

**FINAL YEAR PROJECT
AR APPLICATION FOR CHILD EDUCATION**

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Multimedia and Creative Technology

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APPROVAL

This Project titled "AR APPLICATION FOR CHILD EDUCATION", submitted by Md. Nahid Hasan to the Department of Multimedia and Creative Technology, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Multimedia and Creative Technology and approved as to its style and contents. The presentation has been held on 08 September 2018.

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DECLARATION

We hereby declare that, this project has been done by us under the supervision of Md Salah Uddin, Lecturer, Department of MCT. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Now day's children are more likely to use smartphones. They would like to use smartphones more than a textbook. They use smartphones for playing various games and watch the cartoon as well as funny videos and movies also. The addiction to using smartphones through children is increasing day by day. Maximum parents now want to teach their children via smartphones. In that case, they try to find various learning apps and games. From that sense, we decide to make a child learning apps by using Augmented Reality.

AR is the most powerful way of interaction nowadays. On AR apps we design an alphabets book for the children according to our survey report and we make an android app using unity 3D. When a child opens the apps, then the phone camera will open. And if the child holds the camera in any picture of the book, then the smartphone will tell the name of the alphabet and also tell a word with that particular word and will show a 3D visual model of the object on the mobile display.



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CHAPTER 1

Introduction

1.1 Background

In 1992 the term augmented reality was first introduced by Thomas Caudell and David Mizell. Basically, they are two Boeing engineers. They are working on a simple see-through device that helped airplane engineers in hard-wiring schematics. Augmented reality commonly abbreviated AR according to their documentation.

The goal of augmented reality was to reduce cost and make efficient and improvement in many humans involved operations by aircraft manufacturing. For a long time were dreaming about the possibility of AR and the history of the medium expansion back before we even had a term for it. Basically, AR creates history with its related technology named Virtual Reality. Both of them VR and AR create by common creator The Sword of Damocles.

In 1968, computer scientist and researcher Ivan Sutherland create The Sword of Damocles. The goal of Ivan Sutherland was to create the ultimate display which is capable of transforming the physical world. Its prototype was too hard so that it needed to stopped from the ceiling by a mechanical hand. It could only display basic wireframe rooms for all the hardware that was barely exportable. Replacing the real world with digital reality it was one of the human kinds of first experiments. From 1992 people want to fulfill the vision of Sutherland which was written about over half a century ago.

Now a day we don't need a mechanical hand to stop heavy machines from the ceiling. Because headsets create more powerful than Sword of Damocles from 1968. It can be worn on our faces like glasses or fit perfectly inside our pockets. The device we independently use on our head like glasses, a visor or a helmet as a head-mounted display. Most people can access AR for the first time with the regular device we probably use every day like a smartphone.

As of early 2018, on the headset AR side, the most widely used head-mounted display is the "Microsoft HoloLens". It's totally wireless and its design is like a visor. It runs with a battery and a hundred percent processing power of it located inside its frame. The rapid development of smartphones has actually contributed to the rise of the VR and AR company's. That's why



the same components that make smartphones work, gyroscopes, accelerometers, HDR displays, are also required for AR and VR devices. The high requirements for smartphones have jump production of these elements throughout the past ten years leading to large hardware innovations and reduce costs. AR is created in the basic using the front rear-facing cameras on our phone. We hold it up and your screen is able to display digital objects and knowledge integrated inside your universe. Your phone can now act as a portal to new worlds experiences and information.

1.2 Motivation

Our basic purpose of this project is to make a child learning apps by using Augmented Reality & Virtual Reality. Because children are more interested in a smartphone than their book in this century. So we decide to make something which helps to teach the children. For that, we make these interesting smartphone apps by relating to smart technology for those children who are addicted to mobile phones.

AR brings works sheets or flashcards to our life. It can represent static images in a magical way while simplifying and visualizing complex ideas, making them easier to understand. For example, a flower bud on a printed page could bloom in AR slowly.

The 3D nature of AR inspires children to work together in groups; it creates genuine cooperation and improves communication. The overlay of the real world and dream additionally get youngsters thinking fundamentally with respect to how it functions and where the enlarged article truly is. It is anything but difficult to utilize which enables kids and gives them the fulfillment that they are responsible for their learning, at home or school. This self-coordinated learning builds its concentration and data maintenance. It rouses and connects with the offspring of all capacities to learn.

It's useful for educators as well. They can rapidly make a fun learning condition at a moderately minimal effort. AR is effectively executed, effectively learned and simple to refresh as good as ever substance ends up accessible. AR is a definitive fun, play-based movement and holds tremendous potential for ECE. As a prominent child parenting Master Maggie Dent, says often “children do not have to change. The world around them



has to change”.AR places kids in the driver's seat. The essential exercise that children need to learn is that they are the makers. Innovation is only an empowering influence.

Virtual Reality (VR) to date has had a more prominent profile, picked up its prominence through gaming and you have to put resources into headsets and supporting equipment. 94% of UK educators believe that VR will be helpful in the classroom, appeared by a Lenovo report. 42% anticipate that it will be typical inside 5 years. VR isn't gone for ECE with real producers of VR headsets advertising them as being fitting for children more than 13 years of age influence.

We would like to create an Augmented and Virtual reality application for mobile devices by which children who would like to learn using smartphones and technology.

When a child opens the apps, then the phone camera will open. And if the child holds the camera in any picture of the book, then the smartphone will tell the name of the alphabet and also tell a word with that particular word and will show a 3D visual model of the object on the mobile display. And on the VR apps, we design some environments according to our survey. Inside the environment, there will some alphabets in some fixed placed according to sequence and the child has to collect them by walking inside the environment. When he/she pick any alphabet than the apps will tell the name of the alphabet.

By completing this project, it will give us more opportunity to show and share what we have learned till now as a student of Multimedia & Creative Technology department of Daffodil International University. This will improve my confidence and skills for the job market as well.

1.3 Objectives

The objectives of the project are to:

1. Develop “Alphabet AR Book” application for smartphones.
2. Develop learning smartphone application for children.
3. Let the child know about the alphabet or 3D models of the application with voice over.



4. Provide a various interesting environment for Alphabet AR Book.
5. Provide various interesting 3D models for Alphabet AR Book.
6. Provide the simplest User Interface to experience virtual learning smoothly.
7. Give a child the opportunity to teach him with freedom.
8. Give children the chance of learning alphabets their own suitable time.
9. Show the possibilities of modernization of smart technology of learning.
10. It helps children to learn at a low cost, short time and in an interesting way.

Above all, the principal objective of the project is to learn the child and can be replaced by the textbook.



CHAPTER 2

Background Study

2.1 Introduction

Now a day's people are more likely to use smart phones and technology. They want all facilities o their phone. From that think, we decide to make the augmented and virtual reality apps “Alphabet AR book”. The concept of making augmented reality apps we get from our survey. To make something related with child education by using augmented reality. From that advice and our survey, we decide to make Alphabet AR book apps, after that we share our idea to our head of the department and he tells us to do that. He gave us too many ideas and requirements. Than we start working.

2.2 Survey Report

Before start working we make a survey to know about parents and child requirements. Because we want to make the app's user-friendly, attractive and interactive to the child. The survey helps us to know about their psychology and help us to make interactive apps for the child.

