

VIRTUAL SCHOOL FOR PRESCHOOLER USING VIRTUAL REALITY  
TECHNOLOGY

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## ABSTRACT

Preschool is the first exposure for the children with education and preparation for the primary school. Many parents and teachers faced the problem where children refuse being left alone at preschool as the children having difficulties in adapting to the new environment. In order to solve this problem a Virtual Preschool using Virtual Reality Technology was developed to help the preschooler getting familiar with the school environment, gain virtual experience and excitement to go to school. This application was developed using unity3D and Autodesk Maya in windows platform which consists of 4 learning activities. The four activities are storytelling, drawing, learn ABCs' and mini games. In the testing phase, questionnaires, interview and observation approach has been used to identify the users' acceptance among teachers, parents and children. Results from the survey shows the users agreed that the application is interesting, attractive and capable to help the children to gain excitement to go to school.

Keyword: Virtual School, Preschooler, Preschool Problem, Virtual Reality.

## ABSTRAK

Prasekolah merupakan pendedahan pertama bagi anak-anak kepada pendidikan dan persediaan ke sekolah rendah. Ramai ibu bapa dan guru-guru menghadapi masalah di mana anak-anak enggan berada di pra-sekolah sendiri berikutan mereka masih belum dapat menyesuaikan diri dengan keadaan persekitaran sekolah. Bagi menyelesaikan masalah ini, Pra-sekolah Maya menggunakan Teknologi Virtual Realiti dibangunkan untuk membantu bakal pelajar pra-sekolah untuk mendapat pendedahan tentang persekitaran sekolah, mendapat pengalaman maya seterusnya menarik minat mereka untuk pergi ke sekolah. Aplikasi ini dibangunkan menggunakan unity3D dan Autodesk Maya dalam windows platform serta mengadungi 4 aktiviti. Antara 4 aktiviti-aktiviti itu ialah bercerita, melukis, belajar ABC dan permainan mini. Bagi proses pengujian, pendekatan berasaskan soal selidik, temubual dan pemerhatian telah dilaksanakan ke atas guru, ibu bapa dan bakal pelajar pra-sekolah untuk mengenalpasti tahap penerimaan pengguna terhadap aplikasi yang dibangunkan. Hasil kaji selidik ini menunjukkan bahawa, pengguna bersetuju aplikasi ini seronok dan dapat membantu menarik minat kanak-kanak untuk pergi ke sekolah.

Kata kunci : Sekolah Maya , prasekolah , Masalah Prasekolah , Realiti Maya.

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## CHAPTER 1

### INTRODUCTION

#### 1.1 BACKGROUND

Preschool [1] is an educational establishment that provided early-childhood education [2] for kids between ages of 3 to 6 years old. It is where the kids contact with new peoples other than their own family members. They will know new friends and have teachers to guide them or learning some skills. Preschool is a base to prepare the kids to go to primary school by providing them basic learning on social skills and academic. Attending preschool is not compulsory but most of the parents will choose to send their child to preschool so that they can easily catch up and adapt when they go to primary school.

When the child went to preschool for the first time, most of the parents face the same problem which is the child cry when drop-off [3], [4] or refuse to stay at school without their parents. First day of school, there are usually a lot of crying and screaming. The kids feel so uncomfortable and strange to the new environment and new stranger and therefore they will phobia and feel insecure for the first time they separate from their parents since birth. Parents usually have no idea on how to handle this issue and leave their child crying and believe that the child will adapt to the environment themselves after time passed.

In this case, creating a Virtual School for the preschooler using virtual reality [5], [6], [7] might be helped to overcome this issue. The virtual school is created in a virtual reality environment that imitated the real environment of a preschool. This is to let the children get some early exposure about the environment in preschool and what will

usually happen in the preschool. Instead of telling the kids about the preschool using words, a virtual reality application will be more effective in giving them more realistic pictures about the preschool.

The reason [8] to use virtual reality in this project is because it can help to motivate and lead the children to new discoveries. Through the virtual reality school, the children can get to know what is school and encourage them to give them excitement to go to school. Besides that, compared to other educational application virtual reality applications will be new to the children, so they will feel fresh and willing to explore more about the application.

