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Perceptions of the Use of EveryCircuit-Based Virtual Laboratory on Dynamic Electricity Material

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Abstract *–This research aims to determine the perceptions of Uncen physics education students regarding the use of EveryCircuit-based virtual laboratories on dynamic electrical materials. This research is a quantitative descriptive research with the method used is a survey method with a total of 18 respondents. The research instrument used was a questionnaire. Data for this research was obtained by distributing questionnaires to 16 students which were then filled in online by using Google Form. The questionnaire consists of 4 aspects, namely aspects of understanding the material, aspects of using EveryCircuit software, aspects of motivation, and aspects of usability of teaching materials. The sampling technique in this research is purposive sampling technique. The number of samples in this research was 16 students. Data analysis was carried out by looking at the percentage of answers and then looking at the interpretation category results. The results of this research show that the understanding aspect of the material was 42.5% with the agree criteria, the aspect of using the EveryCircuit-based Virtual Laboratory was 46.875%, and the motivation and skills aspect was 43.75%. So the conclusion from the research regarding the perceptions of physics education students regarding the use of every Circuit is good and students agree in using every Circuit. This is proven by research results which show that the average percentage of students using the EveryCircuit-based Virtual Laboratory from 4 aspects is around 46,875% of students who agree. Meanwhile, 3.125% strongly disagree, 9.375% disagree and 14.062% disagree.*

Keywords: *Dynamic Electricity; EveryCircuit; Virtual Laboratory.*

I. INTRODUCTION

In the era of revolution 4.0, information and communication technology is developing very rapidly. The development of science and technology encourages educators to be able to use it to support the learning process. Learning is a process of interaction between students and educators and learning resources in a learning environment, in other words learning is a process to help students learn well (Makiyah, 2022). In physics learning, there are abstract concepts that require media to present abstract concepts more (Rais, 2020; Rais,

Commented [L1]: 1.The introduction lacks a deep theoretical discussion on the use of virtual laboratories and the EveryCircuit application.
2.The introduction generalizes the benefits of virtual labs without providing specific examples or detailed explanations of previous studies.
3.It fails to analyze the specific challenges and needs of Cenderawasih University students, which would provide better context for the study.

2020). So to overcome this, practical activities must still be carried out even though they are not directly in the laboratory, and Virtual Laboratory is one solution for student practical activities. Virtual Laboratory is a simulation space for the learning process, or a social space in cyberspace, where scientists interact, organize into groups, develop relationships, and share opinions, ideas, resources and work (Muhajarah, 2020). And with this virtual laboratory, students no longer need to go to the laboratory to assemble real equipment because with the virtual laboratory we can do practical work wherever we are, the important thing is that there is an Android cellphone, laptop and wifi network or data package available. Another example is when there are schools that do not have complete laboratory equipment, they can use virtual laboratories based on every circuit.

One of the problems that is quite important in learning physics is the low mastery of computer technology by some physics education lecturers. There are still educators who are not yet able to use computers either in creating learning media or using them in the learning process. Learning is still dominated by the traditional learning system where educators directly present learning in front of the class using white boards (A. Swandi, 2020.). Even though many educators use technology such as PowerPoint presentations, there are still educators who are technologically illiterate which impacts their ability to use technology (A. Swandi d. , 2021) Such conditions need to be of greater concern to educators so that they can continue to carry out creative, innovative, fun and interesting learning regardless of the various conditions currently being faced (Hidayati, Hidayati, A. F., & Puspitarini, I. D). Therefore, IT skills for educators are an obligation. Educators are expected to not only master physics content but skills in creating interesting media and teaching materials are also very important. Educators are expected to be able to present learning media that is interactive and interesting, memorable and easy for students to use (Katoch, 2020)There are several researchers who have created virtual animation programs that can be used as virtual laboratories to improve students' abilities in physics concepts, such as (Wahyudi, 2019), (Palloan, 2019) (Palloan P. R., 2021), (Series, 2019), (Swandi, 2020),

