Application Of Augmented Reality As A Learning Tool Of The Control Project Course Of The Systems Engineering Career – Uladech

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ABSTRACT

This research consisted of the application of augmented reality as a learning tool for the control project course of the systems engineering career - ULADECH. The present investigation is of the descriptive type, of the non-experimental design, of cross section and of a quantitative approach. 68 students were taken as a sample. As a result, 98.53% of the respondents consider that learning improves with an educational tool, also 100.00% of the respondents consider that teaching improves with the use of augmented reality and 98.53% of the respondents, yes, affirm that by incorporating augmented reality improves learning in the Control Project subject. The scope of this research is to provide better content in the classroom for the benefit of students and teachers. It is concluded that with the implementation of an augmented reality as a learning tool, learning in the Control Project subject improves.

Keywords: Augmented reality, Learning, educational tool.

INTRODUCTION

Augmented Reality in education is a good decision, because through it you can try to improve the academic performance of students, also enrich the content given in the classroom and learn in a more dynamic and interactive way (1).

In Mexico, the term Augmented Learning is being handled thanks to the use of Augmented Reality and Virtual Reality technology. But this first is easier to apply than the second, because it only makes use of basic equipment that almost all of us have. Consequently, with the use of this technology, more interactive and playful content can be developed (2).

Augmented Reality is related to Virtual Reality technology that is more widespread in society; presents some common features such as the inclusion of virtual 2D and 3D graphic models in the user's field of vision; the main difference is that Augmented Reality does not replace the real world with a virtual one, but on the contrary, it maintains the real world that the user sees complementing it with virtual information superimposed on the real one. The user never loses contact with the real world within reach of his sight and at the same time can interact with the virtual information superimposed. (3).

Likewise, the application of Augmented Reality as a Learning Tool allows to improve the development of the subject of control project, allowing the attention of the student and creating a more interactive environment between the teacher and the student.

In the Professional Career of Systems Engineering of the ULADECH, in the subject of Control Project of the VIII cycle, it provides a little interactive teaching content making use of simulation programs for the development of laboratory practices, therefore an application of Augmented Reality is proposed as a Learning Tool in order to increase its creativity and innovation,

Contributing to the achievement of the objectives of the development of the subject, in addition to capturing the attention of the student and preventing the distractions that cause poor academic performance.

The statement of the problem is: How does the application of Augmented Reality as a Learning Tool improve the development of the subject of Control Project of the VIII cycle of the professional career of Systems Engineering-ULADECH; 2023?

The general objective was to carry out the application of augmented reality as a learning tool of the control project course of the professional career of systems engineering, ULADECH – 2023.

In this way, for the execution of the general objective, the following specific objectives were proposed: Determine the use of educational tools for learning the control project course of the school of systems engineering of the ULADECH. Identify augmented reality technology as a contribution in the teaching of learning of the control project course of the school of systems engineering of the ULADECH. Analyze the possibility of integration that an educational software of Augmented Reality would have in the subject of control project of the school of systems engineering of the ULADECH.

It is academically justified, why it will improve the educational theme in the classroom through the prototype of Augmented Reality as a learning tool. It is also justified in a technological way, why it allows to improve the experience in the classroom both by the student and by the teacher.

This research project due to its particularities presented is a descriptive methodology with a quantitative approach and non-experimental design and by the characteristics of execution is cross-sectional.

It was obtained as a result 98.53% of respondents consider that If it improves learning with an educational tool, also 100.00% of respondents consider that If it improves teaching with the use of augmented reality and 98.53% of respondents, If affirms that incorporating augmented reality improves learning in the subject of Control Project. This research aims to provide better content in the classroom for the benefit of students and teachers. It is concluded that with the implementation of an augmented reality as a learning tool, learning improves in the subject of Control Project.

Background at the international level

According to Guapi (4), in the year 2022, in his thesis "Development of augmented reality mobile application for the learning of ecology subject" of the National Polytechnic School University of Ecuador, he aimed to develop an augmented reality mobile application for the learning of the subject of Ecology, the agile methodology used is Scrum, based on the results of the tests it is determined that the Unity application, do not present any inconvenience at the time it has been used, thus guaranteeing 100% compliance with the

requirements, concluded that the tests that have been carried out in the mobile applications have allowed to detect a series of errors in the operation of the different modules, components and multimedia content, thus allowing to correct in time all the inconveniences that have arisen and thereby launch fully functional applications into production.