The advantage [8] of using virtual reality in educational application is it can grab attention of the users. Users will find it interesting and feel exciting where they can walk through in the 3D world and interact with the virtual world. Besides that, virtual reality can illustrate the school environment, situation and features more accurate and realistic. Every object in the virtual world will be very detail that users can view it closely by zooming to the maximum and the object can be viewed in 360 degrees. The next advantage is virtual reality application require two-way interaction. Users need to interact with the virtual world and give respond when the object in the virtual world shows it responds. For example, the virtual teacher in the virtual world gives question and the user needs to give the answer. Lastly, virtual reality application lets users learn by doing. When the user interacts with the virtual environment, the user will roughly get the image on how it will happen in the actual world. For example, rubbish on the floor, users will pick it up and throw into the dustbin. Then, they will know in the actual world they will need to do the same thing.

Besides advantages, using virtual reality has its disadvantages too. The disadvantage [8], of using virtual reality is high cost needed. To build an advanced virtual reality application, high cost is needed for the virtual reality tools and software [9]. The next disadvantage is time-consuming for the user to learn how to use the application. Some user may not be familiar with computer application or virtual reality application, so they need time to learn for it or need a guide from the guidance.

## 1.2 PROBLEM STATEMENT

*“First, be prepared for some tear. It's a scenario played out at preschools everywhere. A child screaming, holding on to mom or dad's legs for dear life, refusing to even look at the classroom, much less walk into it alone. - Amanda Rock”*

“Kids cry during first day in preschool” [10], [11], most of the parents face the same problem where their child refuses to leave alone at preschool as the children having difficulties in adapting with the new environment. This happens when their children reached the age to go to school, especially when entering preschool. Some of the children will phobia and cry on the first few days enter the school. From the survey collected from 27 parents, more than 50% from the statistic show the child having negative emotion which is sad, worried and scare when they are first entering preschool. This is because they feel strange and not comfortable with the new environment.

From the survey collected, 7% of the parents have no idea on how to stop this situation and 22% of them just leave their child crying without doing anything. Furthermore, another 11% will stay at the school to accompany their child. This is not the solution to solve this situation though. It will affect the children in their psychological growth, that they will become too dependent to the parents, lost their sense of security, feeling sad and so on. To solve this problem, there are a few suggestions from the teachers. The children can attend the orientation week held by the teachers one week before entering preschool. Besides that, parents can bring their child to a visit to schools or accompany the child at school until they adapt to it. By the way, all these suggestions needed a lot of time from the teachers and parents.

Furthermore, educational application [12] is very common nowadays. It has been used as a teaching tool and also self-learning tools. Many teachers used the educational application during classes. This is because the educational application is very convenient and can easily attract the kids' attention. Instead of books, educational application is more effective in conveying information with the attractive graphics, animation and sound. It will attract the kids' interest and hold their attention.

So, to save the teachers and parents time and for their convenience, the teachers required a tool for to replace the solution to help the child prepare for entering preschool. In this case, a virtual reality application that imitated the situation of the school will be proposed to allow the child to get some exposure about school instead of only teaching them basic knowledge with educational applications. With the help of the virtual school, it may help them to become familiar and comfortable when they go the school. Therefore, the kids will get familiar to the school and can help to reduce their uncomfortable and nervousness toward school.

### 1.3 GOAL AND OBJECTIVES

The goals for this project is to create a virtual school that let the kids feel the environment in school and what will happen in school. To make this succeed this project need to carry on based on the objectives below:

- I. To study the real environment, activities of preschool and virtual reality technology.
- II. To develop a Virtual School Environment for preschool students.
- III. To embed the 2D learning activities' environment in Virtual School.
- IV. To test the functionality of the Virtual School and user acceptance to the application.

### 1.4 SCOPE

- I. Platform – This system will be built on Windows platform. This because most of the PC user is common with Windows platform.
- II. User - The main user of this system is the children from 3 to 5 years old who going to enter preschool. The secondary user is the parents or guidance which will guide the children to use the system.
- III. Module - This system is limited four activities that include in the preschool activities. The four activities are storytelling, learning ABCs, mini games and drawing.
- IV. Function - This system is built to let the preschool children to explore the environment of the school and try some preschool activities. The user can walk through the preschool to have a look at the environment of the preschool. It will include four activities that include in the preschool activities, storytelling, learning ABCs, mini games and drawing in 2D environment.

## 1.5 THESIS ORGANISATION

This thesis consists of 6 chapters:

Chapter 1 is the introduction of the thesis which included the background of the problem, the problem statement, objective and scope.

Chapter 2 is the literature review part which included the review about the project and also some finding regards the project.

