International Journal of Scientific Engineering and Science
Volume 5, Issue 3, pp. 29-31, 2021. ISSN (Online): 2456-7361

Agham: An Augmented Reality Science Based E- Learning App for Basic Education

Londren U. Velasco, Raymond S. Macatangga, Marc Ryan Ihan M. Manota, Cris Mabel C. Montaos, Abegail S. Comandao, Jesfer M. Dela Cruz
Our Lady of Fatima University- Valenzuela
Email address: luvelasco@fatima.edu.ph, rsmacatangga@fatima.edu.ph, immanota@fatima.edu.ph, ccmontaos@fatima.edu.ph, ascomandao@fatima.edu.ph, jmdelacruz@fatima.edu.ph

***Abstract*—** *The researchers developed a mobile application entitled "Agham: An Augmented Reality Science Based e-Learning App for Basic Education" in cooperation with OLFU Basic Ed which has provided important information and formulas related to Science subject and Basic Education. The system can help grade 6 students to appreciate Augmented Reality and to learn a new way of education through e-Learning.*

***Keywords*—** *e-Learning, ACM proceedings, Android, Augmented Reality.*

I. INTRODUCTION

A process or experience of acquiring knowledge or skill is called learning. The process starts as early as a person is born. Learning can be categorized into two ways – Traditional and Electronic Learning. Traditional is based on the physical interaction between a learner and an educator whereas Electronic Learning eliminates the necessity of physical presence. However, traditional learning dominates over electronic learning. The best thing about e-learning is that individuals can take a course from the comfort of their home.

"Online learning" and "virtual learning" were some other words that also spring up in search of an accurate description before e-learning has been in existence since 1999. However, there was evidence which suggests that forms of e-learning existed as far back as the 19th century because the principles behind e-learning have been well documented throughout history.

Within the Philippines, e-learning begun to popularize in early 2000 the same time with the developing ubiquity of ICT in government and education. The term "e-learning" is utilized synonymously with online learning and concerns the online delivery of instructional content as well as associated support services to students.

E-learning offers the capacity to share material in a wide range of configurations, for example, recordings, slideshows, word reports and PDFs. Directing online courses (live online classes) and speaking with educators through talk and message discussions is additionally a choice accessible to clients. In the relentless universe of e-learning the accessible innovations to make a course energizing are continually changing, and course substance can and ought tobe refreshed rapidly to give students the most recent data. Usually particularly critical in case the e-learning preparing is being given to workers in a segment where keeping up-to-date on industry improvements is of the most extreme significance. Typically one of the reasons why numerous businesses are presently advertising preparing through e-Learning - other reasons include low costs and the ability for employees to study in their own time and place. In general, conventional learning is costly, takes a long time and the results can vary. E-learning offers an alternative that is cheaper, faster and potentially better.

In order to simulate reality, technology works to render the actual virtual, and uses virtual. For example, if you take communication, face-to-face communication is now replaced by web world communication where we convey real emotions using virtual emoticons. Cutting edge graphics and 3D technology, on the other hand, make it possible to build real worlds like life. Augmented Reality (AR) programs can make photographs, graphics and videos come alive by creating layers of digital information that can be displayed through Android or iOS devices on top of the physical world. Obviously, by making the learning experience much more enjoyable and strong, this creates the opportunity to redefine learning spaces.

II. EXPERIMENTAL AND COMPUTATIONAL DETAILS

A. SDLC: Agile Model

This refers to a software development approach based on iterative development. Agile methods break tasks into smaller iterations, or parts do not directly involve long termplanning. Functions of these stages are:

Requirements: Vastly simplifies what Agham Application's interface features and purposes. The researchers conduct an interview to OLFU Val Basic Ed proposing the system and

getting the information needed. They also give comments of what the system reports must show to the end user.

System Design: The researchers start to create a user friendly architecture for the Aghamapplication. Different features have been added to Project Structure together with its functions. List down all the materials and requirements needed to create the application such as different API's for Graphical User Interface.

Implementation: The Agham Project Structure from System Design will now be created in actualapplication. Programming codes was developed and Augmented Reality platform was used and all materials have been connected to each other and producing Metro Jeep Application.

Integration and Testing: All units built in the implementation process was incorporated into an app. The built application Agham will undergo through continuous testing. Alpha Testing will be conducted by the researchers and IT Experts (who have experience in developing same application) seeing if there are bugs together with their comments of what to improve in the system. And Beta Testing will be conducted by the beneficiaryand end user, criticizing the application if their qualifications have been met.

