

Tools & Technology in Art Education

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Virtual Kitaab

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July 12th, 2020



VIRTUAL KITAAB: AN APP THROUGH WHICH WE INTIGRATE AUGMENTED REALITY IN OUR EDUCATION SYSTEM

A big percentage of Pakistan's education system is running on same old school principle for more than seven decades now. Since partition, the schooling system has not been reformed until in last recent years. There are various institutes which have adapted the technology and made institutions technologically enable, but the things were not changed completely till COVID-19 hits hard. Schools, universities even many kindergartens are evolving toward online teaching system now.

Introduction

It is ironic that majority of our institutes are running on an older platform. Technology is trying to integrate itself into education system in different forms. Many schools colleges and universities already access the technology with trained teachers and a favorable environment but the use of technology in the class room is still low to zero. The use of technology does not start now it start long time ago for the ease of students. By integrating technology into education, teachers are able to solve many students' issues. Therefore we can say that the technology has become a major pillar for supporting the education system.

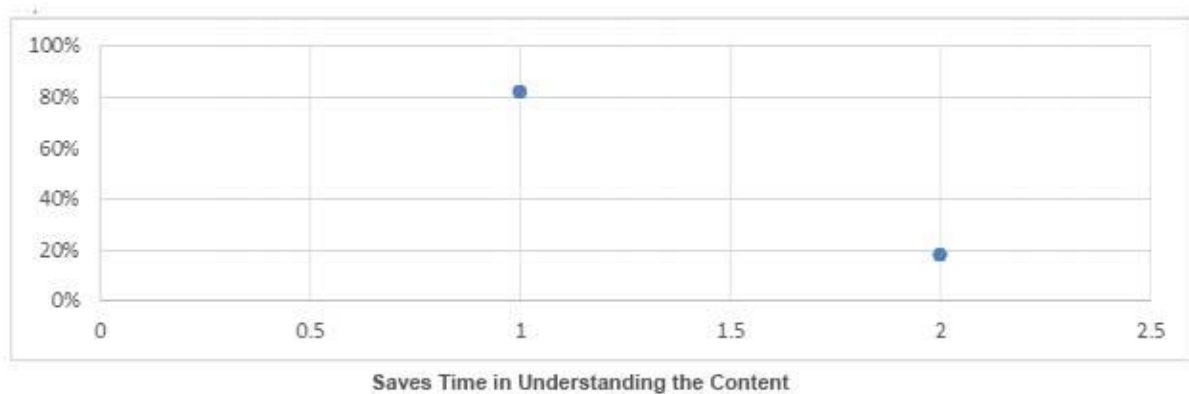
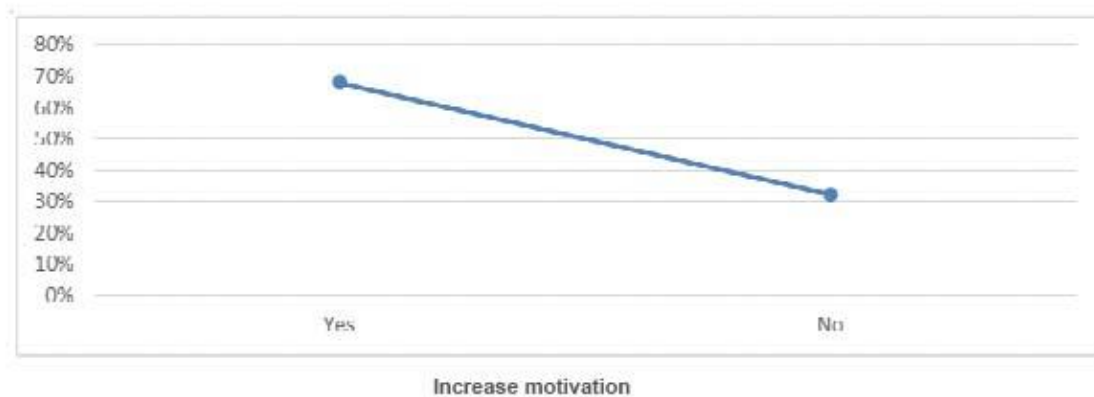
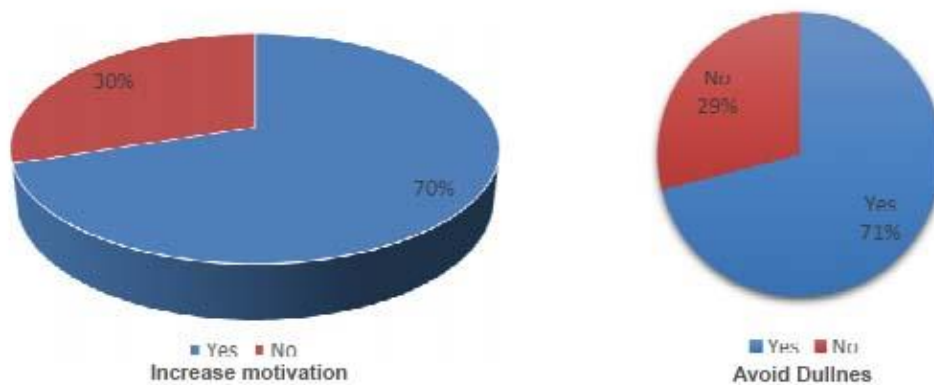