Chapter 3 is about the methodology of the project, which explained about the framework used throughout the whole project and also the survey result and analysis on the survey about the problems and system.

Chapter 4 is the design part and development of the project, which included the system flow, story board design and some 3D models that will be appearing in the system.

Chapter 5 is the result and discussion. The result from the testing phase will be collected and discuss.

Chapter 6 is the summarized and the conclusion part of the project.



## **CHAPTER 2**

### **LITERATURE REVIEW**

#### **2.1 INTRODUCTION**

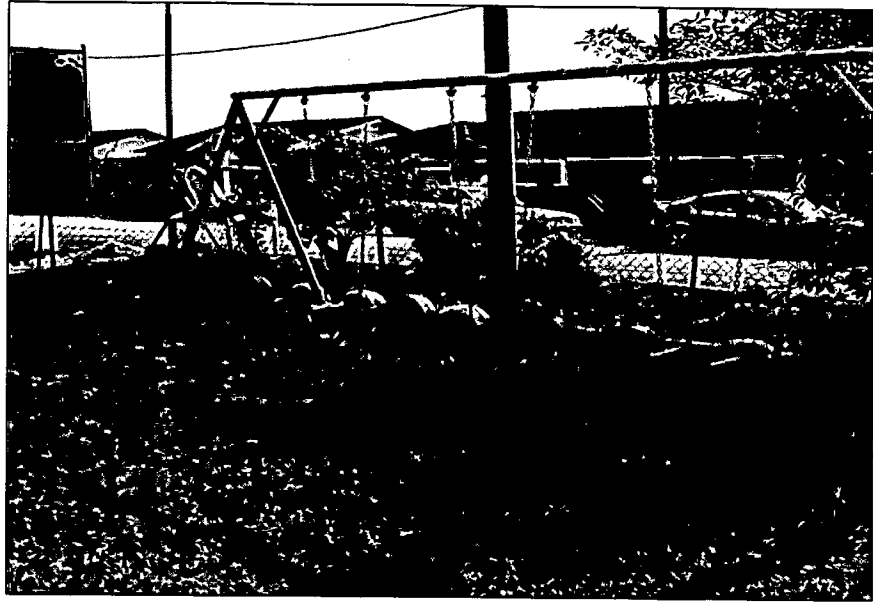
In this chapter, some review and finding regard the project will be done. It is to study about the preschool's environment, preschool's activities, virtual reality and some related software.

#### **2.2 EXISTING SYSTEM OF PRESCHOOL PREPARATION FOR CHILDREN**

##### **2.2.1 PRESCHOOL'S ENVIRONMENT**

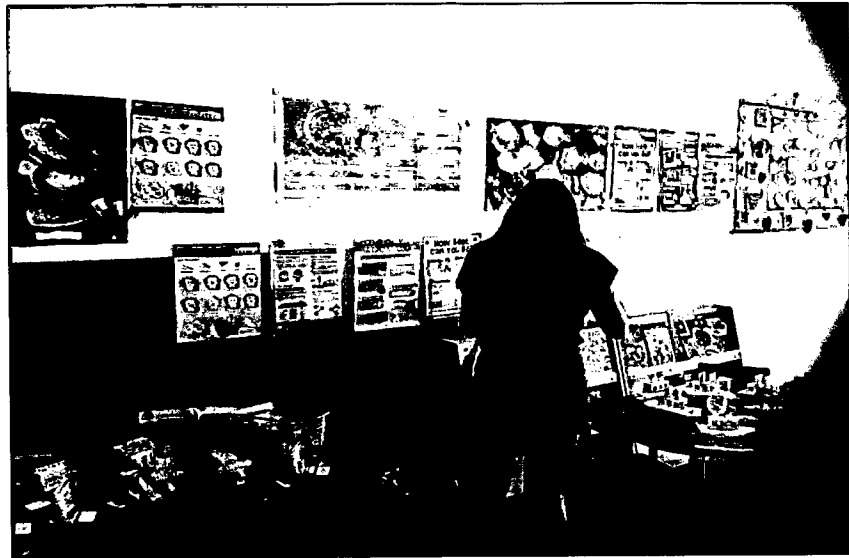
Preschool is children's first exposure to formal education. It is the preparation for the children to get ready for primary school. Therefore, let the children have a great learning process it is very important to have an excellent and suitable learning environment. With an excellent learning environment, children will more supported and their safety will be more guarantee.