Based on observations of physics education students at Cenderawasih University, so far when they do practicum, they usually go straight to the laboratory to do practicum. Of course, by combining the previous tools so that the practicum can be completed properly and correctly. This situation makes some students feel bored because in every practicum they have to assemble and look for tools first. And the challenges faced by physical education students at Cenderawasih University are that UNCEN has a laboratory which is quite far from the physics education study program, so when students want to do practicum, they need

to travel quite a long distance and take quite a long time and also use laboratory equipment. still said to be incomplete. Therefore, researchers are trying to apply the EveryCircuit application, where Every Circuit is an electronics simulation software application contained in the smartphone/computer operating system. This application will display a worksheet with various electronic components that can be simulated by the user. This application is very practical to use because of its small size and elegant appearance. This application can be used to apply to physics education students at Cenderawasih University in Dynamic Electrical Practicum. By using this application, students no longer have the hassle of searching and assembling tools manually. This feature allows students to add several components, for example a voltage source, current source and resistance with predetermined values. This feature also allows students to assemble components in series and parallel, namely by clicking and dragging components according to their wishes or instructions. Next, proving the correctness of the circuit that has been prepared is carried out by running a simulation. The correctness of the circuit is indicated by the presence of electric current flowing in the circuit. Based on the characteristics of EveryCircuit which have been described above, this means that one of the materials that can be applied using EveryCircuit is dynamic electrical material, because the EveryCircuit application can improve students' ability to analyze circuits. Apart from that, based on basic competencies, dynamic electricity material also requires students to analyze.

There are several researchers who also discuss laboratory virtul. Among them is research carried out by (Yuri Yanti, 2020)where by implementing a virtual laboratory in physics learning, the students' competence is very good. This has proven that the virtual laboratory is suitable to be applied in physics learning. The next research was also carried out by (Tarisahfira, 2022) with the research title developing modules assisted by every circuit, with the research title, so that the researchers obtained results that every circuit was very suitable for use in developing teaching modules and student learning outcomes were also good compared to using other applications.

(Yundra, 2020), (Sartika, 2022) conducted research on the use of the every circuit application in learning physics. The research results show that every circuit is good/suitable for use in physics learning. However, based on several previous analyses/researchers which have been stated above, limitations were found, namely: 1) in selecting the material that will be carried out in a virtual laboratory based on every circuit. 2) Previous researchers mostly only focused on the virtual laboratory, without paying attention to the applications that would be used in the virtual laboratory. Based on the 2 limitations above, researchers here will try to conduct

research by paying attention to the material being taught and the applications that are suitable for that material. Therefore, the title taken in this research is the Perception of Physics Education Students at Cenderawasih University towards the Use of an EveryCircuit-Based Virtual Laboratory on Dynamic Electrical Materials.

This research aims to determine the perceptions of physics education students at Cenderawasih University after using the Every Circuit-based virtual laboratory on dynamic electrical material. And after doing a practicum using the Every Circuit-based virtual laboratory with them, will they feel interested in using this application in learning physics for other materials?

II. METHODS

The research method used in this research is in the form of a survey by giving questionnaires to Physics Education students at Cenderawasi University. Filling out the questionnaire is done online via Google form which is given to the students. A questionnaire is a data collection method through statement factors filled in by respondents where the questionnaire distributed to respondents is first validated by an expert/validator. After validation of the questionnaire, the questionnaire was distributed to 16 students and after that it was analyzed. The data analysis technique used is a quantitative descriptive analysis technique by looking at the interpretation of the percentage category of answer tendencies chosen by students where here students are given the choice of strongly disagree, disagree, disagree, agree and strongly agree. After they have given their choice by ticking, an analysis is then carried out using equation 1.1 below to see the percentage of students. The sampling technique in this research uses the Purposive Sampling technique, which is a technique for determining samples using certain criteria and aims to produce a sample that can logically be considered representative of the population (Soegiyono, 2011). Therefore, the sample in this research was taken from physics education students with criteria who had studied/used everycircuit-based virtual laboratories on Dynamic Electricity material. The number of respondents in this study was 16 students.

The instrument used in this research was a questionnaire. With a questionnaire given using a Likert scale. The Likert scale is a measurement scale developed by Likert, this scale has four or more questions which are combined to form a score or value that describes an individual's characteristics, knowledge and responses (Maryuliana, 2016). The following is an assessment rubric from a Likert scale as follows.

Table 1. Likert Scale Assessment Rubric

Commented [L2]: 1.The sampling method is not clearly explained. It mentions purposive sampling but does not provide detailed criteria for selecting participants.
2.There is a lack of detail on the development and validation of the questionnaire, making it unclear how reliable and valid the instrument is.
3.The data analysis techniques are not described in sufficient detail, and there is no mention of how data reliability and validity were ensured.

Score	Categori	Symbol
1	Strongly Disagree	SD
2	Don't Agree	DA
3	Dissagree	D
4	Agree	A
5	Strongly Agree	SA

The questionnaire instrument distributed consists of 3 aspects. The three aspects are as follows: a) the aspect of understanding the material, b) the aspect of using the EveryCircuit-based Virtual Laboratory application, and c) the motivation and skills aspect. The aspect of understanding the material consists of 5 questions, the aspect of using the Circuit Wizard software consists of 4 questions, the motivation and skills aspect consists of 10 questions, so that the total questions from these three aspects are 19 questions.

