

Using Virtual Reality in Educational Field (NOOYA)

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Abstract:

This paper describes need and structure for the project, the resources that were created, the interactive elements and how they were integrated, and the supporting curriculum that was developed. Plans to implement and develop these resources in the future with actual elementary school students. Virtual reality gives instructors the chance to explain well with no limitation. Virtual reality was utilized in many field such as medicine, amusement, and colleges. Developers focus at most on college students except elementary children. The interesting thing in this project is to see the change in the classic educational system. Schools must change classic ways of teaching student by make them interact while learning.

Keywords: Virtual reality; VR; education; english

1. INTRODUCTION

English is an extremely important for correspondence. these days English as the second or outside dialects to talk with in local nations who aren't communicating in English normally [1]. The methods for instructing English are relying upon levels, strategies and projects substance that give in school. Considering English can happen in understudy's nation of origin as a piece of normal examining educational programs and exercises in school [2]. The kid will confront troubles and misjudging out of the blue while he/she beginning to learn new dialect and virtual the truth is the better approach to take care of this issue[3].

Virtual Reality (VR) is instigating focused on conduct in a living being by utilizing artificial tactile stimulation, while the life form has practically zero attention to the interference [4].VR is a PC interface that augments clients' capacities to make the client envisions that he/she is in an alternate domain. It does this by following the human mind particularly the visual cortex and parts of the cerebrum that see development. VR utilize isolate pictures for the privilege and left eyes [5].

Numerous inspirations are beginning performed with virtual reality. In medicinal field for instance the life structures of the human body can be unmistakably spoken to by means of VR [6]. This gives understudies a chance to play on human body by take-off layers covering the human body and

begin taking in the names and area of every organ, muscle, nerve, and bones. What makes VR compelling is the brimming with addictions on illustrations and using the six human faculties to convey a total yield [6]. In addition, VR is also being utilized in the tourism industry for the industry development [7].

VR is another PC innovation, has mind boggling potential in the instruction field [8]. The reason behind this that instruction is territory that requires the understudies to comprehend complex data and VR makes that errand simpler. VR presents data in a 3-dimensional shape with the part observing the world from inside the world with the capacity to interface with world [8].

Learning can be an extraordinarily fun yet accommodating knowledge. As opposed to it being a required responsibility, it tends to be something intriguing [9]. This perspective is the right mindset that an understudy requires. For this to occur, the ordinary technique for passing on information needs to change fundamentally. Virtual reality will help in diminish bore and assembling interest. It will depict the data capably rely upon pictures to take lead in the getting the hang of empowering everything [9].

Making an effective learning condition for rudimentary understudies requires the application that incorporates the best substance, instructive information and includes it to apply the prescribed procedures [10]. For English language guidance, the prescribed procedures to learn it by utilizing the four relational abilities (listening, speaking, reading, and writing) so as to enhance the language. The target in English dialect classroom is to make a learning situation that gives genuine uses of open undertakings [11]. In any case, a few understudies don't discover accomplishment inside these situations made in a customary classroom. Present day innovation in learning configuration permits teachers the opportunity to move outside the conventional classroom and make learning

conditions that happen in virtual situations could be successful and beneficial strategies for guidance [11].

As written game has the highest impact in VR. Games paying the child's attention naturally. The best way to get child's attention is to create challenge games that encourage the child to be more interesting to get best results. When we combine between the games with educational purpose we will get a higher impact in child's knowledge.

In this research, our aim is to solve the difficulties that child faces in learning English as foreign language. We will focus on one major point which is make the difficult part easier for them. This goal will achieve by developing a game that improve their language. The outcomes of the game will be measured after the experiment.

2. GAME DESIGN

The NOOYA application only has one user which is child or student. The student will need only to memories the terms and link the term with the figures then they need to answer the question to get the full marks.

2.1 System Architecture

The system has a non-immersive system for example computer, immersive system such as head mounted display or oculus and hybrid systems which is graphics of the environment. Through the computer it allows the user to play the game using the oculus, exit it. The oculus needs to be connected so the user will play the game in a virtual reality environment. The game will be calculating the score automatically by itself. Figure 1 shows the game architecture.