2.2.1 Requirements Analysis from Parents: First, we select 10 parents of school-going children. After that, we give them a form with a few questions. We name that “Requirements Analysis from Parents”. Here the results of our survey report.



Figure 2.1: Result of child enjoyment going to school



From this survey, we know from the parents that their children enjoy going to school.

Do your child enjoy going to school?

10 responses

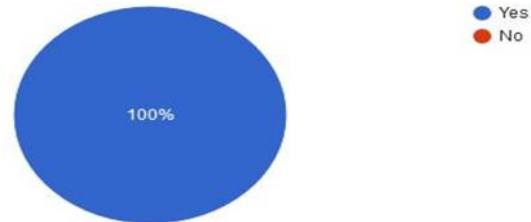


Figure 2.2: Result of smartphone availability of a parent

From this survey, we know from the parents that they have smartphone.

Does your child use smart phone?

10 responses

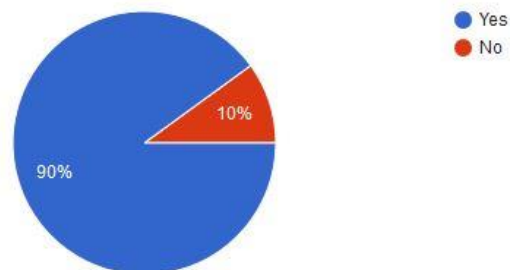


Figure 2.3: Result of smartphone use of a child

From this survey, we know that 90% child use their parent's smartphone.

How many time he/she spend behind smart phone?

10 responses

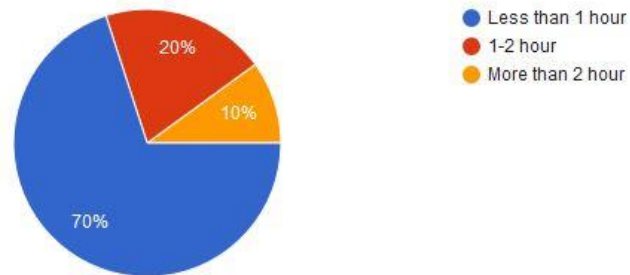


Figure 2.4: Result of spending time on smartphone

From this survey, we know that 70% of children use their smartphones less than 1 hour, 20% of children use their parent's smartphone 1-2 hours and 10% of children use their parent's smartphone more than 2 hours.

What he / she does with smart phone?

10 responses

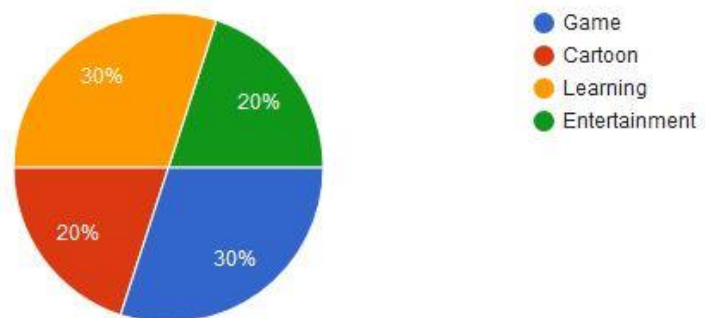


Figure 2.5: Result of activities on smartphone

From this survey, we know that 30% of children use the smartphone for playing the game, 30% children use the smartphone for learning purpose, 20% of children use the smartphone for watching cartoon and rest of 20% use smartphone on entertainment purpose.

Do you have/ know about VR?

10 responses

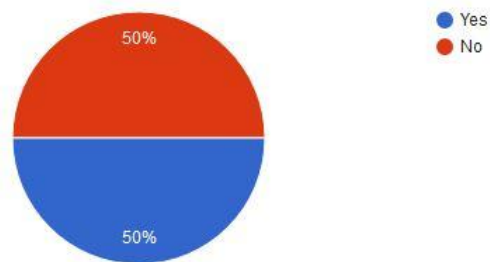


Figure 2.6: Result of idea about VR

From this survey, we know that 50% of parents know about VR and 50% not know about VR.

Do you allow your child to use VR box for Learning?

10 responses



Figure 2.7: Result of accessibility of VR Box

From this survey, we know that 100% of parents will allow using VR Box for learning to their child.

Do you want to learn your child using smart phone?

10 responses

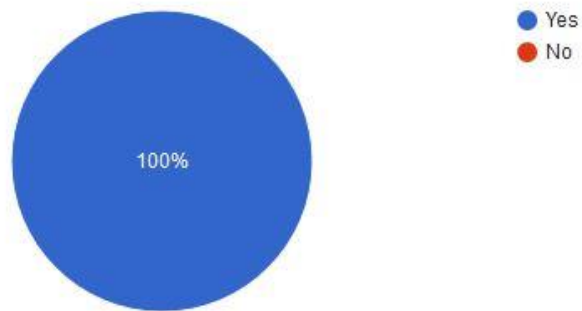


Figure 2.8: Result of learning using smartphone

From this survey, we know that 100% of parents will allow using the smartphone for learning to their child.

What does your child like more below of them?

10 responses

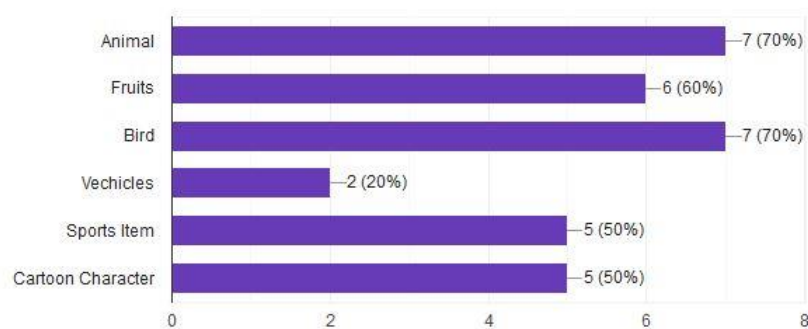


Figure 2.9: Result of children preference contents

From this survey, we know the interested items of children. From this report we make decision about our models of the game.



2.2.2 Children Requirements Analysis: After that we ask some question to their child of those 10 parents about their requirements. We named the survey is “Children Requirements Analysis”. Here the results of our survey.

What is your favourite color?

10 responses

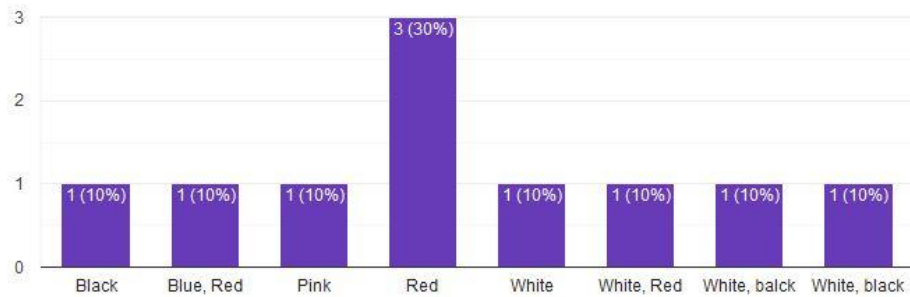


Figure 2.10: Result of children favorite color

Form this survey, we learn about the color choice of children. We found 30% of children like Red most, 10% pink, 10% Blue-Red, 10% black, 10% white, 10% white-red and 20% white-black. It helps us about color sense for our model and design.

what do you like below of them?

