

¹Joan S. Rajah

**Experience of Student in the University of
San Jose Recoletos (USJR) Senior High
School (SHS) ICT Enhancement
Curriculum Innovating an Augmented
Reality App in 21st Century Classroom.**



Abstract: - This study aims to know and determine the students' experience in innovating an Augmented Reality App as material for learning and delivering lessons that can be used in the future classroom. AR may bridge the gap between the classroom and the physical experience. Augmented Reality is a supplementary tool in delivering the topic. An innovative AR app strengthens the technical or techy skills of students taking the ICT Enhancement subject in Senior High.

Keywords: Enhancement, innovative, determine, experience, Augmented

As our world is becoming more technology-driven, there is a need for educational content to be accessible and engaging. Creating an education-focused app with augmented reality capabilities will revolutionize the way students experience learning. The app would allow users to interact with 3D models of historical images, landmarks, and locations. By having access to a virtual representation of these images, users can gain a better understanding of the subject matter they are learning. Additionally, incorporating interactive games and quizzes into the app will help students understand the concepts more quickly. Furthermore, this app will be beneficial to teachers as well. By having access to an augmented reality platform that is dedicated solely to education, teachers can create interesting lessons with engaging visuals and activities. This will help make the classroom environment more exciting and conducive to learning. Overall, my goal is to create an augmented reality education app that will revolutionize the way students experience learning. Making educational content more accessible and engaging, I believe it will help foster a greater love for learning in students of all ages.

Objectives of the Study

This study aims to develop an augmented reality app that would let the students learn to create augmented reality applications that can be used in the 21st-century classroom. The use of Augmented Reality tools like Aryel. It's a tool for familiarizing the component with the use of real objects in AR presentations. This may help bridge the gap between the traditional ways of learning into reality. Create an app that focuses on education. This study aims to know, the student experience in creating, innovating, and developing an Augmented Reality App as material for learning and delivering lessons that can be used in the future classroom. AR may bridge the gap between the classroom and the physical experience to be more creative, and artistic way. This allows students to learn by doing, and the teacher acts as a coach and a facilitator helping students as they work on AR projects. It allows the student to have hands-on experience in producing Augmented Reality Applications. Creating AR products that can be sold and used in future classrooms. Augmented Reality is a supplementary tool in delivering the topic. An innovative AR app strengthens the technical or techy skills of students taking the ICT Enhancement subject in the 21st century classroom.

I. INTRODUCTION

The University of San Jose Recoletos Senior High School established the curriculum for ICT Enhancement. This ICT Enhancement program offers to students taking a different strand like STEM, ABM, HUMSS, and TVL students taking G11 to G12. Every semester each student is entitled to have a subject in ICT enhancement. It is a program offered in the Senior High School of the University of San Jose Recoletos that aims to provide and prepare the students to become adept with the necessary I.T. Skills aligned with their respective strands that will

¹ University of San Jose Recoletos(USJR), Senior High School Department, Cebu City Philippines, 6000

jsraja77@gmail.com

Copyright © JES 2024 on-line : journal.esrgroups.org

enable them to lead and forge the future of human development amidst the technological challenges of the 21st century.

ICT Enhancement might be something new or something that the student already had the skill in ICT. The student skillfully improves more in the field of Information, Communication, and Technology. Students taking ICT Enhancement are only given a certificate upon completion of the task assigned to them.

Students are entitled to learn and experience different enhanced curricula or programs that might improve their computer skills so that they will be equipped and ready to take on challenges in the future.

It started with faculties specialized in different fields like Robotics, Electronics, Programming, Graphics design, Photography, Computer basics, etc. With the help of the curriculum, students were able to learn and experience ICT Enhancement.

The Pew Research Center reports that mobile technology use has more than doubled in the past decade from 35% in 2011 to 81% in 2019, with smartphone use especially prevalent among young Americans — about 96% of people ages 18 to 29 own a smartphone. These trends are creating opportunities for using augmented reality in education.