The results of filling in the questionnaire in the form of values for each aspect will be converted into percentages, with the percentage formula as follows:

$$\% P = \frac{f}{N}$$

Description:

P = group percentage number

F = number of students in each group

N = total number of students who are research subjects

To see the interpretation criteria for this aspect. The following are the criteria for interpreting scores based on intervals according to (Riduwan, 2015) as follows:

Interval Score	Categori
0% - 20%	Strongly Disagree
21% - 40%	Don't Agree
41% - 60%	Dissagree
61% - 80%	Agree
81% - 20%	Strongly Agree

The steps in the research include the following:

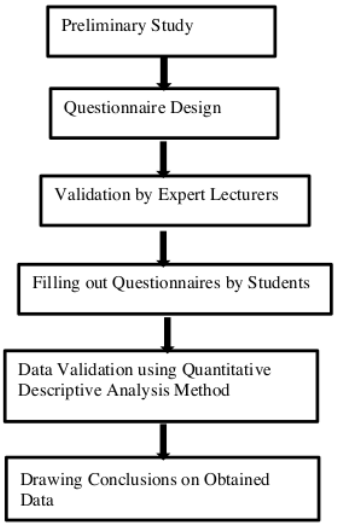


Figure 1: Research Steps

III. RESULTS AND DISCUSSION

From research data on the Perceptions of Physics Education Students at Cenderawasih University regarding the Use of EveryCircuit-Based Virtual Laboratory on Dynamic Electrical Materials using a questionnaire instrument. There were 16 students who filled out the questionnaire in this research. with 4 aspects assessed. These four specs include:

1. Aspects of Material Comprehensibility

This aspect is given with the aim of measuring the extent to which students have mastered material about dynamic electricity when implementing the EveryCircuit-based Virtual Laboratory. In this aspect, 16 students were able to provide their opinions on the 5 statements given. The statements given to the students can be seen in the following table:

Number	Question
1	I feel that having a Virtual Laboratory based on EveryCircuit can help understand Dynamic Electricity material
2	I can easily understand Dynamic Electricity material when using the EveryCircuit Based Virtual Laboratory
3	I can practice well regarding Dynamic Electricity after using the EveryCircuit Based Virtual Laboratory application
4	I felt helped in assembling tools on Dynamic Electrical material after using the EveryCircuit Based Virtual Laboratory application
5	I found it helpful to understand how laboratory equipment works, especially regarding electricity, after using the EveryCircuit-Based Virtual Laboratory application

Table 3. Statement of Material Understandability Aspects

Table 3 above is a statement filled in by 16 students. After students fill in/give their opinions by ticking/checking Strongly disagree, disagree, disagree, agree and strongly agree, then the results are analyzed, and we can see them in the following table:

Table 4 Data on Material Comprehension Results

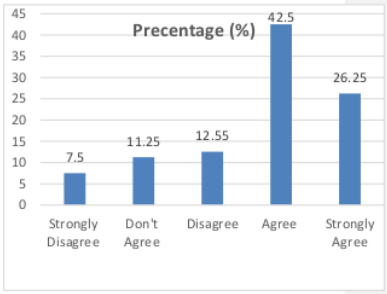
Number	Strongly Disagree	Don't Agree	Disagree	Agree	Strongly Agree
1	12.5%	18.75 %	12.5 %	37.5 %	18.75 %
2	6.25%	12.5 %	12.5 %	43.75 %	25 %
3	0%	6.25 %	18.75 %	56.25 %	18.75 %
4	12.5%	6.25 %	6.25 %	43.75 %	31.25 %
5	6.25%	12.5 %	12.75 %	31.25 %	37.5 %

Commented [L3]: 1.The results section provides basic descriptive statistics but lacks a detailed inferential statistical analysis that would offer deeper insights into students' perceptions.
2.Diagrams and tables are included but are not well-integrated into the narrative, which can make it difficult for readers to correlate the visual data with the text.
3.There is no comparative analysis with other studies or different virtual lab implementations, which would provide a broader context for the findings.