Does our educational system has adapted the technology completely? Pakistan is a third world country. The education is suffering with a lot of problems in this part of the world. There are number of educational systems running in the country; having different syllabus altogether. The learning and educational system is mainly divided into six different levels: preschool (for the age from 3 to 5 years), primary (grades one to five), middle (grades six to eight), high (grades nine and ten, leading to the Secondary School Certificate or SSC), intermediate (grades eleven and twelve, leading to a Higher Secondary School Certificate or HSSC), university programs leading to undergraduate and graduate degrees. Each level has its own problems regarding teachers, students and the class room. All these systems are encountering some serious problems, that can be identifiable but reasoning to address all these problems in one-go is not possible. The most important element of this area is the students, who are mentally disturbed and feel tortured studying under this obsolete system; therefore, the focus is purely on them to rectify and find solutions for their unsolved scenarios.

Data Analysis

Visual base learning plays important role in understanding the knowledge easily. It helps those students who forgets the theoretical knowledge within no time. When students see moving images with audio it increases the interest, vocabulary. A case research 2015, “Impact of Visual Aids in Enhancing the Learning Process” by Ghazi University Dera Ghazi Khan, Punjab

Pakistan shows the importance of visual base learning. The data of this research is given below:

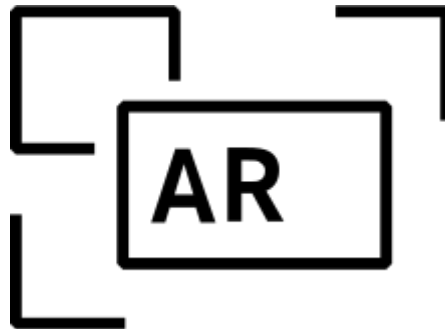


After understanding this data we can say that we have to develop such visual base platforms that helps the students in learning.

Advance Technology

With growing technology and advancement, visual base learning has grown already which is playing important role in understanding and acquiring the knowledge easily. The time is right to develop an application that helps a student to get basic information through visual resources.

I have selected the augmented reality to make such application that helps a learner to get informative knowledge. We need to understand the basics of augmented reality, for creating a worthy system/solution; the interactive real-world experience in which computer generated images are the main elements - in other words, the combination of real world with 3D computer generated models and real world objects.



Augmented reality is most trending technology which is integrating itself in every field. It can be easily operated on smartphone applications that is a major reason behind its popularity. Today, most games work on the augmented reality. Identically, AR is playing important role in sports, marketing, shopping, medicine, landscaping, maps and tourism through smartphone applications. This vast advantage has made the technology to enter into educational system, to provide more informative, understandable learning culture, to create a visual base learning application for students.

Introduce Augmented Reality in Pakistan's Educational System

There is no standard, up-to-date and advanced educational system within the country. Every province has their own educational platform, having different curriculum that can hardly assimilates with another system. At start, it's difficult to implement the AR in every educational system because of data variety and complexity.

Mobile Application Development

The plan is to develop an application that can give technological access to the teachers and their prospective students on hand. The application would be designed according to Federal Government Intuitions curriculum. This can be viewed at <http://www.fgei-cg.gov.pk/pages/fbbooks.php> that has a variety of books present at this system. The implementation of data is divided in seven (7) phases, followed by Pakistan's learning educational levels.