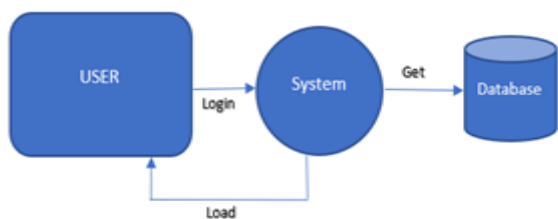


Figure 1: System Architecture

The system receiving users' interactions as an input and show the suitable output. The user will Login to his account that was created. Then the system will get all information related to the same user while it is loading. The system will save everything in database. The user will enter to first since directly.

2.2 Data Flow Diagram

The data flow diagram is shown in Figure 2. Based on figure 2, for the user interface, in this page the user can go to learn or quizzes or achievement or exit the application. After click on learn button he will go to 3 lessons.

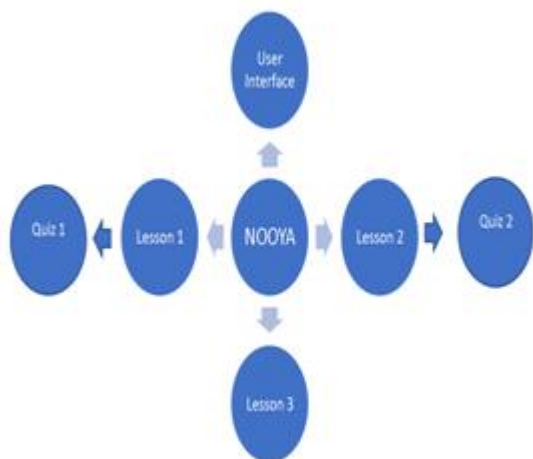


Figure 2: Data Flow Diagram

Since it is a virtual reality application the events should be smooth and connected. First of all, the user should login to the system. After that the user will enter to the first lesson. The user in the first lesson will see 5 images with the pronunciation of each word then the user will go to the first quiz. The user in Quiz 1 will have a True and False

questions with the picture and he/she can hear the pronunciation of each word to select the correct answer then the grade will appear after finishing the last question. The user in the second lesson will see 5 different images with pronunciation of each word. The images in this lesson will be different than the previous lesson. Then he will go to the second quiz. The user in Quiz 2 will have a multiple-choice question with the image of each word and the pronunciation then he/she will choose the correct answer to pass the quiz and see the grade. The user in this lesson should wear the oculus to see the 360-degree and headset to hear the sound. In this lesson he will see different images for all alphabet letter and the picture for each word.

2.3 Hardware Requirement

The computer needs in order to run the game. It must have Windows to run the game. The player will use oculus and joystick to play the game. The oculus is needed to show to the user a full vision and to be able to play it will track the body in real-world environment. The joystick is need for input in order to know user's movement. Mix between real world and the virtual environment to show the results and visualize it with user movement in real time by using 3D physical interaction.

2.4 Software Requirements

Android Studio is the Integrated Development Environment (IDE) for Android application development, based on IntelliJ IDEA . IntelliJ's powerful code editor and developer tools, Android Studio offers much more highlights that upgrade your profitability when building Android applications. The most important tool in the Android is Git. Git is a conveyed source-control instrument that is rapidly turning into the standard for portable improvement as well as for programming designing all in all. We have never taken a shot at a portable advancement venture that does not utilize Git for adaptation control. Another essential device in the Android environment is Gradle. Gradle is a manufacturing apparatus like

Insect and Maven that enables you to oversee libraries and library ventures, run instrumentation tests, and make contingent forms. Android Studio completes a great job of overseeing libraries all alone, however, Gradle makes this errand simple and versatile. Similarly, as with Git, Gradle is completely incorporated into Android Studio, which ships with an amazing exhibit of perspectives that permit the client to investigate Gradle documents graphically and look at the yield of a Gradle construct process.