Augmented reality (AR) is a technology that overlays digital information such as sounds, videos, and graphics on top of the real-world environment. AR is often confused with virtual reality (VR), a technology that creates entirely artificial environments. Together, these technologies are collectively known as extended reality (XR), and they are driving change across industries: IDC reports that the AR/VR market is expected to grow from \$16.8 billion in 2019 to \$160 billion by 2023.

Industries such as engineering, manufacturing, and space exploration commonly use AR in business applications such as research and development. With the emergence of new technologies and the widespread adoption of smartphones, educators are increasingly expected to use AR in the classroom.

Below are several examples of augmented reality in education and tools for teachers:

Math

AR tools can help teachers create engaging and educational math content that sparks students' curiosity, helping them achieve academic success. Smartphone AR app Photomath allows students to scan a math problem from a physical worksheet, then virtually walks them through calculation steps using animation. AR apps can also help students understand mathematical concepts through visualization and interactive 3D models. For example, the Merge Cube enables students to hold, view, and rotate a virtual cube, offering an interactive way to learn about geometry.

Chemistry and biology

With AR apps, teachers can help make learning about science more engaging through interactive lessons. By combining AR elements, videos, and animation, teachers can aid students in their scientific inquiries. For example, Chem101 AR helps students to understand complex compounds such as acids and oxides. Through special cards, students can virtually modify molecular structures and create new substances.

History

Teachers can take advantage of AR tools to help students experience history interactively. Tools such as 360Cities and Timelooper enable virtual visits to sites worldwide to teach about cultural and historical perspectives. At museums and historical sites, students and teachers can use their smartphones to access AR apps that provide additional information and context about historical pieces on display.

Coding

A key benefit of AR technology is that it allows students to get involved in the process of developing lesson plans in collaboration with teachers. Teachers can also use platforms to develop coding lesson plans with AR

technology. For example, Tynker provides teachers with tools to teach coding for video games. It also allows students to build AR classroom projects. (<https://Online.Maryville.Edu/Blog/Augmented-Reality-in-Education/#what-Is>, n.d.)

Review of Related Literature

Augmented reality (AR)-based media has grown in popularity and as a tool that serves as a bridge in everyday life. Augmented reality is used in games, virtual tourist attractions, and educational media to enhance daily life. Yet, using Augmented Reality media as a teaching tool is still rather unusual in the field of education. By preserving this research, we can advance the use of Augmented Reality media as a teaching tool.

AR(Augmented Reality is now being increasingly adopted across industries like product development, medicine, and now, health and safety. Applications cover uses in training system monitoring, machine maintenance, and a range of other uses.

For the purpose of developing training plans and curricula, augmented reality (AR), which is still in its early stages of use, is being used. In order to find some contemporary applications of augmented reality in training and curriculum design, 30 publications were chosen for this analysis and were then reviewed. A review of the effects augmented reality has on student engagement, a look at the current uses of AR in curriculum and training development, a look at the future implications of augmented reality in curriculum and training development, and a brief introduction to AR were the four main themes that emerged. With that, future recommendations of the conducted research are being discussed as of now. (**Hildenbrand, n.d.**)

In terms of technology, Education has the potential to pupils' influence to actively learn and can inspire as a result of an efficient procedure of learning. Previous Research has been conducted to discover the Problem that Technology will be used in Education has the potential to pupils' influence to actively learn and can inspire as a result of an efficient procedure of learning. Previous research has discovered the Problem that the advancement of technology will

The emergence of augmented reality as a brand-new interactive medium that adds virtual annotations to the real world creates novel ways to acquire knowledge that is relevant to the business. Little is understood, though, about how users react to its features. This research on interactive media characteristics of interactive technologies is used to examine augmented reality (AR) and to determine how closely they resemble the present crop of commercial AR apps. Potential media effects of AR on consumer behaviour are examined based on a review of the research on how consumers react to these qualities. Finally, the article suggests a research agenda for additional investigation of this novel marketing phenomenon.