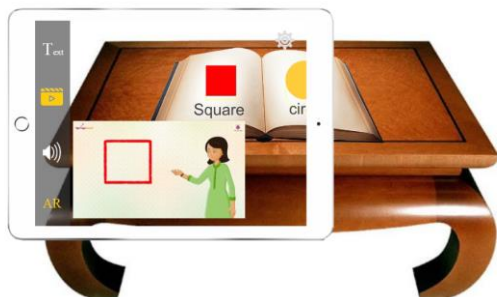
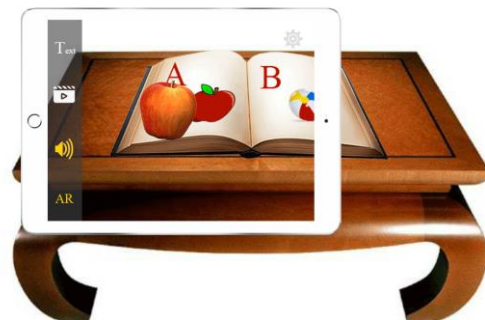
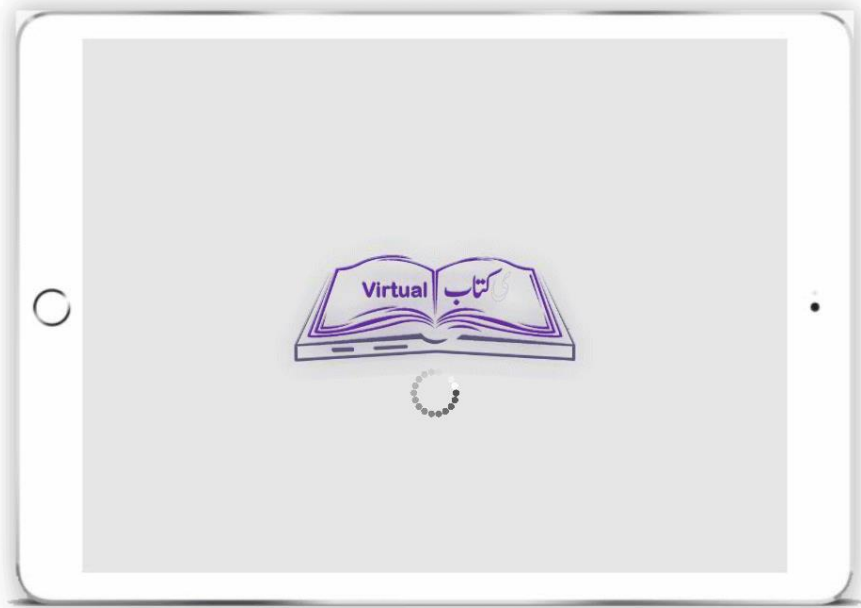


Phase seven (7) is the last phase in which the data from various education systems will be integrated. Phase one (1) will cover the Preschool level. It's a beginner level on which a child requires more visual knowledge to understand the books. Being a new application there would be several test-runs to assure the efficiency and productivity of the product. 3D models and audio knowledge of these text books would be made to save them on the application's cloud. Other data, like text and videos could be obtained automatically from the internet through artificial intelligence. This will allow a problem to be tackled easily to find best possible solution to solve it in the application. The time application is ready as per Federal Government education system's guidelines for preschool level, then it will go for the 2nd phase for adding data onto next level (Primary level). The process would be followed by 3rd, 4th, 5th, 6th level and so on. Every level has its own complexity in terms of data information that varies with the students' type that has to be addressed accordingly. This is the core reason to divide the implementation process in various steps.

Virtual Kitaab App

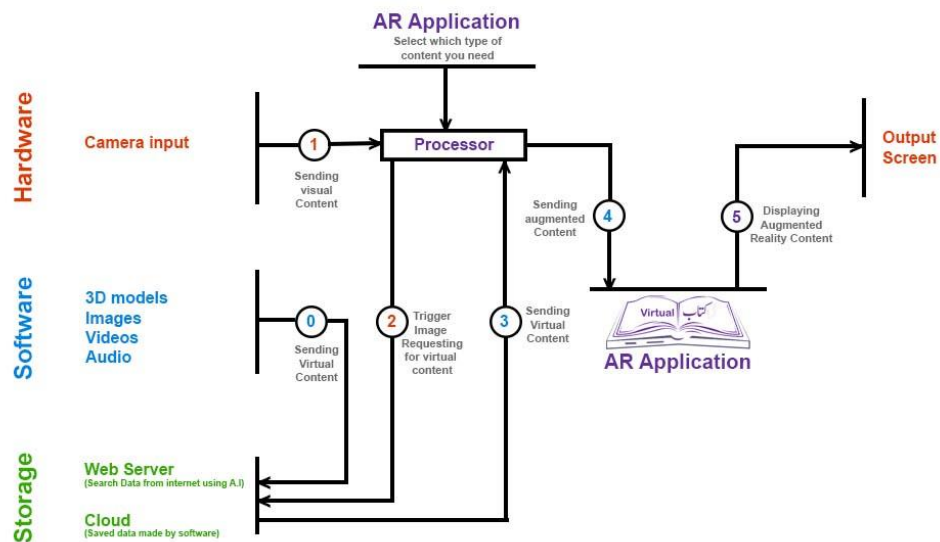
Using augmented reality, an AR application can help students. Virtual Kitaab is a mobile app that convert 2D image of object in a 3D animated form. In this application we can also take information through audio. A student can just have to play the voice to obtain more information about the model. The sound itself is self-explanatory to explain the basic knowledge, according to level. For example, starting from very basic level of education from preschool class, a student of nursery class is reading about pictures like A for Apple, B for ball etc. To acquire more information about the picture, a student just need to place a camera on the gadget in front of an apple and tap on the screen. The camera will sense the image and create a 3D model of the

apple. This model will start rotating on the screen with a voice describing about the apple that will start after taping the play button. This is workable on rest of the subjects.