2.5 Functional Requirements

The system should give accurate outputs based on the users' movement. The system must calculate users score. The system will have a database for all users. The system will accept or ignore user input. The system will be compatible with Oculus.

2.6 Non Functional Requirements

The system must get the database for all user. The system should allow user to exit. The system will respond to user movement. The system should take the user to first scene.

2.7 Activity Diagram

The activity diagram explains the all activities that are exist in the system. Since it is a virtual reality application the events should be smooth and connected. First of all, the user should login to the system. After that the user will enter to the first lesson. After finishing the lesson, the system will take the user to the first quiz. Now if the user finishing the first quiz the system will calculate the score. The system has 3 lessons the two first lessons are same but the third lesson need the oculus to see the 360-degree video and headset to hear the sound. After finishing all lessons, we have 2 quizzes. The first quiz is True and False questions and the second quiz is multiple choice question and after finishing each quiz the score will appear. The activity diagram is shown in Figure 3.



Figure 3: Activity Diagram

2.8 Use Case

The use case will show the user behavior. There is one user which is the child. The child shares some allowed behavior. The child will create an account with username, email and password only then login. The game will start, when game start the student can start lessons, Quizzes and interacting with system. The system will calculate the score automatically and stored in the database. Figure 4 shows the user case diagram.

2.9 ERD

The entity relation diagram shows the relationship between the entities. It is a very simple ERD since it is for activity of creating account. The ERD will function as follow. One child can create one account. One child can login in to one account. One child should use unique username. One child should use unique Email. The score will show according to the username

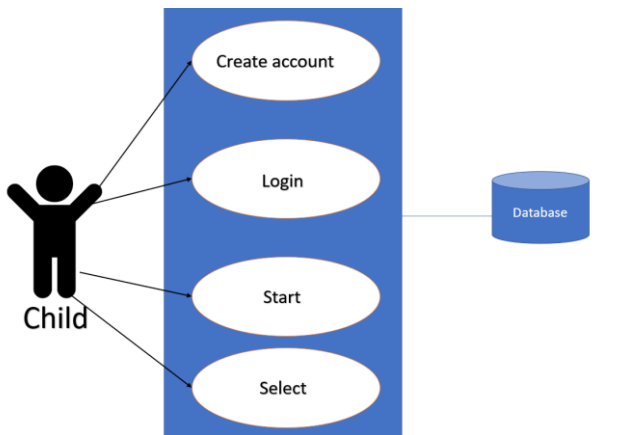


Figure 4: Activity Diagram



Figure 5: Nooya Game Home Page

2.10 Game interface

The NOOYA game interface is shown in Figure 5, Figure 6 and Figure 7. Thus, the game will function as follow. First, the students will see the sign-up or login button then he/she should press sign up if he is new user or login to begin. When the student press “Learn” he/she then goes to the next page. In the second page the student will go to the first lesson. The student will hear an audio of someone pronounce the word for each image and he/she will see a button to go to the next image. Basically, after finishing the lesson 1 she/he can go to the first quiz or to next two lessons. If the student goes to the first quiz he will have True or False questions and he/she should answer all questions to see the grade. But if he/she goes to the second lesson he/she will see the same as what he/she see in the first lesson but with different images. The lesson 3 is the 360-degree room it will see the entire alphabet letter with the example of each litter and with a picture of the word. The student will go to the last quiz which is multiple choice questions he will see the picture and hear the word to select the correct answer then the grade will show.