10 responses

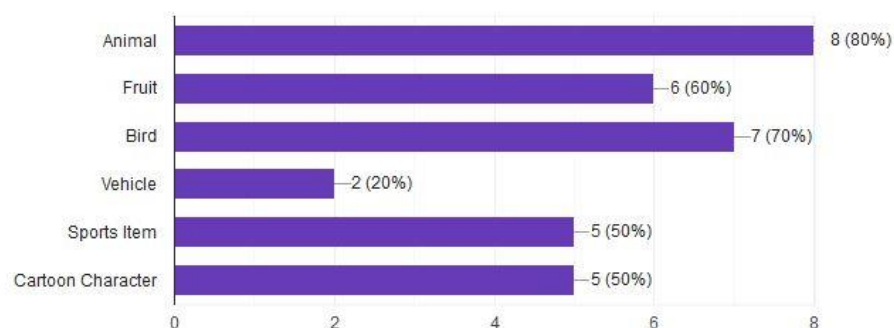


Figure 2.11: Result of children favorite contents

From this survey, we know the interested items of children. From this report we make decision about our models of the game.



2.3 Augmented Reality

Customarily, developing an AR application for a beginner is very difficult because it basically includes pattern recognition, image processing, object rendering, interaction ability and so forth. All these processes have to be done altogether then only it is able to display a virtual object in a real environment. Therefore, developing AR applications in a custom way can be time-consuming and troublesome. However, few AR companies such as Metaio, Vuforia, Wikitude, ARMedia, Layar and many more have developed AR Software Development Kit (SDK) which enables AR application to be developed effectively and some SDKs do not actually need any programming skills. We are work AR Vuforia SDK.

2.4 Virtual Reality

Virtual Reality is used in many sectors. Among them scientific visualization, industrial design and architecture, education, healthcare, video game and more. In VR mode users can freely move around the floor. It will give him/her the real flavor of being inside that floor. All these processes have to be done altogether then only it is able to display a virtual environment. Developing VR applications use VR Software Development Kit (SDK). Such as Oculus Rift, Gear VR, Vive, Google VR and many more. We use Google VR SDK.



CHAPTER 3

Methods of Development

3.1 Introduction

This chapter will be explaining the process of developing the “Alphabet AR Book” applications. The explanation will be divided into one section; this section demonstrates the workflow of the “Alphabet AR Book” application.

3.2 Alphabet AR Book Workflow

In this section, we will explain the workflow process of the "Alphabet AR Book" application. So the major workflow discussion as followed:

3.2.1 Alphabet AR Book Design: First of all, we do book design for the “Alphabet AR Book” application by Adobe Illustrator software. We do create a basic book page template design for the “Alphabet AR Book” application.

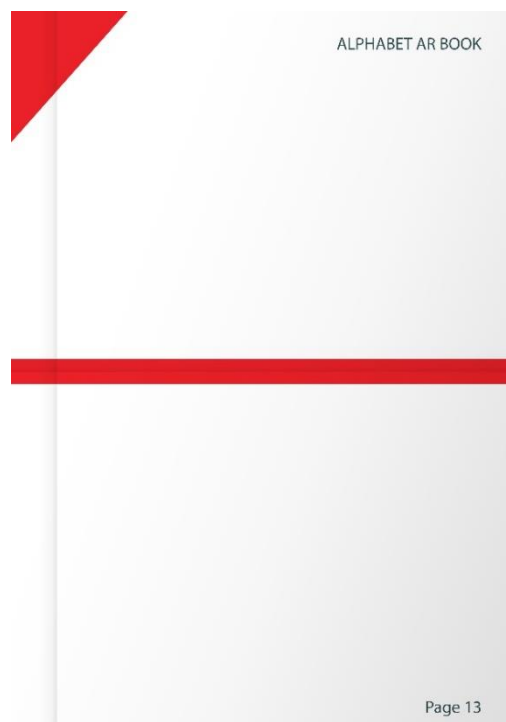


Figure 3.1: Basic book page template design for “Alphabet AR Book”

We do create book cover and back page.

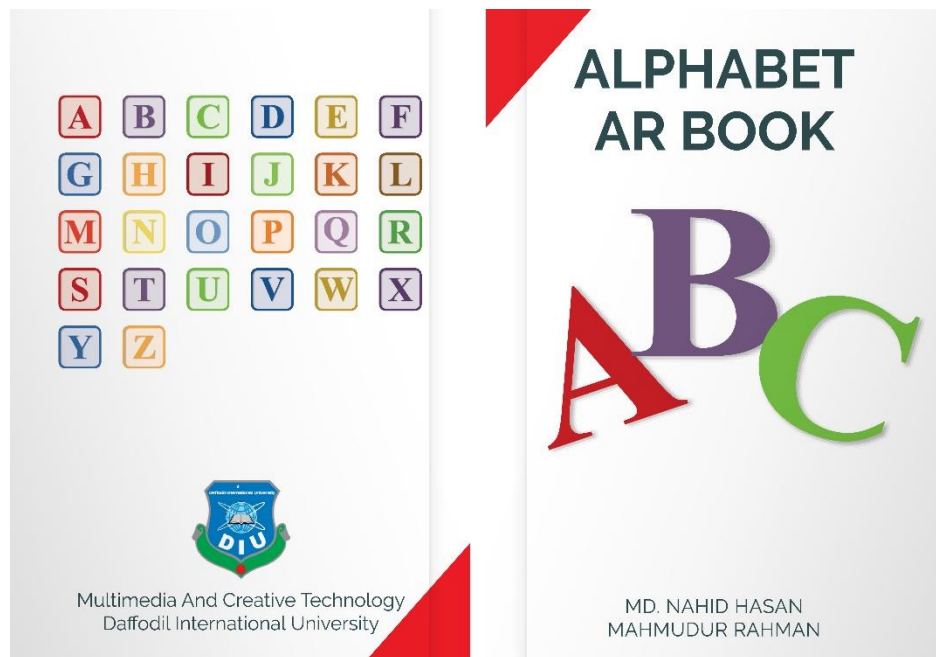


Figure 3.2: AR book cover and back page design

We collect image and design AR book page.

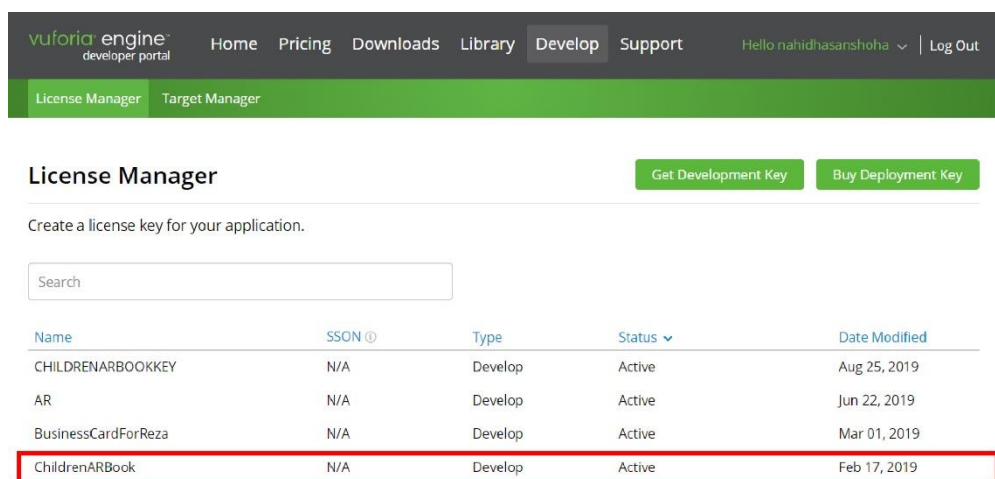


Figure 3.3: AR book page design 01



Figure 3.4: AR book page design 02

3.2.2 Vuforia Development Portal: We log in vuforia development portal and create Get Development Key of License Manager.