According to Josfal (5), in 2020, in his research work called "Application of augmented reality in the pedagogy of primary education" of the San Andrés University of Argentina, he aimed to analyze the use of Augmented Reality as a resource that favors the teaching-learning process in primary school students in private schools, The methodology used for the development of the study was documentary, and consisted of the analysis of various theoretical sources obtained in virtual repositories the results evidenced the importance attributed by the authors consulted to Augmented Reality and its contributions in the pedagogical field. In this way it is concluded that it is a resource that allows the stimulation of learning in secondary school and in particular in private institutions since it is where you mostly have access to the necessary devices.

In 2018, the author Angarita (6), made a scientific article entitled "Appropriation of Augmented Reality as support for the teaching of natural sciences in primary basic education", Revista Boletín Redipe, the objective of this article was Formulate a pedagogical proposal for the teaching of natural sciences through the use of augmented reality through an application in fifth grade students, With the purpose of strengthening meaningful and collaborative learning, the methodology of this research was qualitative, obtained as a result that they show a positive impact on the teaching-learning process and allow to propose a pedagogical strategy for primary level with the help of the augmented reality resource, concluded that Augmented Reality applications contribute to the strengthening of meaningful and collaborative learning.

Background at the national level

In 2022, the authors Aranda and Gómez (7), in their thesis entitled "Mobile application with augmented reality to improve the training process in the production area of the company OPPFILM S.A.", of the Autonomous University of Peru, the main objective of this study is to determine if the use of mobile applications with augmented reality will help the training process in the cutting and packaging area of the company OPPFILM S.A. the methodology that will be

used will be Mobile Methodology – D, from the results found, the general alternative hypothesis is accepted that establishes that there is a dependency relationship between the implementation of a mobile application with augmented reality with the training process of the cutting and packaging area in the company OppFilm S.A. concluded that it is important to indicate that the use of the C-OPP application, I improve the understanding in the collaborators in training from bad to good, obtaining as a result greater understanding of the topics dictated.

According to Changua (8), in the year 2021, in his thesis entitled "Augmented reality mobile application for learning healthy diets", the objective of this research was to determine the effect of an augmented reality mobile application for learning healthy diets, as a complement for nutrition-oriented learning of food consumption, The research carried out was of applied type, of quantitative approach and of pre-experimental design, the results achieved of the execution of this project were: 93.47% increase in the degree of knowledge, 40.41% increase in the degree of motivation and 44.40% increase in the degree of satisfaction. It was concluded that the effects achieved by the benefits of augmented reality are acceptable for learning and can be applied in schools, universities and companies.

According to Sánchez (9), in 2018, in his thesis called "Mobile application with Augmented Reality in mobile learning of the theme military dictatorship in Peru of the 5th year of the Dionisio Manco Campos school", of the César Vallejo University, as an objective of this research project was to determine the effect of the mobile application with augmented reality in the improvement of mobile learning on the subject of the military dictatorship in Peru, the research methodology was of quantitative type of experimental design, the results obtained by the T test a significant difference between the average hours to learn of the experimental group and the average hours to learn of the control group, concluded that the mobile application improves the learning time of the students.

Background at the regional level

According to Ginés (10), in 2019, in his thesis entitled "Program based on Augmented Reality to improve the production of stories in students of the 3rd. Degree of primary education in the Educational Institution No. 88240 Peace and Friendship Nuevo Chimbote - 2017 ", of the National University of Santa, whose objective was to demonstrate that the program based on augmented reality improves

the production of stories in the students of the 3rd. Grade of primary education of the I.E. N°88240 "Peace and Friendship", the methodology was of quasi-experimental design, the results obtained was to improve the production of stories in the students, concluded that when carrying out the application of the augmented reality program with the children of the experimental group a fairly significant improvement was observed in their story productions.

According to Alegría (11), in 2018, in her thesis called "Computer tools and competences in the learning process in students of the María de los Ángeles Private Educational Institution – Satipo - 2018", of the Catholic University Los Ángeles of the city of Chimbote, whose objective was to determine the relationship between computer tools and the development of competences in the learning process of students, the methodology developed was of correlational level of descriptive design, obtained as a result a positive influence on the behavioral development in the students, concluded that the Movie Maker tool impacted in a 75.5% in the behavioral development of the students.