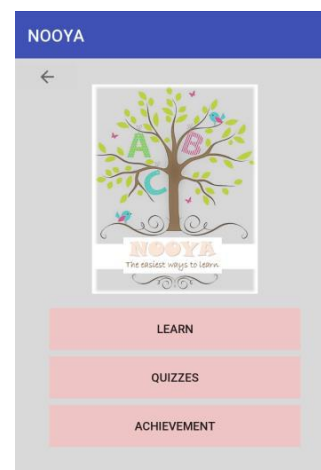


Figure 6: Main Page

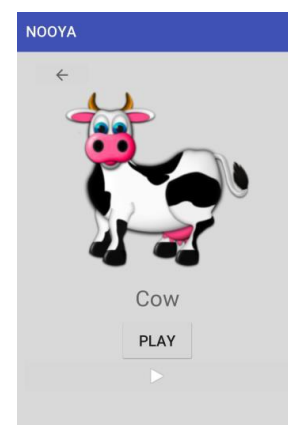


Figure 7: Main Page

3. IMPLEMENTATION AND TESTING

The NOOYA game was implemented and tested on children aged between 6-12 years old. The total sample of this experiment was be 26. The sample was divided to two groups. First group will be the control group which will learn the English in

regular ways and the second group will be the test group which will learn using our application. Each group had 13 students. The grades of the control group are shown in Table 1. The grades of test group are shown in Table 2.

Table 1: Control Group

Grades	Number of student	Average
5	3	23.077%
4	4	30.769%
3	6	46.154%
2	0	0%
1	0	0%
0	0	0%
Total	13	100%

Table 2: Test Group

Grades	Number of student	Average
5	6	46.154%
4	3	23.077%
3	4	30.769%
2	0	0%
1	0	0%
0	0	0%
Total	13	100%

The results show that the test group gets better score than the control group. This result proves that Virtual Reality can help student to memorize words better and help the students to get higher score.

4. CONCLUSION

Education is very important since it helped build generations. People were always greedy when it comes to learning. Everyone wants to learn and develop. The NOOYA is an English virtual reality application designed for children. The NOOYA was custom-made while keeping simplicity in mind. It was also designed while seeking for people to grasp it and similar tools and stop teaching students traditionally. The NOOYA tries to dispose of the negativities of leaning in a typical classroom. Everything can be discovered beginning from

introduction to the issue to a thorough analysis of the system and users.

Future work is needed in more term for elementary students since a gap exists there. It is also needed for the higher lever to be covered. The application can also expand instead of being 3 lessons and only. And the application also is implemented in IOS.

5. REFERENCES

- [1] Lems, K., Miller, L. D., &Soro, T. M. (2009). *Teaching reading to English language learners: Insights from linguistics*. Guilford Press.
- [2] Farrell, T. S., & Jacobs, G. (2010). *Essentials for successful English language teaching*. A&C Black.
- [3] McIntyre, E., Kyle, D. W., Chen, C. T., Kraemer, J., & Parr, J. (2008). *Six principles for teaching English language learners in all classrooms*. Corwin Press.
- [4] Hoorn, J. F., Konijn, E. A., & Van der Veer, G. C. (2003). Virtual reality: Do not augment realism, augment relevance. *Upgrade-Human-Computer Interaction: Overcoming Barriers*, 4(1), 18-26.
- [5] Scherer, M. J. (2011). *Assistive technologies and other supports for people with brain impairment*. Springer Publishing Company.
- [6] Carmigniani, J., Furht, B., Anisetti, M., Ceravolo, P., Damiani, E., &Ivkovic, M. (2011). Augmented reality technologies, systems and applications. *Multimedia tools and applications*, 51(1), 341-377.
- [7] Guttentag, D. A. (2010). Virtual reality: Applications and implications for tourism. *Tourism Management*, 31(5), 637-651.
- [8] Tan, D., &Nijholt, A. (2010). Brain-computer interfaces and human-computer interaction. In *Brain-Computer Interfaces*(pp. 3-19). Springer, London.
- [9] Cooper, L., & Harris, J. (2013). Recognition of prior learning: exploring the 'knowledge question'. *International Journal of Lifelong Education*, 32(4), 447-463.
- [10] Lancy, D. F. (2010). Learning'from nobody': The limited role of teaching in folk models of children's development. *Childhood in the Past*, 3(1), 79-106.
- [11] Yeung, A. S., Lau, S., &Nie, Y. (2011). Primary and secondary students' motivation in learning English: Grade and gender differences. *Contemporary Educational Psychology*, 36(3), 246-256.