License Manager Get Development Key Buy Deployment Key

Create a license key for your application.

Search

Name	SSON [Ⓞ]	Type	Status [▼]	Date Modified
CHILDRENARBOOKKEY	N/A	Develop	Active	Aug 25, 2019
AR	N/A	Develop	Active	Jun 22, 2019
BusinessCardForReza	N/A	Develop	Active	Mar 01, 2019
ChildrenARBook	N/A	Develop	Active	Feb 17, 2019

Figure 3.5: Create Get Development Key of License Manager

Create Add Database of Target Manager.



Target Manager

Add Database

Use the Target Manager to create and manage databases and targets.

Database	Type	Targets	Date Modified
ARDatabase	Device	2	Jun 27, 2019
BusinessCardForRezaDataBase	Device	1	Mar 01, 2019
ChildrenARBookDataBase	Device	33	Aug 30, 2019

Figure 3.6: Create Add Database of Target Manager

AR all book page image Add target for tracking.

<input type="checkbox"/>	AlphabetY	Single Image	★★★★★	Active	Aug 25, 2019 08:11
<input type="checkbox"/>	AlphabetX	Single Image	★★★★★	Active	Aug 25, 2019 08:11
<input type="checkbox"/>	AlphabetW	Single Image	★★★★☆	Active	Aug 25, 2019 08:11
<input type="checkbox"/>	AlphabetV	Single Image	★★★★★	Active	Aug 25, 2019 08:10
<input type="checkbox"/>	AlphabetU	Single Image	★★★★☆	Active	Aug 25, 2019 08:10
<input type="checkbox"/>	AlphabetT	Single Image	★★★★★	Active	Aug 25, 2019 08:10
<input type="checkbox"/>	AlphabetS	Single Image	★★★★★	Active	Aug 25, 2019 08:09
<input type="checkbox"/>	AlphabetR	Single Image	★★★★☆	Active	Aug 25, 2019 08:09
<input type="checkbox"/>	AlphabetP	Single Image	★★★★★	Active	Aug 25, 2019 08:08
<input type="checkbox"/>	AlphabetN	Single Image	★★★★☆	Active	Aug 25, 2019 08:07
<input type="checkbox"/>	AlphabetM	Single Image	★★★★☆	Active	Aug 25, 2019 08:07
<input type="checkbox"/>	AlphabetL	Single Image	★★★★★	Active	Feb 28, 2019 17:15

Figure 3.7: AR all book page image Add target for tracking.

After Vuforia analyzed the images and given me ratings for the images.

AlphabetZ

Edit Name Remove



Type: Single Image
 Status: Active
 Target ID: 5914038ca46c41b8adee5fdbbbc044d3
 Augmentable: ★★★★★
 Added: Aug 25, 2019 08:12
 Modified: Aug 25, 2019 08:12

Update Target Hide Features

Figure 3.8: Vuforia Image Tracking and Rating

And download Database for unity editor.

ChildrenARBookDataBase Edit Name

Type: Device

Targets (33)

Add Target

Download Database (All)

Target Name	Type	Rating	Status	Date Modified
Introduction	Single Image	★★★★★	Active	Aug 30, 2019 15:38
ChildrenBookForARBackPage	Single Image	★★★★★	Active	Aug 30, 2019 15:38
ChildrenBookForARCoverPage	Single Image	★★★★★	Active	Aug 30, 2019 15:38
ARBackPage	Single Image	★★★★★	Active	Aug 26, 2019 20:21
ARCoverPage	Single Image	★★★★★	Active	Aug 26, 2019 20:21
AlphabetM2	Single Image	★★★★★	Active	Aug 26, 2019 01:25
AlphabetW2	Single Image	★★★★★	Active	Aug 26, 2019 01:22

Figure 3.9: Download Database for unity editor

3.2.3 Unity AR setup and workflow: We open Unity2017.2.5f1 version. Go to build settings and PC to switch platform Android. Then go to Player Settings and setup company name, product name, package name of Other Settings, select API level of Other Settings. After go to XR Settings and select Vuforia Augmented Reality.



Figure 3.10: Unity Player Settings

We import Vuforia Database in Unity. Create new scene, delete Main Camera and select GameObject Menu>Vuforia>AR Camera. AR camera inspector Vuforia Behaviour (Script) to click Open Vuforia Configuration, Vuforia License Manager to copy License key and paste App License key.



License Manager > ChildrenARBook

ChildrenARBook [Edit Name](#) [Delete License Key](#)

License Key Usage

Please copy the license key below into your app

```
Ab06hjH/////AAABmeGAtduoHUshpazIV2VJr:fNqWrBDgfpibjwbi7s/Xwv92Bb+NVTPuNWzfOeW/ZcWObFv8xRIEB2kHwooxBXL3/OtkW/W/ZatKAMinD4r9e89+2Wqgwe6QeIe0k33aVTtgdK7M9aSUBJB8D9ME7rHAQQJstN119JvqgErFUoOdnHEKR7cFRBpgMLsq9REvvv72Ip8P+U3FFIA3221SFGdUPpwFDY3ctW4dYWhVCH7ahGHiCdJ1uznkv61O2kDr1c+OSMHIEXOm/ZueH9eQTj9ae8aBU4CVY2Q59IX6Qk47nBWFuBgv1u0+PhL8tDYbyU6eP+hqmvvIyOeE1mrxtJIKNA+hv+xEHuqeEHSvE+X59pZx
```

Plan Type: Develop
Status: Active
Created: Feb 17, 2019 02:57
License UUID: 887acbae802a443e888d0ae858bf169d