Virtual reality and augmented reality are not brand-new technologies. However, a number of obstacles made their implementation impossible. In many fields, including education, AR and VR are now more feasible and desirable thanks to recent technology advancements combined with the spread of affordable gear and software. They have also been launched with fresh promises that were before unthinkable. The characteristics of AR and VR promise new teaching and learning methods that better fit the demands of the learner of the twenty-first century. We are currently reimagining schooling. This work explains the causes behind the recent rise of augmented reality (AR) and virtual reality (VR) and why their actual use in education will become a reality in the not-too-distant future. (<https://Online-Journals.Org/Index.Php/i-Jet/Article/View/9289>, n.d.)

A technology known as augmented reality (AR) allows for the real-time blending of digital content and data from the external environment. Direct access to context-sensitive nonpublic information is made possible in real time through augmented reality. By enhancing what we are seeing, experiencing, and hearing in the real world,

augmented reality improves how we perceive the outside world. The different augmented reality software development kits (SDKs) that are available to construct augmented reality applications are compared in this research. The study explains the differences between augmented reality and virtual reality, as well as the operation of the augmented reality system and the many kinds of tracking utilized in AR.

Augmented Reality (or AR for short) is a virtual experience wherein real-life surroundings are enhanced by computer-generated content. In these past years, the application for AR technology has become much more portable and accessible on mobile devices, and it also has become more visible in our audio-visual media and other aspects in our lives. Utilizing AR can give opportunities for learners to apply its technology in different areas of livelihood. This paper details an overview of AR, its recent developments, and in addition, explores the impact of AR on society and evaluates the implications for learning and education. (*Augmented Reality (AR) Defined, With Examples and Uses, n.d.*)

There has been an increase in interest in using augmented reality (AR) to design original educational environments in recent years. The application, benefits, features, and usefulness of augmented reality in educational contexts are all taken into account in this overview of the literature on the subject. A total of 55 papers that were published in the Social Sciences Citation Index database between 2011 and 2016 were examined. The key conclusions from this analysis include the most up-to-date information on research in augmented reality in education. The study also analyzes future trends, prospects for augmented reality research in educational contexts, and future visions. (https://www.researchgate.net/publication/286049823_Augmented_Reality_Trends_in_Education_A_Systematic_Review_of_Research_and_Applications, n.d.)

Technology in education can influence students to learn actively and can motivate them, leading to an effective process of learning. Previous research has identified the problem that technology will create a passive learning process if the technology used does not promote critical thinking, meaning-making or metacognition. Since its introduction, augmented reality (AR) has been shown to have good potential in making the learning process more active, effective and meaningful. This is because its advanced technology enables users to interact with virtual and real-time applications and brings the natural experiences to the user. In addition, the merging of AR with education has recently attracted research attention because of its ability to allow students to be immersed in realistic experiences. Therefore, this concept paper reviews the research that has been conducted on AR. The review describes the application of AR in a number of fields of learning including Medicine, Chemistry, Mathematics, Physics, Geography, Biology, Astronomy and History. This paper also discusses the advantages of AR compared to traditional technology (such as e-learning and courseware) and traditional teaching methods (chalk and talk and traditional books). The review of the results of the research shows that, overall, AR technologies have a positive potential and advantages that can be adapted in education. The review also indicates the limitations of AR which could be addressed in future research. (<https://doi.org/10.5539/ies.v8n13p1>, n.d.)