Evaluation: Evaluation Form will be answered by IT Experts, End Users and Beneficiary. They willbe given an evaluation to rate the system accordingto different criteria.

Deployment of System: Once the testing and all evaluation has been computed and passed. The Agham Application can now be introduced to market to be used by the end user and beneficiary.

Maintenance: This step takes place after installation. Modifications arise as a result of changing either customer requests or uncovered defects during live use.

B. Procedure For The Calculation of Data

The weighted mean of the data set defined as x1, x2, x3, ... can be represented by its respective frequency or weight as the total of the data multiplied.

Equation 1 $$WM = \frac{\sum(w_i - N_i)}{n_x}$$

Where

w = data set total

N_i = sub criteria

n_x = number of sub criteria

C. Testing Procedure

The tester tests an application in Alpha Testing without understanding the inner workings of the program being evaluated. Information is inserted into the system and the result is contrasted with the actual results; what the software does with the incoming data or how the system arrives at the export data is not a question for the alpha testing carried outby the tester.

Tests are performed on each software function to assess its actions, using a blend of inputs that represent standard operating circumstances, and intentional irregularities and mistakes.

III. Result and Discussion

This chapter discusses the project description and structure. This chapter of skeletal design will be developing, this will ensure that the data obtained will effectively answer the research question, Methodology is a strategy researchers will use to implement the design plan of the project.

A. Project Description

This android application will recognize real objects, using the Augmented Reality technology it will give a 3D object a specific topic that the students will be using upon using the application. These 3D objects will give information about the models that are based on their reading material. Promoting educational information systems about using Augmented Reality that can detect only 3D objects using QRcode.

The application developed by the researcher can be installedon Android devices with a minimum API level of 6.0 or Marshmallow version of latest API 2GB of RAM and 1GB of storage. For a smooth experience of this application it is recommended to install it on smartphones with Android version 7.0, 8.0 and up with 4GB of RAM and at least 8GB of storage also with screen resolution that is 1080x2400 pixels.

The programming language that is used to develop this application is C#, Unity and Visual Studio, and for the development of the mobile application for scanning the real object using software of Vuforia object scanner that will read through QR code. Several testing and updates have been done on this software first to ensure the beneficiary or the user of a free from kinds of error application, also to avoid problems using the application.

B. System Requirements

For the minimum hardware requirements, researchers will be needing an Android Mobile device minimum version of Android 6.0 and up, also Laptop or computer device with8 GB ram and i5 processor. The process in developing the project will be based on the Agile Development Model. The Agile model will determine the needs, build the prototype, and evaluate the prototype, a flexible and on-going evolution that helps the system reach the customers satisfactorily. Theoutput consists of the respondents' instant answers to a potential implementation and the application's flow.

IV. Conclusion

The project "AGHAM: An Augmented Reality Application for Science and Health" provides alternative ways of learning of students to an application using Augmented Reality that can provide models and assets from the topics such as Solar System, Flower Structure, Classification of Animals, Respiratory System and Circulatory System. Also, students can test their knowledgeby taking up the quizzes with levels provided by the application. This system will provide users further information and advance technology with regards to Augmented Reality.

Acknowledgment

This paper would not have been possible without the support and the help of several individuals who in one way or

another contributed and extended their valuable assistancein the preparation and completion of this study. Problem child group would like to extend their heartfelt gratitude to the following: To the Researchers Mr, Londren U. Velasco, Ms. Cris Mabel C. Montaos, Ms. Abegail S. Comandao and Mr. Jesfer dela Cruz for the proposal and suggestions that they gave during the research to improve and make the capstone project successful. To the faculty of the beneficiary of this capstone project, Our Lady of Fatima University – Basic Education, who accommodatingly and patiently helped us in selecting our respondents. This study would not conceive without their cooperation as the subject. Nothing has been more important to us in the pursuit of this project than our own families. We would like to thank our parents, whose love is with us in whatever we do. They are always there to motivate and support us even during the most difficult times. Most importantly, we wish to thank, the Lord, our God for giving us this chance to showcase our knowledge, skills, and talents and share it with others. We thank Him for being a part of this endeavor from the very beginning and for never leaving us. We owe Him the time and the strength that we have in order to pass this. We are honored to take this opportunity to be influenced by our professors, to inspire our schoolmates, make our parents proud and to glorify Him.