Figure 3.11: Vuforia License Key

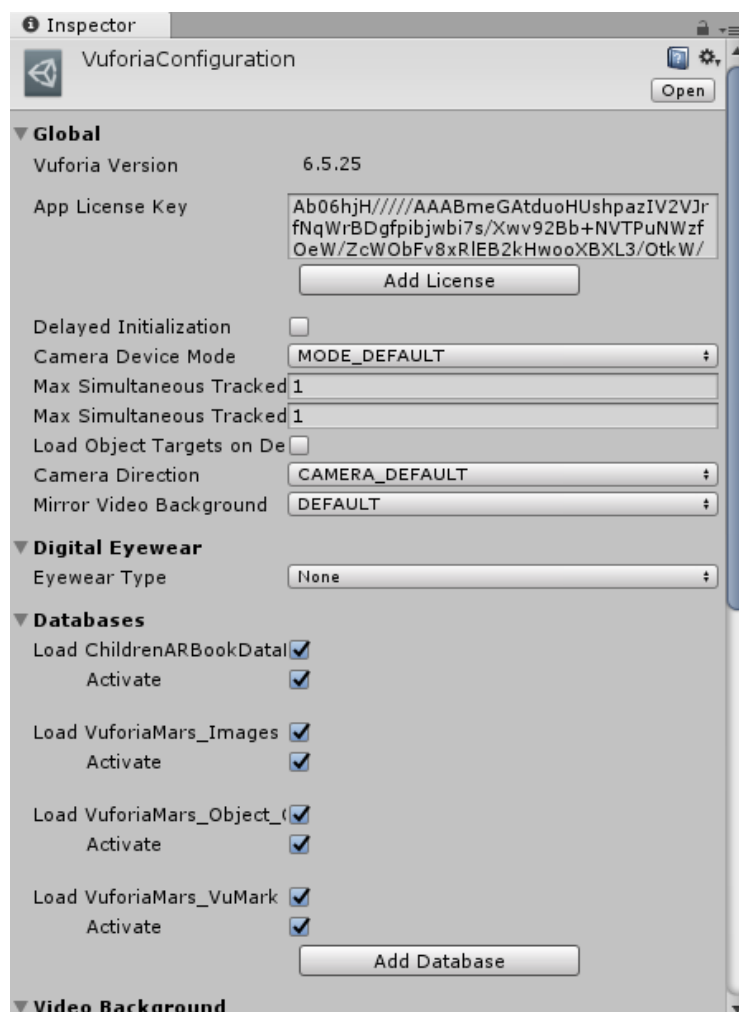


Figure 3.12: Add App License Key

Then select GameObject>Vuforia>Image setup step by step all Image Target in Scene View. Collect 3d model for unity assets store download and import.

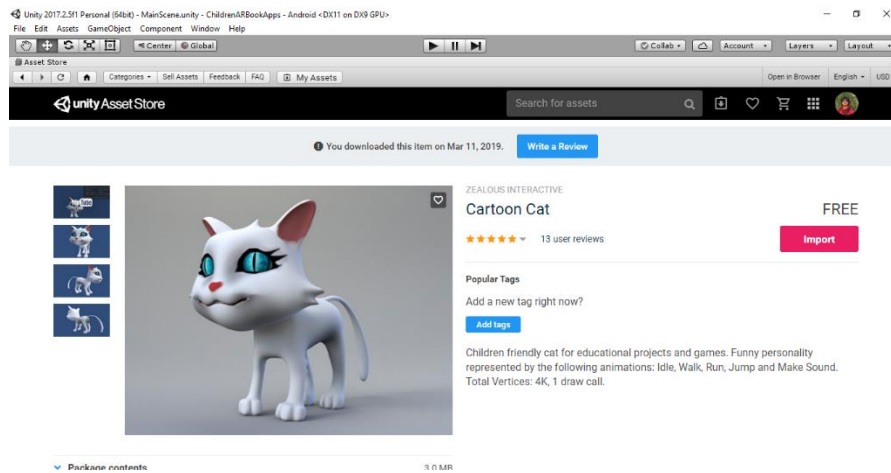


Figure 3.13: Unity Assets Store

Every Image Target child related 3d model.

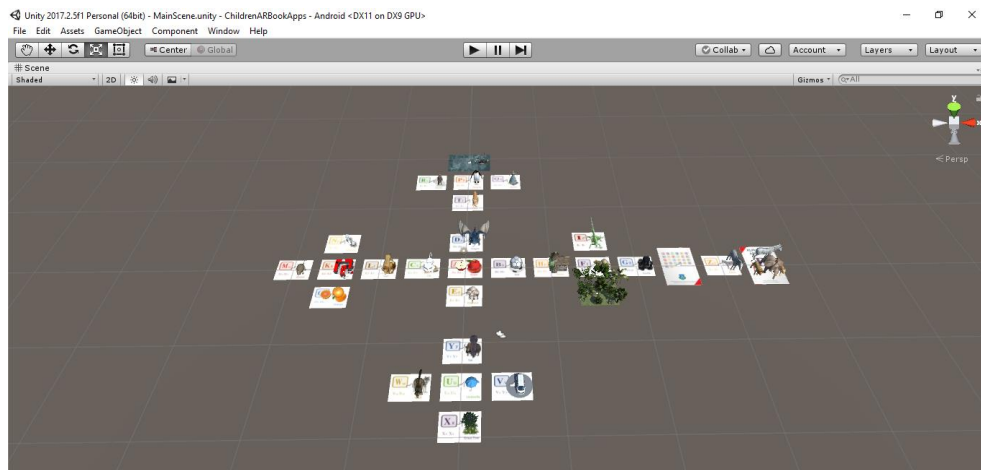


Figure 3.14: Unity “Alphabet AR Book” Scene Image Target child 3d model

Every Image Target add Audio Source component and uncheck Play On Awake. Also add “Image Target Play Audio” script.

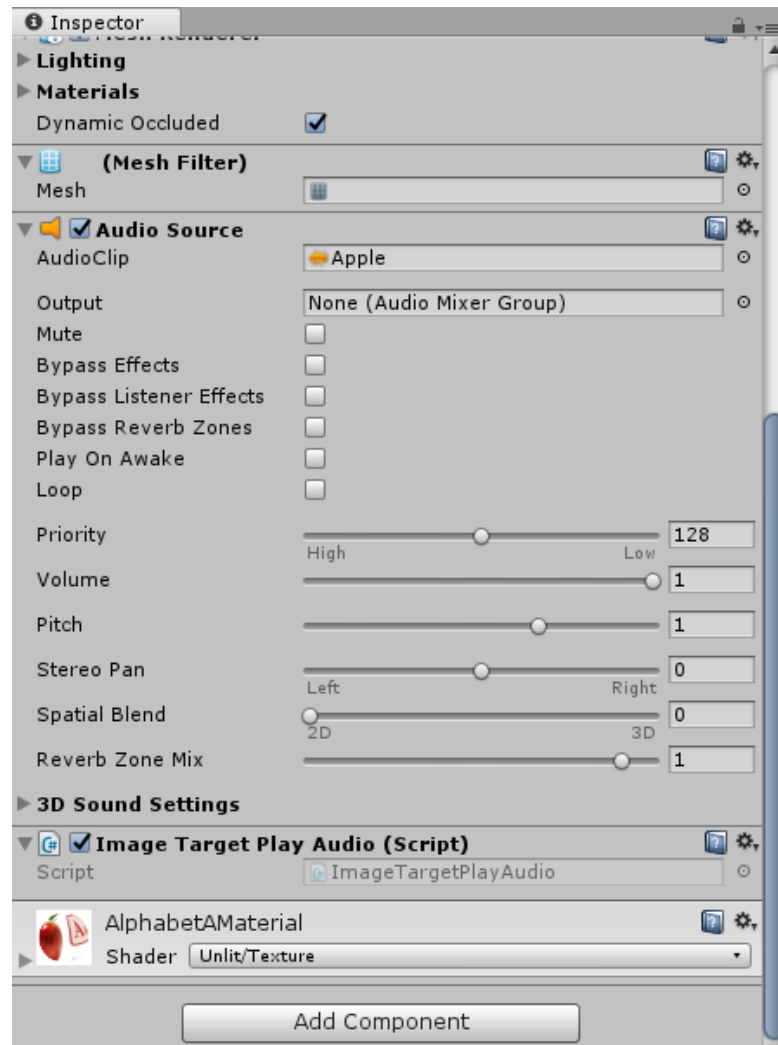


Figure 3.15: Add Audio Source and also add script component

“Image Target Paly Audio” script:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using Vuforia;

public class ImageTargetPlayAudio : MonoBehaviour, ITrackableEventHandler
{
    private TrackableBehaviour mTrackableBehaviour;

    void Start()
    {
        mTrackableBehaviour = GetComponent<TrackableBehaviour>();
        if (mTrackableBehaviour)
        {
            mTrackableBehaviour.RegisterTrackableEventHandler(this);
        }
    }

    public void OnTrackableStateChanged(
        TrackableBehaviour.Status previousStatus,
```