For preschool activities, it is separated into outdoor activities and indoor activities. Outdoor activities are very important as it provides the children opportunities to explore the nature, gross their motor development, exercise the body, stimulate imagination, promote problem-solving skills and have fun. Therefore, preschool needs to have a large space for the outdoor activities. For example, a playground or a courtyard will be good enough for preschool child's outdoor activities.

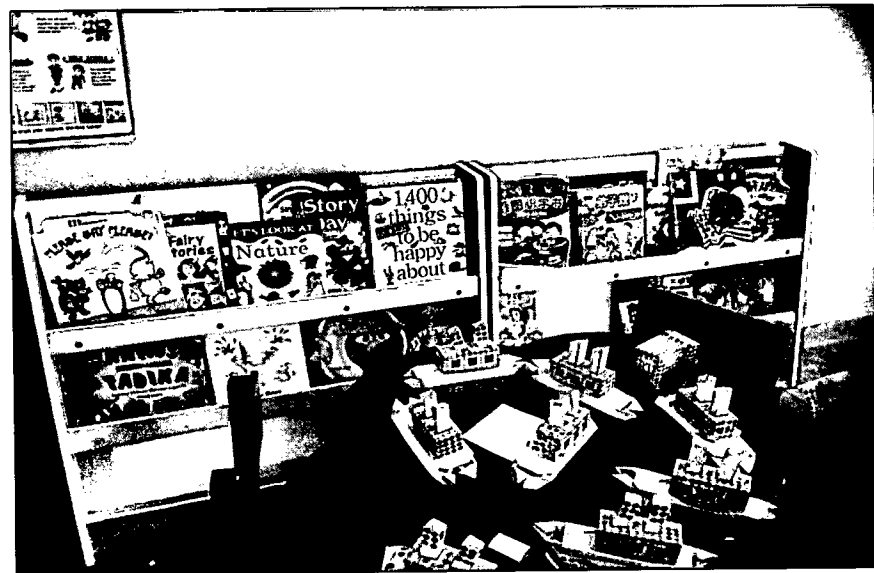


**Figure 2.1** The outdoor environment of the preschool where children having outdoor activities.

For indoor activities, children generally having hand art learning, academic learning, storytelling session, and some activities that planned by the teacher. The classroom normally separated into many corners. They may have drawn corner, book corner, game corner, activity corner and so on. Different corners may use for different purposes.