In 2017 Quispe (12), in his thesis entitled "Audiovisual resources as a learning strategy improve literacy in children of first grade of the I.E. Particular Sciences Señor de la Joya – Arequipa, 2014", of the Catholic University Los Angeles of the city of Chimbote, whose objective was to determine if audiovisual resources as a learning strategy improve reading and writing in children of first grade, The methodology used was quantitative level and a pre-experimental design, resulted in a large percentage of students with significant achievements, concluded that the use of the application of audiovisual resources as a learning strategy in reading-writing, improving school performance.

MATERIALS AND METHODS

Design

The research design is quantitative non-experimental design, descriptive type and due to the characteristics of its execution is cross-sectional.

It is of a non-experimental type since it is based on observing phenomena as they are shown in their natural context and then going on to be analyzed (13).

Population and sample

The population is composed of students of the subject of Control Project, of the Professional School of Systems Engineering - ULADECH, with a total of 68 students enrolled in the semester 2022-III. We will use non-probability sampling for convenience.

The sample will be the same as the population a total of 68 students of the subject of Control Project, of the Professional School of Systems Engineering – ULADECH

Procedures

An instrument is applied as an item questionnaire in a survey to all students of the subject of control project of the VIII cycle of the professional career of systems engineering, which are part of the sample, in order to analyze by variables their respective dimensions and indicators the achievement or fulfillment of the objectives.

Independent variable:

Application of augmented reality

Dependent variable

Learning tool

Instruments

A survey will be carried out where the level of satisfaction with respect to the learning tool and the level of satisfaction with respect to Augmented Reality will be measured.
For this, the questionnaire was carried out, which has closed or dichotomous questions, in order to facilitate the answers of the respondents answered only with a YES or NO.

Analysis plan

For the analysis plan, the students of the subject of control project of the VIII cycle of the professional career of systems engineering-ULADECH were selected, which developed a survey to obtain useful information for research. Likewise, Microsoft Excel software was used to tabulate the information collected with the surveys and then proceeded to graph to obtain the results.

In the present research work called "Implementation of a web attendance control system", it has been taken into consideration to strictly comply with those ethical principles that allow to ensure

different aspects, such as personal protection or care of the environment; all this taking into consideration the provisions of the code of ethics for research, stipulated by the Catholic University Los Angeles de Chimbote (14), which details the following:

- Protection of people: At this point it is established that people have to be seen as the end and not as the means, in this sense a degree of protection towards them will be needed, considering that human dignity, identity, confidentiality and privacy must be respected, involving in turn the full respect of their fundamental rights.
- Care of the environment and biodiversity: For the advancement of any research activity, the care of the environment must always be considered and in turn take measures to avoid damage to it.
- Free participation and right to be informed: All those who participate directly or indirectly in this research work must be kept informed about the purposes and purposes of the same, expressing free and specific will.
- Beneficence not maleficence: The well-being of the people who participate in this research must be ensured, ensuring that they comply with certain rules, such as not causing harm, reducing adverse effects and maximizing their benefits.
- Scientific integrity: It must be extended in teaching activities taking into account the deontological norms of its profession and declaring damages and benefits, thus maintaining the scientific integrity of the researcher.

RESULTS

4.1. Level of satisfaction with a learning tool

Table No. 2: Know that it is an educational tool Frequency distribution about knowing an educational tool, regarding the application of augmented reality as a learning tool of the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	n		%
Yes		65	95.59
No	3		4.41
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question Do you know what an educational tool is?

In Table No. 2 it is observed, that 95.59% of the students of the control project course, answered that Yes they know that it is an educational tool, while 4.41% of the students stated that They do not know that it is an educational tool.

Table No. 3: The educational tool improves learning Frequency distribution about the educational tool improves learning, regarding the application of augmented reality as a learning tool of the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	n		%
Yes		67	98.53
No	1		1.47
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question Do you think that an educational tool improves learning?

In Table No. 3 it is observed that 98.53% of the students of the control project course, answered that Yes improves learning with an educational tool, while 1.47% of students stated that It does not improve learning with an educational tool.

Table No. 4: Learning needs to be improved Frequency distribution about the need for the educational tool to improve learning, with respect to the application of augmented reality as a learning tool for the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	n		%
Yes		53	77.94
No	15		22.06
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question Do you think learning tools are necessary in education?

In Table No. 4 it is observed that 77.94% of the students of the control project course, answered that if learning tools are necessary in education , while 22.06% of students stated that learning tools are not necessary in education.