```
TrackableBehaviour.Status newStatus)
{
    if (newStatus == TrackableBehaviour.Status.DETECTED ||
        newStatus == TrackableBehaviour.Status.TRACKED ||
        newStatus == TrackableBehaviour.Status.EXTENDED_TRACKED)
    {
        // Play audio when target is found
        GetComponent().Play();
    }
    else
    {
        // Stop audio when target is lost
        GetComponent().Stop();
    }
}
}
```

Some still 3d model add “Rotation” script:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

public class Rotation : MonoBehaviour
{
    // Start is called before the first frame update
    void Start()
    {

    }

    // Update is called once per frame
    void Update()
    {
        transform.Rotate (new Vector3(0,30f,0)*Time.deltaTime);
    }
}
```

We all collect to audio for google translate and import unity. And assigned to every audio clip. Sometimes AR Camera not perfectly focus, so add “focus component” script:

```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;

//This part is VERY important!!!!
using Vuforia;

public class FocusComponent : MonoBehaviour {
    void Start ()
    {
        // Setting up callbacks with the Vuforia behaviour
        var vuforia = VuforiaARController.Instance;
        vuforia.RegisterVuforiaStartedCallback(OnVuforiaStarted);
        vuforia.RegisterOnPauseCallback(OnPaused);
    }

    private void OnVuforiaStarted()
```



```
{
    //This specifies how the camera will focus
    CameraDevice.Instance.SetFocusMode(
        // "CONTINUOUSAUTO" means that the camera will automatically focus on the
subject
        CameraDevice.FocusMode.FOCUS_MODE_CONTINUOUSAUTO);
}

private void OnPaused(bool paused)
{
    if (!paused) // resumed
    {
        // Set again autofocus mode when app is resumed
        CameraDevice.Instance.SetFocusMode(
            CameraDevice.FocusMode.FOCUS_MODE_CONTINUOUSAUTO);
    }
}
}
```

Finally, add Menu scene in “Alphabet AR Book” application and this scene add three button Play, About, Exit.



Figure 3.16: Menu of “Alphabet AR Book” application

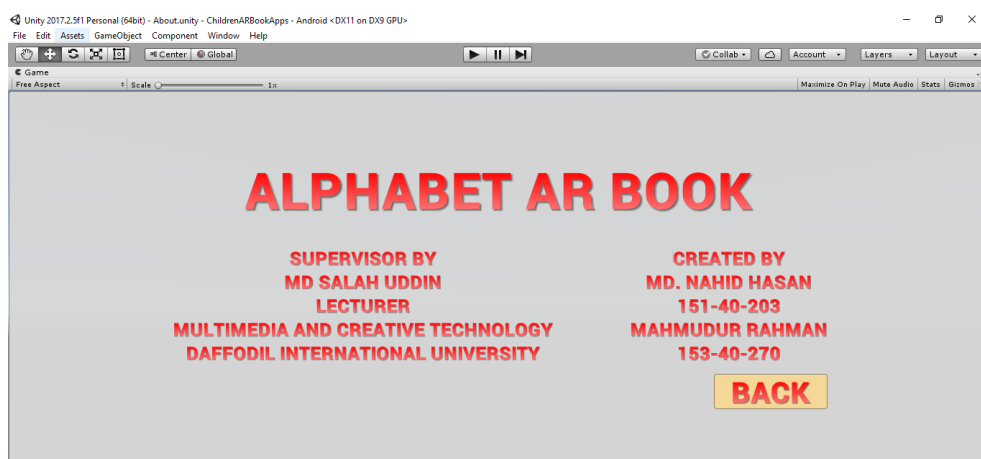


Figure 3.17: About of “Alphabet AR Book” application

Then add “Menu” script for button:



```
using System.Collections;
using System.Collections.Generic;
using UnityEngine;
using UnityEngine.SceneManagement;

public class Menu : MonoBehaviour {

    public void PlayGame()
    {
        SceneManager.LoadScene ("MainScene");
    }
    public void About()
    {
        SceneManager.LoadScene ("About");
    }
    public void Exit ()
    {
        Application.Quit ();
    }
}
```




CHAPTER 4

Software's & Plugins

4.1 Introduction

Once we knew what to do for our project and we had the necessary data to shift to the production phase, we made the list of necessary software as below, and made sure we have them installed in our workstation.

- Unity – 2017.2.5f1
- Adobe Illustrator
- Autodesk Maya 2019
- Vuforia
- Adobe After Effects CS6
- Microsoft Visual Studio 2017

4.2 Unity

Unity Technologies developed a cross-platform game engine called UNITY. It was first released in 2005 and has already launched several updated versions with greater tools to develop interactive games, software and application. The most beneficial part of Unity is, it can be used in multiple operating systems, and the deployed software from unity can opt for almost any popular operating system. Thereby, one can develop software in unity for both Windows, MAC and android, Linux, ios; everything. The game engine has basically two parts to work with. One is the frontend which includes making the scene with necessary elements and the other is the backend, where the scripting/programming is done. The user only experiences the results shown in frontend. Unity game engine allows scripting in two languages. The C# and JavaScript.

I have chosen this game engine for my project because of its user friendly user experience and user workflow. I designed the scenes and user interface in this engine and C# programming language to make them interactive.



4.3 Adobe Illustrator

Adobe Illustrator is a vector graphics editor developed powered by Adobe Inc. Originally designed for the Apple. Development of Adobe Illustrator began approximately 1985. Along with Creative Cloud, Illustrator CC was released. The latest version is Illustrator CC 2019. It was released in October 2018. It is the 23rd generation in the product line. Adobe Illustrator was reviewed as the best vector graphics editing program by PC Magazine in 2018.

4.4 Autodesk Maya

Autodesk Maya is a 3d designing, modeling, animation and VFX software with the capabilities of animating CG objects. This software was released in February 1998. Since then, this software is being widely used for animation. Because of having a user friendly interface, Maya has become one of the favorite 3d modeling and animating tools to the industry professionals. After the initial release, the software is being upgraded with newer and smarter opportunities and the latest versions include realistic shader and dynamic simulation tools to get even physically and visually perfect models and animations. We have chosen this software for all the 3d design and modeling parts of our project.

4.5 Vuforia

Vuforia is a plugin which provides cross-platform Augmented Reality support for Android, iOS, and UWP devices, through a single API. It allowing developers to write their apps once and run them using the best available core technology. It starts with Unity 2017.2, Unity Developers have been able to create Vuforia-enabled apps using a simple authoring workflow and open scripting directly in the Unity Editor. The Vuforia plugins included performance optimizations. It included tight ongoing synchronization of features and fixes. It is a native Unity workflow that enables developers to focus on creating the best AR experiences.