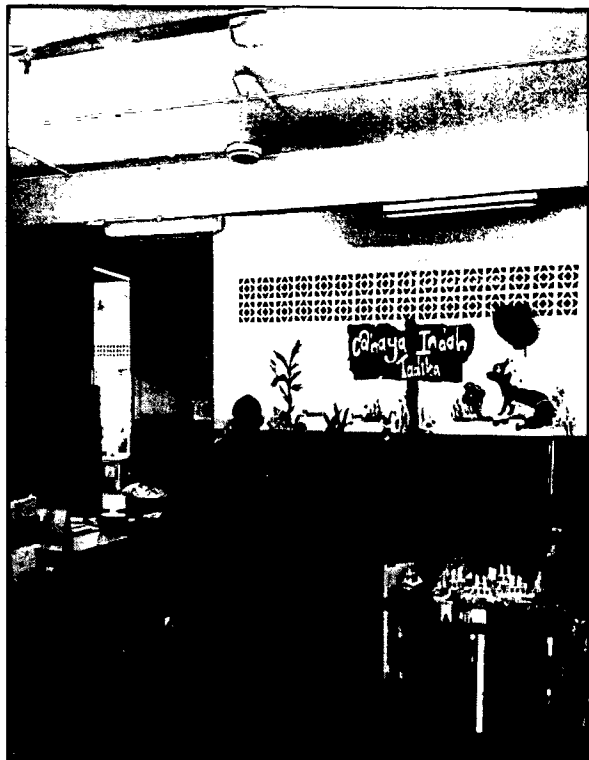


**Figure 2.2** The indoor environment of the preschool where children having indoor activities.

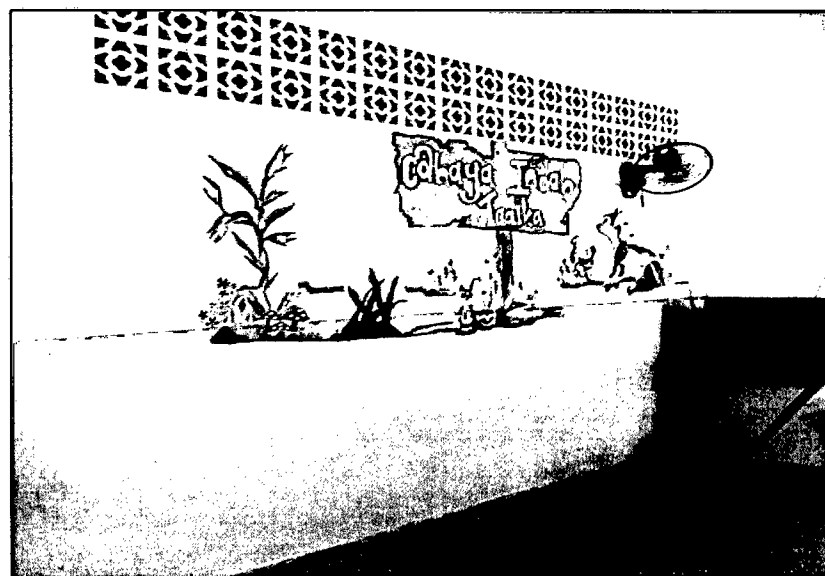


**Figure 2.3** Mini library corner for the children to read some books.

Preschool usually decorated with colorful drawings and cartoons. This is because children like colorful things and easily attract by the cartoon character. The wall may paint with some mural drawing with some cartoon animals, trees or insects.



**Figure 2.4** The decoration of the preschool.



**Figure 2.5** The decoration of the preschool.

## 2.2.2 PRESCHOOL'S ACTIVITIES

Early-childhood education is very important as it benefits the kids in their future life, growth, learning and well-being [25]. Excellent early-childhood education will help the kids to be more successful in future school as it provided a base of academic, social and emotion guides. To have good qualities of education, good activities in class are needed.

The preschool teachers will have a plan of preschool activity's schedule for the kids. There two types of daily schedule of preschool, which is the full-day schedule and half-day schedule. Below are the examples of the daily schedule:

<b><u>Full Day Preschool Schedule</u></b>	
<b><u>7:00 AM: CREATIVE KIDS OPENS</u></b>	Arrival and free choice activities are available for our students who arrive early each morning.
<b><u>8:30 AM: BREAKFAST</u></b>	
<b><u>9:15 AM:</u></b>	Our full day students go to their assigned classrooms to begin the day's activities.
<b><u>9:45 AM: MORNING MEETING</u></b>	
<b><u>10:15 AM: CENTER ACTIVITIES</u></b>	
<b><u>11:00 AM: MORNING SNACK</u></b>	
<b><u>11:15 AM: OUTSIDE-GROSS MOTOR PLAY</u></b>	
<b><u>11:40 AM: FREE CHOICE ACTIVITIES</u></b>	
<b><u>12:00 PM: STORIES, SONGS, FINGER PLAYS</u></b>	
<b><u>12:30 PM: LUNCH</u></b>	
<b><u>1:15 PM: REST/QUIET TIME</u></b>	
<b><u>3:00 PM: AFTERNOON SNACK</u></b>	
<b><u>3:30 PM: OUTSIDE (WEATHER PERMITTING)</u></b>	
<b><u>OR INSIDE FREE CHOICE ACTIVITIES</u></b>	
<b><u>4:00 PM-5:30 PM:</u></b>	Our full day students can use this time to work on projects that were not completed during the morning time, participate in teacher planned art, science, pre-math, pre-reading, writing, computer, sensory, and various other activities. Books and table toys are also an option for the students to use as they wait for their parents or guardians to arrive.
<b><u>5:30 PM: CREATIVE KIDS CLOSES</u></b>	

**Figure 2.6** The full day schedule and activities that carry out in the preschool.

<b><u>Half-Day Preschool Schedule</u></b>
<b><u>9:30 AM: ARRIVAL</u></b>
<b><u>9:50 AM: MORNING MEETING</u></b>
<b><u>10:15 AM: CENTER ACTIVITIES</u></b>
<b><u>11:00 AM: MORNING SNACK</u></b>
<b><u>11:15 AM: FREE CHOICE ACTIVITIES</u></b>
<b><u>11:45 AM: MOVEMENT- GROSS MOTOR PLAY</u></b>
<b><u>12:00 PM: STORIES, SONGS, FINGER PLAYS</u></b>
<b><u>12:25 PM: PREPARE FOR DISMISSAL</u></b>
<b><u>12:30 PM: DISMISSAL</u></b>

**Figure 2.7** The half day schedule and activities carry out in the preschool.

In preschool, it is more encouraged to having activities that will develop motor skills for the kids. Hands-on-activity is one of the activities that will develop kids' motor skills. Hands-on-activities encourage kids to do activities on their own. For example matching card, playing ball, hoping, catching and so on. Through these activities, the kids will learn new skills and this is when the motor skills development happened [26].