The uses and applications of VR and AR technologies have been widespread in the last few years. One of its most important areas of use is the use of virtual and augmented reality in education, learning and training. Hence, this research paper examines the latest developments and the scientific findings in the field of augmented software industry, its applications, and uses in teaching, learning and training. Tens of augmented reality applications, their areas of application, and practical uses were studied with the aim of: Identifying strengths and weaknesses and selecting the appropriate ones in teaching, learning and training. To achieve the objectives of the research: The method of content analysis based on the applied approach was used, the researcher recommended: It is necessary to adopt the application and usage of augmented reality technologies in education, learning and training at the highest levels, and recommended the use of a set of software and platforms that would enhance the quality of teaching, learning and training and improve its (<https://ieeexplore.ieee.org/document/8726192>, n.d.) **outcomes.**

Augmented Reality and Virtual Reality are not new technologies. But several constraints prevented their actual adoption. Recent technological progresses added to the proliferation of affordable hardware and software have made AR and VR more viable and desirable in many domains, including education; they have been relaunched with new promises previously unimaginable. The nature of AR and VR promises new teaching and learning models that better meet the needs of the 21st century learner. We're now on a path to reinvent education. This

work consists of explaining the reasons behind the new rise of AR and VR and why their actual adoption in education will be a reality in the near future. (<https://doi.org/10.1007/978-1-4899-0038-8>, n.d.)

The emergence of augmented reality as a brand-new interactive medium that adds virtual annotations to the real world creates novel ways to acquire knowledge that is relevant to the business. Little is understood, though, about how users react to its features. This research on interactive media characteristics of interactive technologies is used to examine augmented reality (AR) and to determine how closely they resemble the present crop of commercial AR apps. Potential media effects of AR on consumer behavior are examined based on a review of the research on how consumers react to these qualities. (<https://doi.org/10.1016/j.jretconser.2016.02.004>, n.d.)

Methodology

Pilot study on learning by doing and innovation. Exploring and engaging students on how to innovate an Augmented App for classroom instructional materials or can be used for future classrooms. Students taking ICT Enhancement was introduced to Augmented Reality, showing some examples of Augmented Reality and how to make an Augmented Reality Apps using the Aryel as a tool in doing AR apps. Students are taught to learn about AR creation and expected to innovate an AR app that can be used in the future classroom. They are taught how to use the tool in making an AR App. They are given augmented reality examples as their reference in doing an application. Students are told to find some free 3D assets for them to use in the making of the app. Experience the student in creating frames for the filters using canvas and learning to convert 3D model files that will be compatible with the AR app that has been used. Allowing students to add some events and Properties in the making. Give them time to explore and preview their app using their own mobile devices. Connecting their mobile phones using a QR code for them to appreciate the AR App. Allowing students to interact and collaborate with their classmates on the making and running of the AR App. Students are given the options as to what kind of Augmented Reality App they going to create according to the strand they belong.

This Augmented Reality App is a material to engage students for a better understanding and experience of real objects in an interactive way. The use of ARYEL as a tool in creating an Augmented Reality App. To be more realistic than expected. Unite AR and Unity with Vuforia Engine can also be possible for use.

The following sections in the Senior High School are tested to create, innovate, and make it materialized. G12-SLR, G11-BL. JOSEPHINE, G11-FULGENTIUS-, G11-ST NICHOLAS, G11-BLESSED PETER OF GUBBIO, G11-ST JAMES, G11-FREDERICK OF REGENBURG are the students who are guided and taught to innovate an AR App. They need to explore the tools for making an App. They are allowed to use templates and may create their own idea from scratch. After they were able to innovate an app was materialized. Students are asked to answer questions about their experience in using the App.

Survey Questions and Results

1. Do you know what Augmented Reality is? Yes [] No []

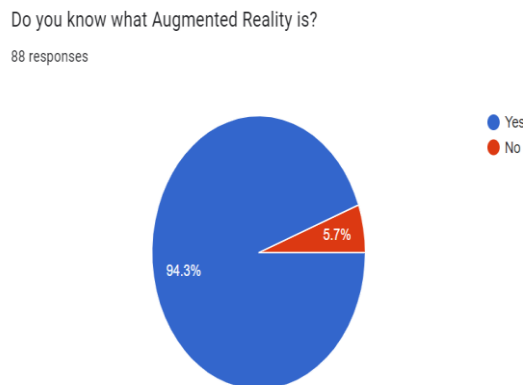


Figure 1: shows the responses on knowing what Augmented Reality is.