With Unity 2017.3, we introduce with Vuforia 7. Its helps developers to attach digital content to even more types of objects and environments using Model Targets, Ground Plane. While ensuring the best possible experiences on the broadest range of devices and operating systems.



4.6 Adobe After Effects

Adobe After Effects is another mighty product of Adobe Systems. This is basically used for post- production in non-linear editing panels. This software has a reputation in the film, television and game industry for its opportunities of motion graphic animation, visual effects production, 2d animation, video and audio editing. This is the one stop solution for almost any kind of compositing works in the industry now. The software was first released in 1993 and since then it has been upgraded with several newer versions. Though there are other node based powerful compositing tools in the industry now, Adobe after effects is still the first choice for artists like me who like to work with layers and timelines. In our project, we used Adobe after effects for the intro video of the project.

4.7 Microsoft Visual Studio 2017

An Integrated Development Environment (IDE) was developed by Microsoft and named as Microsoft visual studio ^[10]. This software is used to develop computer programs, websites, applications, mobile apps and lots other items. This IDE can produce both native code and managed codes. Also the integrated debugger makes it capable of source level debugging and machine-level debugging.

As Unity game engine needs an IDE to script for the product, it includes some external IDE with it. Microsoft Visual Studio is preferred by the Unity officials for its latest versions and that persuaded me to use this for my project's backend.



CHAPTER 5

Final Output & Evaluation

5.1 Introduction

In this chapter, we will discuss the building process and evaluation result and the promo video. It will help us to find out the lacking and bugs.

5.2 Building the. apk File

Through the process stated earlier, our application is ready with all functionalities. But, the main problem is, still we need to play and run this inside Unity game engine. So, it's not yet ready for the audience. In order to build it to .apk file, we need to do a "Build Settings".

In the "Build Settings" option, there are player setting options too. We can change the name of the App, the company name, the versions, the preferred devices, the logo of the Application, cut scenes and all other necessary formalities there. Inside the build settings, we must arrange our scenes according to order, keeping the Scene Management script in mind.

This is to be noted that, without building the scenes in serial, the application won't be deployed properly as useable. apk file.

If the work file was needed to be modified in other workstations, we found it useful to have the project settings folder always with the exported package. In order to use the same work files on another computer, we need to open a new project and import the custom package in that new project. The "Project settings" folder should be replaced by the previously saved project settings folder. Thus all tiny details will be reloaded. Otherwise, it's very common to have errors, which are almost impossible to solve without creating that part from scratch.

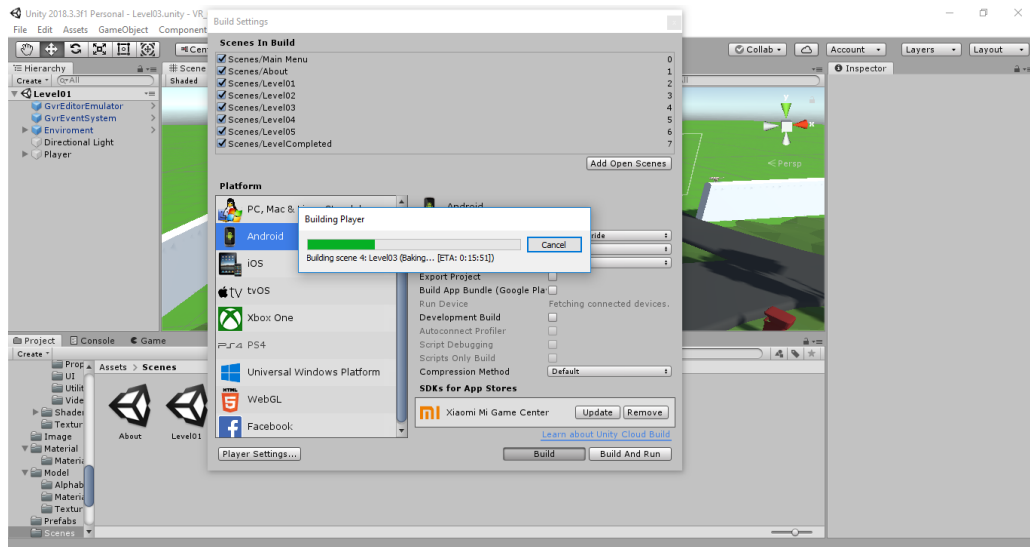


Figure 5.1: Build “Alphabet AR Game” application

5.3 Compositing the Intro:

The Introductory video is a very short video clip that is just made with the intention of appreciating child learning. This video will also be used to promote this application. This short blood worming video is both a promotional and inspirational child learning, indeed.

In the making of this video, the design used in the apps are used with visual effects added and composited with Adobe After effects.

5.4 Children evaluation:

After complete building, we again meet with those children and offer them to use our application. After that, we collect their evaluation. The result of this survey is below:

Do you play th AR game?

10 responses

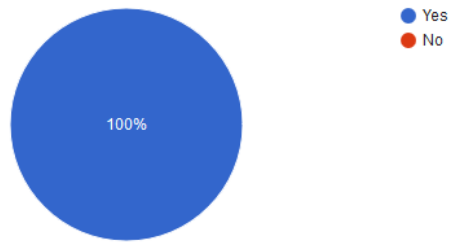


Figure 5.2: Result of play AR game

Every child plays the AR game.

Do you enjoy the game?

10 responses



Figure 5.3: Result of enjoy the game

Every child enjoys the game.

Is it easy to use?

10 responses



Figure 5.4: Result of easy to use



It was easy for every child.

Do you like the design of AR game?

10 responses

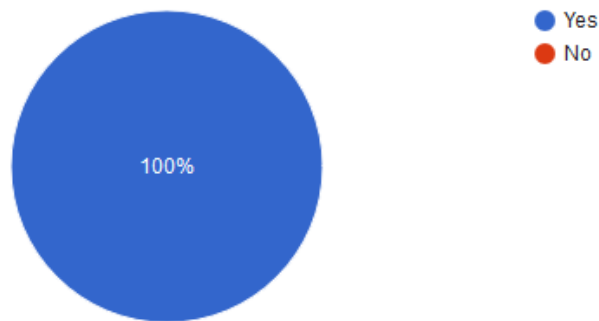


Figure 5.5: Result about the design

Every child like the design of the AR game.

Do you play the VR game?

10 responses

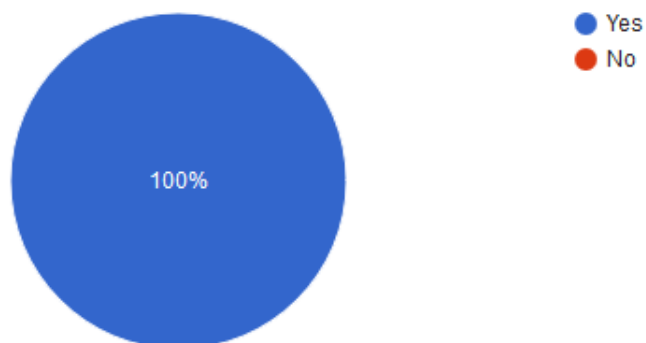


Figure 5.6: Result of play VR game

Every child plays the VR game.

