data needed to conduct this research, it was fundamental to develop a mobile application, where the content in AR will be displayed. The mobile phone application is a material developed to present the promotional content of some supermarket products, in AR, on the device screen (Figure 2). The application interface was developed with Unity3D software, which is one of the most popular game engines nowadays. In the development was used the programming language C Sharp, together with the framework of Vuforia SDK, which makes possible the creation of content in AR

in the application. The application works on Android and IOS operating systems, which are currently the most widespread on mobile phones.



Figure 2. Image of the application in the test environment

Future procedures

The follow-up of the research will involve a series of tests with the application developed that will present the promotional content, with AR, to the consumer. Exhaustive tests will be carried out to determine the suitability of the application for the study. After the appropriate tests with the software, field research will begin, where each individual in the experimental group will use a mobile phone, with the application developed for this study, to assist in making their purchases inside the supermarket. Strategic points in the supermarket aisles will receive an AR marker. By pointing the device to these locations, the user will see highlighted brand information as well as prices and promotions of the goods. In this way, it will be possible to analyze consumer behavior, in relation to the communication created in AR, and raise important information that will help to answer the questions of this investigation. In the next step, questionnaires will be applied to consumers at the points of sale observed to collect the data seen as necessary to perform the comparative analysis between the experimental group and the control group. Afterward, a questionnaire with questions with scales of answers will be used, exclusively with the experimental group, to evaluate the rates of communicability, interactivity, and functionality of the application with created AR. Initially, the collected data will be tabulated and organized based on descriptive statistics techniques. Inferential statistics will be used to identify possible behavioral differences between the analyzed groups and the probability that these differences occurred by chance or because of the stimulus produced by this study. We formulate two hypotheses: the AR app facilitates the visualization and the location of promotions available at the points of sale; AR will influence positively the buying experience.

Conclusion

The use of AR in commerce and advertising is a new field of study and technological advances in holography indicate that, in the near future, contents in AR may be projected inside and outside the points of sale to generate brand and product advertising.

Furthermore, devising scenarios where the user can interact with the generated virtual content, even if it is still necessary to be holding a device in hand, can be of great contribution to the future study of merchandising action-oriented marketing, specifically, using AR as a new way to attract and persuade the consumer inside the points of sale.

Furthermore, recent research suggests that the consumer experience with AR should be more hedonic than utilitarian, especially during the initial episodes of technology, and that the affective component plays a stronger role in conducting behavioral responses than cognitive ones. These assumptions are based on the results of previous research and need to be empirically tested in future studies. This study aims to use an approach that is more utilitarian than hedonic. As AR technology in marketing is currently evolving at a high speed, future developments are likely to go in different directions. Thus, further investigation of this new form of human-computer interaction, which brings significant challenges for consumer studies, is needed, where further investigation of the research issue raised in this article could be quite enlightening. The answer to this question would expand our existing knowledge and allow marketers to design AR campaigns more efficiently.

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