

Development of 3D Multimedia as a Learning Tools Online Based Virtual Reality

Sholihin Sholihin^{1,*} Eka Susanti¹ Emilia Hesti¹ Sarjana Sarjana¹,
Adewasti Adewasti¹

¹ State Polytechnic of Sriwijaya

*Corresponding author. Email: sholihin@polsri.ac.id

ABSTRACT

Practicum or experiment is an important learning method to be implemented in learning because it can provide direct experience for students to introduce, familiarize, and train students to carry out scientific steps and procedural knowledge. During the COVID-19 pandemic, teaching and learning activities on campus were carried out online including practical courses, it was very difficult to conduct lectures, especially in practicum courses, especially for new students who were still relatively minimal about how to practice in the Telecommunications Laboratory of the Sriwijaya State Polytechnic because of information very limited available. With the advancement of technology today is growing very rapidly. Therefore, multimedia development is carried out. Submission of information about signal processing practicum is to create 3-dimensional virtualization using the Blender application and the Verge3D application to convert 3D modeling so that it can be viewed on a virtual reality-based web browser. virtual reality is a technology that combines a real object with a virtual object that has a real 3D (3D) shape in real-time.

This research, we will apply 4 scenarios in building a device for signal processing practicum with VR technology. Scenario 1; Measurement of power supply and high pass filter. Scenario 2; Measurement of power supply and band pass filter. Scenario 3; Measurement of power supply and low pass filter. Scenario 4; Measurement of power supply and OP-AMP Inverting.

Keywords: 3D, Blender application, Multimedia, Verge 3D application, Virtual Reality Technology

1. INTRODUCTION

Sriwijaya State of Polytechnic is a higher education institution that has produced many of the best graduates who can compete in the world of work. In addition to understanding concepts, practicum or experimentation also has a positive impact on increasing student motivation and interest in learning.

COVID-19 (pandemic *Coronavirus Disease – 19*) has affected education systems worldwide, leading to the closure of schools, universities and colleges. Therefore, with the advancement of technology, practicum activities can be equipped with virtual practicum-based learning. Virtual practicum can be used as an alternative to focus students' attention in teaching and learning activities and to train students to do real practicum. Practical activities can be trained using the virtual world. Virtual Reality is a technology used to describe a three-dimensional environment generated by a computer.

Animation is actually an adaptation of the word 'animation' which is derived from the basic word 'to animate' in the general English-Indonesian dictionary meaning to animate. In general, animation is an activity to animate, move inanimate objects and an inanimate object is given encouragement, strength, enthusiasm and emotion to come alive or just impress alive. Nowadays, there are many animation software that are developing in the community, for example Autocad, 3D Max, Solidwork, Blender. One *software* of the most commonly used is a blender because *software* this has nature, *an open source* the blender is a *software* 3-dimensional processing and animations that can be run on Windows or Linux. *software* This is used to make object designs in 3-dimensional form and the images shown are more alive and real closer to their original form.

Virtual Reality Technology is a technology that presents a visual display is made such that looks like a real-world situation.

Based on these explanatory books and papers, the researcher wants to develop 3-dimensional multimedia as a Signal Processing Practice Facility at the

Telecommunications Engineering Laboratory, Sriwijaya State Polytechnic. This 3-dimensional multimedia development uses Blender, Verge3D, and software *Virtual Reality Oculus Quest 2* as additional tools to view 3-dimensional objects in real and clear terms.

This research, we will apply 4 scenarios in building a device for signal processing practicum with VR technology. Scenario 1; Measurement of power supply and high pass filter. Scenario 2; Measurement of power supply and band pass filter. Scenario 3; Measurement of power supply and low pass filter. Scenario 4; Measurement of power supply and OP-AMP Inverting.

2. DESIGN SYSTEM

In practice, the signal processing jobs that will be practiced are Power Supply Measurements and High Pass Filters, Power Supply Measurements and Band Pass Filters, Power Supply Measurements and Low Pass Filters, Power Supply Measurements and OP-AMP. Making practicum objects using basic objects such as cubes, cylinders, and planes. The objects to be designed are :

Table 1. Signal Processing Practicum Object

No	Object Name	Jumlah
1	High pass filter modul	Sufficiently
2	Band pass filter modul	Sufficiently
3	Low pass filter modul	Sufficiently
4	Op-amp inverting modul	Sufficiently
5	Power supply	Sufficiently
6	Osilloscope	Sufficiently
7	Generator function	Sufficiently
8	Probe Cable	Sufficiently
9	bnc to bnc cable	Sufficiently
10	banana to bananan cable	Sufficiently
11	Clip cable	Sufficiently
12	Power cable	Sufficiently



Figure 1. Design for signal processing practicum module

3. CURRENT RESULT

In determining the results of the test, the researcher will use the signal processing jobs that will be practiced are Power Supply Measurements and High Pass Filters, Power Supply Measurements and Band Pass Filters, Power Supply Measurements and Low Pass Filters, Power Supply Measurements and OP-AMP.