Group Time is an activity which lets the kids to carry out activities in a group which involves the whole class. Group activities include dance, sing the song, group games and so on. This is to transitioning the kids into days' activities and days' schedule. This is the time where communication skills and social skills development happen. The kid will mix around with other kids, make new friends and share their story.

Story Time is the academic time where the teacher will teach some basic knowledge to kids. It can be either in the way of storytelling, discussion, questioning and answering or other interactive and interesting way. The way of teaching must be entertaining and attractive to grab the kids' attention, because the kids lost attention easily and fast.

Every preschool may have different schedules and activities. By the way, every activity planned aim to help the development and growth of the kids.

### 2.2.3 PREPARATION METHODS

For the issues, children refuse to go to preschool, there are a lot of methods take by the teachers and parents to prepare the child before they are entering the preschool actually and adapt to the preschool life. The preparation before entering preschool [13], [14] is very important so that the children will gain their excitement and having fun going to school without the negative emotion like worry, nervous and feeling uncomfortable.

One of the methods is the preschool teachers can organize an orientation week one week before the kids entering the preschool. During the orientation week, the children are exposed to the environment in school and been introduced to the teachers and new friends. Besides that, an introduction about what they will do in school will give an image to the children. Therefore, they will not feel strange to what is going to happen in school. This process will help the children to be familiar to the preschool and adapt to it.

Next, the parents can bring their child for a visit to preschool before entering preschool. They can spend a whole day with the child to observe how other children behave and what they do in the preschool. Through this, it will give a preparation for the child that they may stay at school without parents because other children staying alone with their friends at school and having fun with their friends. Besides that, they will also gain excitement by looking at the children joining some interesting activities that prepare by the teachers. The child will affect by the children in the preschool when he or she sees the children are having fun playing games.

When the child having problems attending to preschool, some parents will accompany their child at school until they adapt to it. It can be understood that the child feels insecure when they first attend to preschool. This is could be the first exposure of the child to the outside world since born. Therefore, parents can accompany the child at school to let the child feel that they are save at school then they will adapt to it.

## **2.3 EXISTING VIRTUAL REALITY EDUCATIONAL APPLICATIONS**

### **2.3.1 VIRTUAL REALITY**

Virtual Reality (VR) imitates the real world and allowed the user to feel that they are immersed in the virtual 3D world. The first created virtual reality system was a multi-sensory simulator [27]. It was created by Morton Heilig [27] in the year 1960 to 1962 so VR is not a new technology and it exists around 50 years ago. Starting from 1990s, virtual reality becomes more popular. Virtual reality can be heard from the peoples and all of the media very often. This is because it attracts person's interest with its fascinating and new technology.

The advantages of VR [8] are it able to illustrate the real world into a virtual world and allowed the user to immerse and feel the real situation in a virtual world. VR usually uses to build applications that need to let the user to feel the real situation in the virtual world like a simulator for armies that let the army to be trained under the virtual war environment. Furthermore, VR in Medicals are popular too. Surgery simulator helps the trainee doctors a lot to practice surgery before having the real surgery on the patient.

VR is now being used in many areas. Education is one of the area which used virtual reality in teaching and learning process. The reason virtual reality used in education is it allowed the student to immerse in the virtual environment and it is easier for the student to learn. Besides that, it provided a new way of presentation. VR can provide a more accurate illustration of some features, some processes and so on, look at an object at very close distance and 360 degrees, observe and examine some activities or places that are hardly to be done in the realistic world. Furthermore, VR need interaction and it promote active participation. The interaction might me typing, speaking, movement, touching and so on. VR also gives an opportunity for the learner to learn by doing. There might some activities is hardly to be carried out in the reality world. For example, some dangerous experiments that are not allowed to done by the students in the laboratory are now can be experienced by the student through the virtual world.