Do you feel comfort on the VR game?

10 responses

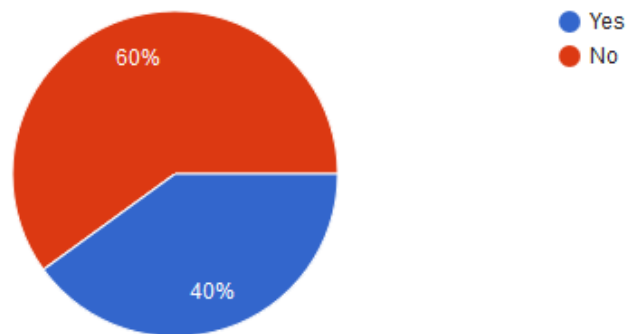


Figure 5.7: Result of feel comfort on VR game.

40% of children enjoy the VR game and 60% didn't enjoy the game.

Is it easy to use?

10 responses

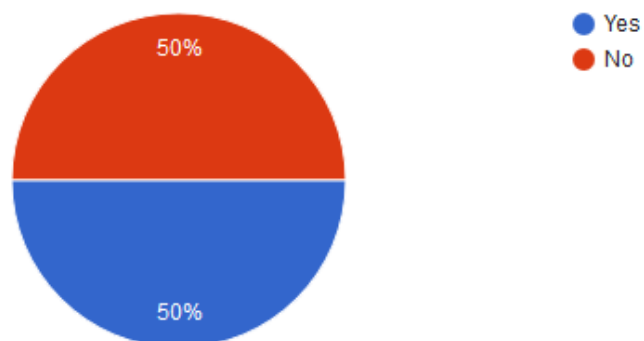


Figure 5.8: Result of easy to use

The game was easy to 50% of the child and not easy was the rest of 50%.

Do you enjoy the game?

10 responses

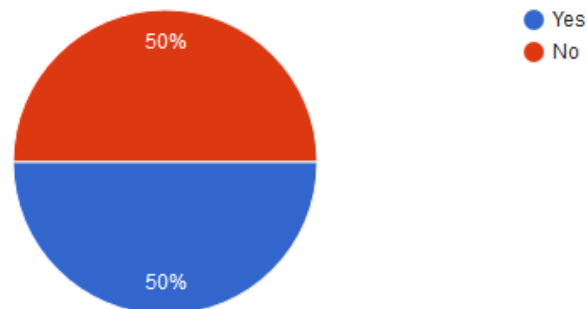


Figure 5.9: Result of enjoy game

50% of children enjoy the VR game and the rest of 50% didn't enjoy it.

Do you think it is beneficiary for your study?

10 responses

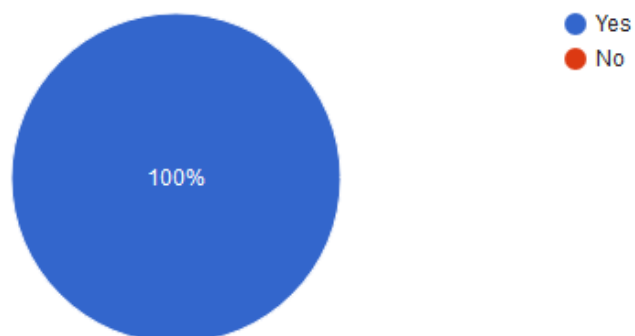


Figure 5.10: Result of think beneficiary

Every child thinks our AR apps and VR game is beneficiary for their study.



5.5 Lacking and Bugs:

Mainly, the “Alphabet VR Game” application some lacking and bugs. This application play by VR controller and VR Box. So, mobile Bluetooth to connected VR controller and mobile set in VR Box. Sometimes, the VR controller works not perfectly. Because we use the MI VR controller and VR Box. This is low-quality devices.

Other problems are not working “Alphabet AR Book” and “Alphabet VR Game” application low android version, low ROM and RAM smartphones. So, this application will need high or latest android version, high ROM and RAM smartphones perfectly for play.



CHAPTER 6

Future Possibilities

6.1 Introduction

In this chapter, we tried to discuss the enormous possibilities after this project. This “Alphabet AR Book” and “Alphabet VR Game” is a milestone in the electronic mediums of representing learning. But, this is definitely just a beginning. This kind of project has a lot more to be expanded. There are scopes of adding newer features and making this application more useful to a larger number of users. Enthusiastic people can get inspired by this step and draw their footprints on this journey in many different ways.

6.2 Opportunities with this project in near future:

- In these apps, we tried to teach children about alphabets only. In the near future, we add more like word, spelling, sentence making, countering, and calculation.
- This app can also be used in the classroom instead of textbook.
- We will make these apps for all grade students in the future.
- We want to convert all medium textbooks in AR and VR apps.
- This First Person Character experience can be converted to Virtual Reality if someday the VR devices get comfortable and more popular.
- We will make our history 3d visuals in VR apps.



CHAPTER 7

Discussion

7.1 Introduction

In this chapter, I have presented a comparative discussion about my project and other ways of presenting AR & VR. Regardless of time and technology, how the outcome is being helpful and is freely discussed in this chapter.

7.2 Discussion:

Educators understand that the educational method ought to be all concerning creativeness and interaction. While academics don't essentially have to be compelled to recruit all students into science, their goal is to induce them inquisitive about a topic. That's where AR & VR could come in handy. The potential of combining smartphones and Augmented Reality and Virtual Reality for education is big, though it still has to be fully discovered. AR & VR, in various ways, could grant students extra digital information about any subject, and make complex information easier to understand.

The time given to complete this project was limited to 8 months. However, it is a challenge because there are ongoing academic subjects need to be carried out concurrently with this project. Therefore, multitasking is very important because this project must be completed without affecting academic performance. In addition, time management is also a key factor to ensure this project hits the checkpoint throughout the process and able to be completed on time.

In several cases, theoretical data isn't enough to get the correct skills in skilled areas. Students shouldn't be mere listeners and passive observers. Students of technical colleges particularly would like to observe and active expertise in their areas. Through interaction, unlike VR, AR features could help perform a virtual practice – with augmented tutorials, digital modeling, and simulations, and acquire some experience in the end. It is not a secret that motivated and engaged students will understand a subject better and learn faster.



CHAPTER 8

Conclusion

In this century, human life has been widely affected by the electronic devices around them, and the rate is still growing. Some experts also believe that this social media-based society is actually breaking the bondage between humans and humanity is under a threat too. But there must be ways to use every tool in a positive way because the tools are not controlling us, rather we are responsible as the users. So, if we can clarify our way of thinking, way of using the opportunities science has offered to us, we definitely can make a better future.

This system also can be made to control more smart devices. For example, it may be designed to serve as a smart education system in Augmented Reality and Virtual Reality application. As the Augmented Reality and Virtual Reality technology are growing, automated education system control is another emerging technology, both of this idea can be merged to produce smart book apps and game apps. These apps Augmented Reality and Virtual Reality control system.

This project was just a beginning. More attractions, services and inspirations will help this endeavor to reach its utmost success of creating a modern society. Where modern education will not only be inside books and paper, but modern education will symbolize modern technique to learning and teaching, above all modern ways of looking at life.

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