2. Have you used Augmented Reality in learning the subject? Yes [] No []

Have you used Augmented Reality in learning the subject?

88 responses

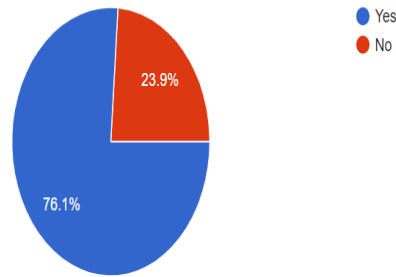


Figure 2: shows the responses on used of Augmented Reality in learning the subject.

3. What particular subject do you want to learn with the use of Augmented Reality?

Science History Robotics Math

Others

What particular subject do you want to learn with the use of Augmented Reality?

88 responses

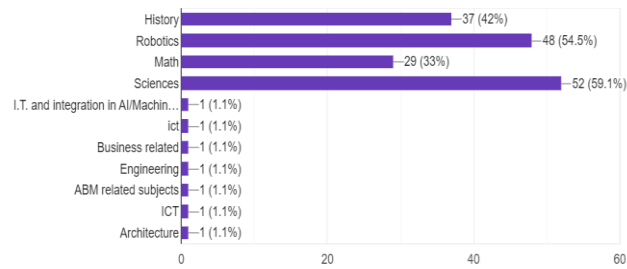


Figure 3: shows the responses on what particular subject the student want to learn with the use of Augmented Reality.

4. What gadgets are to be used in using an Augmented Reality?

mobile phone tablet computer

What gadgets are to be used in using an Augmented Reality?

88 responses

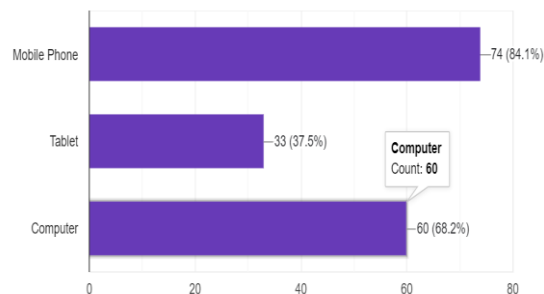


Figure 4: shows the gadgets used in using Augmented Reality.

5. Do you have experience in learning the subject using Augmented Reality? Yes No

Do you have experience in learning the subject using Augmented Reality?

88 responses

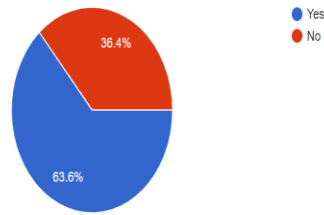


Figure 5: shows responses on the experience in learning the subject Augmented Reality.

6. Is your school using Augmented Reality to learn a particular subject? Yes [] No []

Is your school using Augmented Reality to learn a particular subject?

88 responses

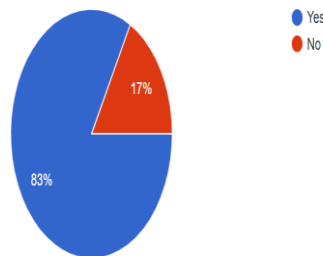


Figure 6: shows responses on using Augmented Reality to learn a particular subject.

7. Are you familiar with AR technology?

- Yes
- No

Are you familiar with AR technology?

88 responses

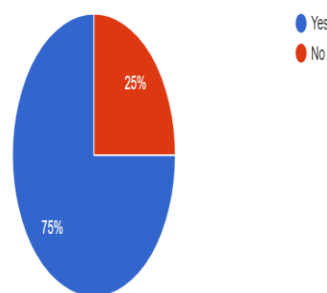


Figure 7: shows responses on familiarity of Augmented Reality.