REFERENCES

[1] Alenezi, A., & Shahi, K. (2015). Interactive E- Learning through Second Life with Blackboard Technology. Procedia Social and Behavioural Sciences, 176, 891-897.
[2] Almajali, D., & Al-Lozi, M. (2016). Determinantsof the Actual Use of E-Learning Systems: An Empirical Study on Zarqa, University in Jordan. Journal of Social Sciences, 5 (2), 1-29
[3] Almajali, D. A. Masa'deh, R., & Al-Dmour, R. (2016). The Role of Information Technology in Motivating Students to Accept
[4] Beth, A. D., Jordan, M. E., Schallert, D. L., Reed, J. H., and Kim, M., (2015). Responsibility and generativity in online learning communities. Interactive Learning Environments, 23(4), pp. 471–484.
[5] Barber, W., King, S. and Buchanan, S., (2015). Problem Based Learning and Authentic Assessment in Digital Pedagogy: Embracing the Role of Collaborative Communities. The Electronic Journal of E-Learning, 13(2), pp. 59– 64.
[6] Issues and Challenges in Open and Distance e- Learning: Perspectives from the Philippines (2016) Patricia Arinto
[7] E-Learning Readiness Assessment Tool for Philippine Higher Education Institutions (2016) JoAnn D. Doculan
[8] Computer-based technology and studentengagement: a critical review of the literature (2017) Laura A. SchindlerAn
[9] Assessment of the Effectiveness of E-Learning in AMA Olongapo Campus (2019) Froilan Moboand Gesswein Sabado
[10] International Journal of Social Sciences: Dimensions of Learners' Satisfaction in The Delivery of Instruction In Blended Learning Program In Teacher Education Institutions (2016)Leah Luisa D. Panes
[11] The role of e-learning, advantages and disadvantages of its adoption in higher education.Valentina Arkorful and Nelly Abaidoo (2015)
[12] A Literature Review: Readiness Factors to Measuring e-Learning Readiness in Higher Education, Elizabeth A. D. 2015, Pages 230-234
[13] The Effectiveness of E-Learning: An Explorative and Integrative Review of the Definitions, Methodologies and Factors That Promote e-Learning Effectiveness; Noesgaard, Signe Schack; Ørngreen, Rikke, Electronic Journal of e- Learning, v13 n4 p278-290 2015
[14] Education 2.0: E-Learning Method, 13 May 2015, Pages 376-380, Andreea-Maria
[15] The Effectiveness of E-Learning: An Explorative and Integrative Review of the Definitions, Methodologies and Factors that Promote e-Learning Effectiveness (2015); Signe Schack Noesgaard
[16] Utku Kose (2020). Augmented Reality Based E- Learning Applications. Encyclopedia of Information Science and Technology, Third Edition.
[17] Chris Lytridis Avgoustos Tsinakos, Ioannis Kazanidis (2018). ARTutor— An Augmented Reality Platform for Interactive Distance Learning. Challenges and Future Trends of Distance Learning.
[18] El Kabtane Hamada, Adnani Mohamed, Sadgals Mohamed, Mourdi Youssef (2016). An Augmented Reality Approach to Integrate Practical Activities in E-Learning Systems. International Journal of Advanced ComputerScience and Applications (IJACSA).
[19] Nor Farhah Saidin, Noor Dayana Abd Halim & Noraffandy Yahaya (2015). A Review of Research on Augmented Reality in Education: Advantages and Applications. International Education Studies.
[20] Mona Alkhattabi (2017). Augmented Reality as E- learning Tool in Primary Schools' Education: Barriers to Teachers' Adoption. International Journal of Emerging Technologies in Learning.
[21] E-Learning: It's Effectiveness as A Teaching Method Forjunior High School Students of Southernside Montessori School (2015), Marikey M. Conde
[22] E-Learning Technology Adoption in the Philippines: An Investigation of Factors Affecting Filipino College Students' Acceptance of Learning Management Systems. The International Journal of E-Learning and Educational Technologies in the Digital (2017). Manuel B. Garcia
[23] A Comparative Study on the Effectiveness of e- LearningTechnologies Used in theBlended LearningApproach (2015). FelicisimoV. Wenceslao, Jr.
[24] PAPER • OPEN ACCESS Students' perception one-learning: a basis for the development of elearning framework in higher education institutions to cite this article: 2019, MM Daniels et al
[25] Education in the Philippines: The Case of Technical Education and Skills Development Authority Online Program (2018), Francis Mark Quimba and Madeline Dumaua