To start implementing learning activities in the real world, it can be seen in a technology media, Virtual Reality namely through several stages. Make modeling whole components required in software a blender.

After the modeling of all components has been completed, the next step is to combine the components that have been made according to the required job. In Module 1, the required components are such as the High Pass Filter Module, Oscilloscope, Function Generator, probe cable, BNC to BNC cable, Banana to Banana cable, Crocodile clip cable, Power cable.

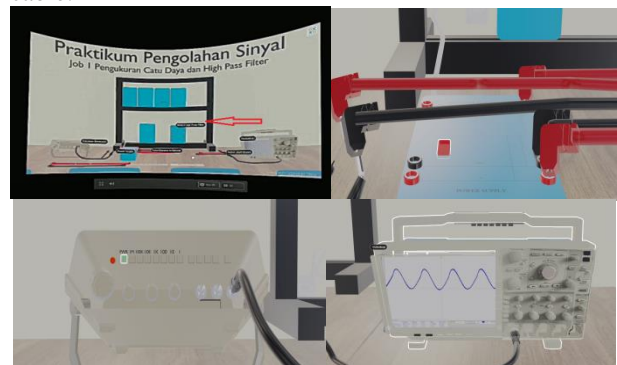


Figure 2. Result for power supply and High Pass Filter



Figure 3. Result for Power Supply and Band Pass Filter

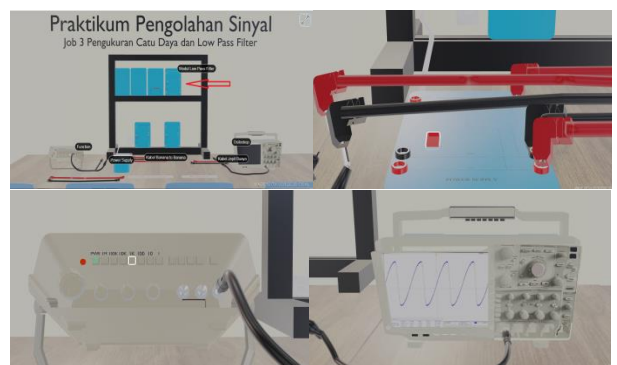


Figure 4. Result for Power Supply and Low Pass Filter



Figure 5. Result for Power Supply and Low Pass Filter

4. CONCLUSION

With the advancement of technology, practicum activities can be equipped with virtual practicum-based learning. Virtual practicum can be used as an alternative to focus students' attention in teaching and learning activities and to train students to do real practicum. Practical activities can be trained using the virtual world. The existence of a VR application system for today's learning media can make it easier for lecturers and students to introduce signal processing laboratories and make it easier to learn signal processing practices.

Scenario 1, it is a challenge to measure the power supply and High Pass Filter (HPF), where in job 1 it is intended to be able to understand and know the working principle and purpose of the circuit and to know the input and output frequencies of the HPF circuit and the parameters measured.

Scenario 2, it is a challenge to measure the power supply and Band Pass Filter (BPF), where in job 2 it is intended to be able to understand and know the working principle and purpose of the circuit and to know the input and output frequencies of the BPF circuit and the measured parameters.

Scenario 3, it is a challenge to measure the power supply and Low Pass Filter (LPF), where in job 3 it aims to be able to understand and know the working principle and purpose of the circuit and to know the input and output frequencies of the LPF circuit and the parameters measured.

Scenario 4, it is a challenge to measure the power supply and OP-AMP Inverting, where in Job 4 it aims to be able to understand and know the working principle and purpose of the circuit and to know the input and output frequencies of the HPF circuit and the parameters measured.

AUTHORS' CONTRIBUTIONS

Contribution to the authors is making research data collection, with the testing how many modelling and coding for to using vr.

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In writing this paper, the researcher has conducted several sample trials with reference to references as reference material, to improve this paper. The researcher also thanks the previous authors, and the researcher also apologizes if there are different writing words.

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