Table No. 5: Using Learning Tool Frequency distribution about the use of learning tool, regarding the application of augmented reality as a learning tool of the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	n		%
Yes		60	88.24
No	8		11.76
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question Do I ever use a learning tool?

In Table No. 5 it is observed, that 88.24% of the students of the control project course, answered that they did use a learning tool, while 11.76% of the students stated that they did not use an educational tool.

Level of satisfaction with respect to Augmented Reality

Table No. 6: Meet Augmented Reality Frequency distribution about knowing Augmented Reality, regarding the application of augmented reality as a learning tool for the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	n		%
Yes		26	38.23
No	42		61.76
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question. Do you know what augmented reality is?

In Table No. 6 it is observed, that 61.76% of the students of the control project course, answered that they do not know what Augmented Reality is, while 38.23% of the students stated that they do know that Augmented Reality is.

Table No. 7: Applications with Augmented Reality Frequency distribution about applications with Augmented Reality, regarding the application of augmented reality as a learning tool for the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	**n**		**%**
Yes		20	29.41
No	48		70.59
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question. Do you know some applications that make use of augmented reality technology?

In Table No. 7 it is observed, that 70.59% of the students of the control project course, answered that they do not know some applications that make use of Augmented Reality, while 29.41% of the students stated that they do know some applications that make use of Augmented Reality.

Table No. 8: Using Augmented Reality improves teaching in the subject of control project. Frequency distribution about using Augmented Reality in the subject of control project, regarding the application of augmented reality as a learning tool of the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	**n**		**%**
Yes		68	100.00
No	-		-
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question. Do you think that augmented reality improves teaching in the subject of Control Project?

In Table No. 8 It is observed, that 100.00% of the students of the control project course, answered that If augmented reality should be used in the subject of control project.

Table No. 9: Incorporating Augmented Reality improves learning. Frequency distribution about using Augmented Reality improves learning in the subject of control project, regarding the application of augmented reality as a learning tool of the control project course of the VIII cycle, the systems engineering career - ULADECH.

Alternative	n		%
Yes		67	98.53
No	1		1.47
Total		68	100.00

Source: Questionnaire applied to the students of the control project course, regarding the question. If we incorporate augmented reality, will it improve learning in the subject of Control Project?

In Table No. 9 it is observed, that 98.53% of the students of the control project course, responded that If we incorporate augmented reality it will improve learning in the subject of Control Project, while 1.47% of the students said no.

DISCUSSION

The objective of this research is to carry out the application of augmented reality as a learning tool of the project course of control of the professional career of systems engineering, ULADECH – 2023. An analysis of the results was performed for each objective.

With respect to the first objective, to determine the use of educational tools for learning the control project course of the school of systems engineering of the ULADECH. In table No. 3, The educational tool improves learning, it is observed that 98.53% of the students surveyed consider that Yes improves learning with an educational tool. This result is similar to the results obtained in the research of Alegría (11), entitled "Computer tools and competences in the learning process in students of the Private Educational Institution María de los Ángeles - Satipo - 2018", who in her research showed the results obtained from the variable computer tools observing that 54.50% of the total are in an initial stage in the use of

computer tools that are programs, applications or simply instructions used to perform other tasks more easily.

With regard to the second objective, to identify augmented reality technology as a contribution in the teaching of learning of the control project course of the school of systems engineering of the ULADECH. In Table No. 8, Using Augmented Reality improves the teaching of the subject of control project, it is observed that 100.00% of the students surveyed, consider that if teaching improves with the use of augmented reality. The result obtained is similar to the research of Angarita (6) refers to a study of application of Augmented Reality that allowed to improve the teaching-learning process of the competences in the management of computer science in both teachers and students.

With regard to the third objective, to analyze the possibility of integration that an educational software of Augmented Reality would have in the subject of control project of the school of systems engineering of the ULADECH. In Table No. 9, Incorporating Augmented Reality improves learning, it is observed that 98.53% of the students surveyed, consider that If we incorporate augmented reality improves learning in the subject of Control Project. The result obtained is similar to the result obtained by Sánchez (9), in his thesis entitled "Mobile application with Augmented Reality in mobile learning of the subject military dictatorship in Peru 5th year of the Dionisio Manco Campos school", who, in his respective work, indicated that an improvement in academic performance was obtained by 23.05% when making use of an Augmented Reality software in the Human Anatomy course of the 6th grade of primary.

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