8. Have you ever used AR Applications before? Which of the following have you used?

- Social Media filters
- Virtual product try-on
- Virtual fitting rooms
- Magic mirrors

- Gaming applications
- Virtual events
- I have not used any AR applications

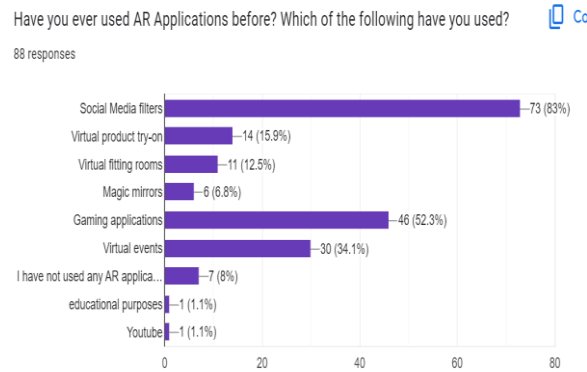


Figure 8: shows responses on have the student ever used AR applications before and which of the following have used.

9. How would you describe your experience using any AR applications mentioned?

- Fun
- Innovative
- Educational
- Useful
- Engaging
- Interactive
- Memorable
- Exciting
- Confusing
- Disappointing
- Others

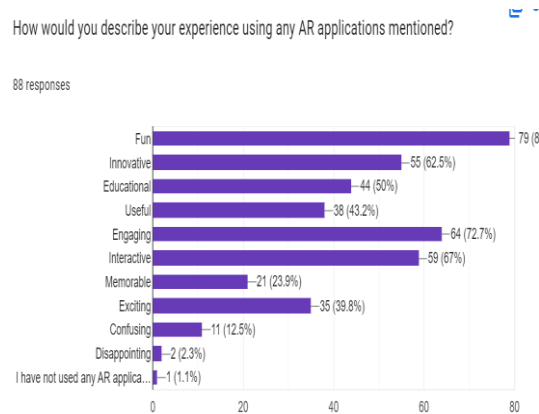


Figure 9: shows responses on describing the experience using Augmented Reality Applications.

10. What is your grade level are you in Senior High School University of San Jose Recoletos?

G11 [] G12 []

What is your grade level are you in Senior High School University of San Jose Recoletos?
88 responses

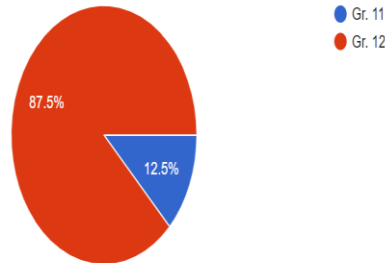


Figure 10: shows responses on what grade level the students are taking.

11. Are you familiar with Augmented Reality?

Are you familiar with Augmented Reality?
88 responses

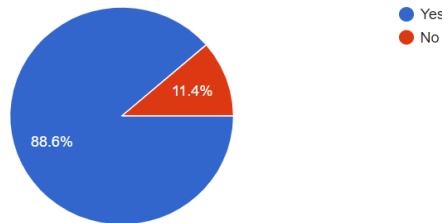


Figure 11: shows responses on familiarity of student in an Augmented Reality.

12. On a scale of 1 to 5, How familiar are you with AR technology?

On a scale of 1 to 5, How familiar are you with AR technology?
88 responses

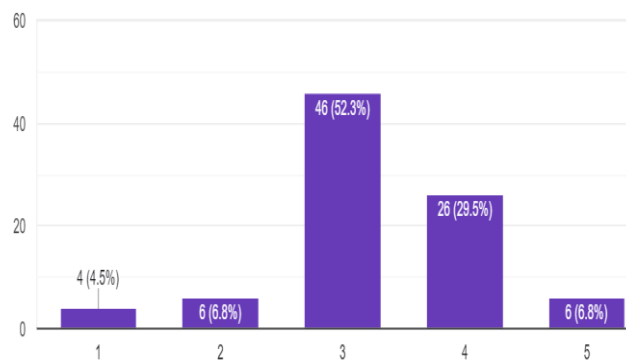


Figure 12: shows responses on a scale of 1 to 5, How familiar are the student in Augmented Reality.