Working

Let's try to understand the technical making of this application. Starting from augmented reality which is the key feature of this application, when a person scan the 2D image through the application camera will capture the image. This is known as trigger image.



When this trigger image goes to the application it overlays the virtual content over the real object. Now the question here arises, that where this virtual content comes from? This virtual content come from the existing data on the internet or from the application cloud on which we have save the data, shown to us on the application screen. The data 3d models are made on the software like 3Ds Max, Maya, Blender and etc. Now, there are two ways to see these models in the application either we can see these models' animated rotational video, that will play at the time when trigger image come to the processor. The second method shows the 3ds model on the screen that can rotate the 3d model by tapping on the screen to see it in all directions. Audio content is also attach with this model and we can hear it by taping the play button. The informational text, pictures and videos are also taken from the internet which is shown on the screen when the trigger image come across the application server. Mondly is a language learning app using augmented reality.

https://www.youtube.com/watch?time_continue=1&v=KmSN3-KG6cg&feature=emb_logo

Here are some platforms through which we can make our augmented reality data. Currently some of the projects like make3D, [embossify](#) and export to canoma are working that can also help us in making our data.



These can convert 2D into 3D, but we can see the image only from one side that is given by the 2D image. These apps use color filter and read the color shades to make an object 3D model. Same concept is used by our app. Another term named as photogrammetry that works on images taken from 360 degree rotation. After that these are converted into 3D model using software like. Autodesk recap pro, pix4Mapper and reality capture.

<https://www.youtube.com/watch?v=wL2cT-cEXz0>

Key features

The technology has following integrated key elements

- User friendly interface for children
- Animated 3d models which can be moveable on a finger's touch
- Audio information that support 3d model
- Text information data
- Supporting informative videos
- Autobiography

Versions

This application has two versions:

- One for the students for home use
- Other for institution.

The home version has limited features that permits students only to see the static 3D models with limited audio and video information. We can also buy more feature by taking annual membership of this application. Whereas, institution version would be having full access to all features.

Differentiate between Old School, Virtual and Augmented Reality

The usage of black and white boards, with usage of chalks and markers is still alive in Pakistan's educational system. This can be observed from government and middle level schools that are present in outskirts of the country. This system is destroying youth and not letting them to engage and cohere themselves completely with the learning environment. Not only the students, but the teachers educating these students have minimum to zero knowledge. The system is running in our educational arrangement, since the country's very existence. To grow and be fully developed, the government now has to take a step forward in changing our current education criteria.



In contrary, there are private institutes which have already started virtual/online learning from last few years. The virtual learning was not fully deployed until the current situation fall before the world – COVID-19. It made 5 out of 10 institutes to make their education available online through virtual system. The advantages are many but there is a large number of teachers who

are not fully aware of to the usage. The educational institutions are now focusing more than ever to train and educate their faculty members, followed by the transfer of knowledge to the students.



However, the augmented reality has become a real-thing now. The advancement is increasing day by day not only in educational but both public and private sectors too. This technology shift is happening in most parts of the world. AR allows its user to learn and acquire information in a realistic way. The AR helps to understand the concepts in a better way. It's a new era that has advanced learning level in all phases of life.

Problems

This application could be expensive to implement in our educational system. The application works on digital gadgets like mobile, android pad, iPad and etc., that needs some cost to purchase gadgets. Teachers should learn the technical model to implement in the classroom for students to take benefit from it. The government might not take a stand to implement the technology for advancement and better learning. However, as the virtual classrooms and learning has become a norm now, the time is not far when there would be AR utilisation in our private education sector. The private graduate schools and universities charge enough to start giving AR learning facility.



However, the government has to play its role hither. Pakistan is already growing in IT sector and adding AR to our learning enhance the industry. The system should be introduced to the pre-school system that will motivate kids to adapt toward fun learning process. There definitely would be a cost involved, but implementation of the system will allow the generations to come to be fully advanced and efficient to the technology. 3D visual aid will develop interest amongst the students to learn with interest.

Belonging from a third world country, there would be thousand reasons for technology not to be implemented easily within. The technology shift would be facing hardware and mostly software issues that would take decades to be installed and instigate completely.

Conclusion

Based on the above-mentioned reasoning and arguments, AR is the new learning. But lying down in the list of third world countries, Pakistan would have to see an unforeseen time to get this technology completely on-hands.