13. How often do you use AR applications?

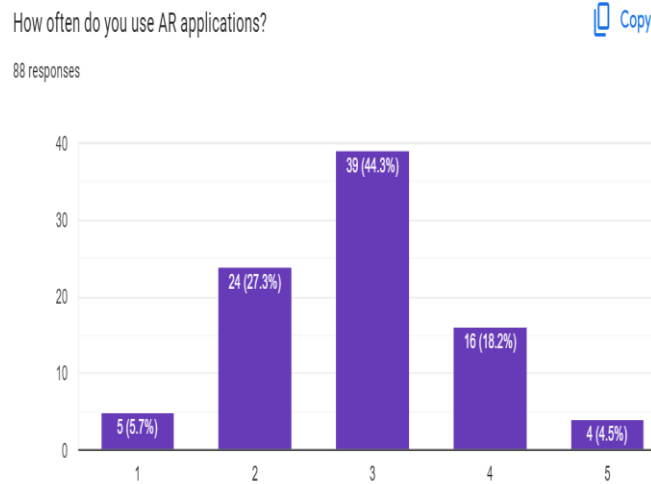


Figure 13: How often student use Augmented Reality.

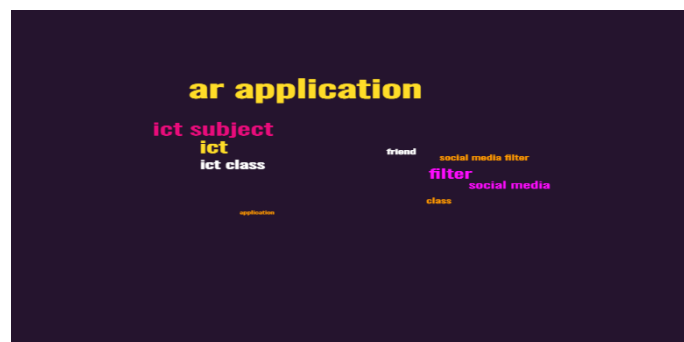
14. How did you first learn AR applications?



<https://monkeylearn.com/word-cloud/result>

Figure 14: shows the responses of student on how do they first learn Augmented Reality applications.

15. How would you describe your experience in innovating and using any AR applications?



<https://monkeylearn.com/word-cloud/result>

Figure 15: shows responses on how the student experience in innovating and using the Augmented Reality applications.

CONCLUSIONS

This ICT Enhancement programs elevates the student learning new trends and technology. It is program where it develops the 4 C of the students in the 21st Century classroom. It's a chance for the student to be innovative. Innovating projects like Augmented Reality will benefit the learning experience of student in the classroom

regardless of the age, the culture, the practice. It elevates the learning styles and strategies and methods of teachers to present the lesson in the 21st century classroom. Augmented Reality applications are fun, interesting, engaging, and amazing.

REFERENCES

- [1] Hildenbrand, D. K. (n.d.). *The impact of augmented reality on curriculum and training design*.
- [2] *Augmented Reality (AR) Defined, With Examples and Uses*. (n.d.).
- [3] https://www.researchgate.net/publication/286049823_Augmented_Reality_Trends_in_Education_A_Systematic_Review_of_Research_and_Applications. (n.d.).
- [4] <https://ieeexplore.ieee.org/document/8726192>. (n.d.).
- [5] <https://doi.org/10.1007/978-1-4899-0038-8>. (n.d.).
- [6] <https://doi.org/10.1016/j.jretconser.2016.02.004>, n.d.)
- [7] <https://online.maryville.edu/blog/augmented-reality-in-education/#what-is>. (n.d.).
- [8] <https://online-journals.org/index.php/i-jet/article/view/9289>. (n.d.).
- [9] <https://doi.org/10.5539/ies.v8n13p1>. (n.d.).