Table 4 is a table of analysis results regarding students' understanding of material after using the EveryCircuit-based Virtual Laboratory. The statements were given in a total of 5 statements where the first statement stated that "I feel that the EveryCircuit-based Virtual Laboratory can help understand Dynamic Electrical material". From this question, there were 12.5% of students who Strongly Disagree, 18.75% of students who Disagree, 12.5% who Disagree, 37.5% who Agree and 18.75% who Strongly Agree. Meanwhile, the second statement states that "I can easily understand Dynamic Electrical material when using the EveryCircuit Based Virtual Laboratory" from this statement 6.25% strongly disagree, 12.5% disagree, 12.5% disagree, 43.75% agree, 25% Strongly Agree. Then for statement 3 which reads "I can practice well regarding Dynamic Electricity after using the EveryCircuit Based Virtual Laboratory application", there are 0% who Strongly Disagree, 6.25% who Disagree, 18.75% who Disagree, 56.25% who Agree, 18.75 % Strongly Agree. For the 4th statement with the sound "I feel helped in assembling tools on Dynamic Electrical material after using the EveryCircuit Based Virtual Laboratory application", 12.5% strongly disagree, 6.25% disagree, 6.25% disagree, 43.75% agree, 31.25% Strongly Agree. And for statement 5 which reads "I feel helped in understanding how laboratory equipment works, especially regarding electricity after using the EveryCircuit Based Virtual Laboratory application" there are 6.25% who strongly disagree, 12.5% who disagree, 12.75% who disagree, 31.25% those who Agree, 27.5% Strongly Agree.

After the data/results of student work are analyzed using equation (1), they are then averaged so that we can see the average percentage of students who Strongly Disagree, Disagree, Disagree, Agree and Strongly Agree on each given aspect. For the aspect of understanding the material, there were 7.5% who Strongly Disagree, 11.25% who Disagree, 12.55% who Disagree, 42.5% who Agree and 26.25 who Strongly Agree. For more details, see the diagram below:

Figure 1. Average Percentage of Students Who Strongly Disagree, Don't Agree, Disagree Agree, and Strongly Agree on the aspect of understanding the material



The figure above shows that in the aspect of understanding the material, most of the students answered in the affirmative, meaning that most of the students had understood the dynamic electricity material using the EveryCircuit-based Virtual Laboratory. After

we measure the understanding of the material, we next look at the aspects of using the EveryCircuit-Based Virtual Laboratory.

2. Aspects of Using EveryCircuit-Based Virtual Laboratory

This aspect was given with the aim that researchers wanted to see what students' opinions/perceptions were when using the EveryCircuit-based Virtual Laboratory on dynamic electricity material. In this aspect, students fill in/give opinions regarding 4 points regarding the use of the EveryCircuit-Based Virtual Laboratory. These statements can be seen in the following table:

Table 5. lists questions Aspects of using EveryCircuit-Based Virtual Laboratory

Number	Question
1	I can easily use the EveryCircuit based Virtual Laboratory application
2	All components needed to make a circuit in Dynamic Electrical material are available in EveryCircuit
3	I know the components in EveryCircuit that are needed for Dynamic Electrical material
4	I can easily create circuits and run simulations in EveryCircuit

The table above is a statement filled in by respondents with opinions of Strongly Disagree, Disagree, Disagree, Agree and Strongly Agree. So the following results are obtained:

Table 6. Data on the results of using EveryCircuit-based Virtual Laboratory

Number	Strongly Disagree	Don't Agree	Disagree	Agree	Strongly Agree
1	6.25 %	6.25 %	12.5 %	43.75 %	31.25 %
2	0 %	18.75 %	6.25 %	56.25 %	18.75 %
3	0 %	6.25 %	12.5 %	50 %	31.25 %
4	6.25 %	6.25 %	25 %	37.5 %	25 %

Table 6 above is a table of analysis results from research related to the use of the EveryCircuit-based Virtual Laboratory in Dynamic Electrical material. The list of statements consists of 4 statements where based on the research results, for statement 1 there are 6.25% who Strongly Disagree, 6.25% who Disagree, 12.5% who Disagree, 43.75% who Agree, 31.25% who Strongly Agree. Then for the second statement, 0% strongly disagree, 18.75% disagree, 6.25% disagree, 56.25% agree, 18.755% strongly agree.

Meanwhile for the third statement, 0% strongly disagree, 6.25% disagree, 12.5% disagree, 50% agree, 31.25% strongly agree. And for the fourth statement, there are 6.25% who Strongly Disagree, 6.25% who Disagree, 25% who Disagree, 37.5% who Agree, 25% who Strongly Agree.

After the data/results of student work are analyzed using equation (1) they are then averaged so that we can see the average percentage of students who Strongly Disagree, Disagree, Disagree, Agree and Strongly Agree on each given aspect. For the aspect of using EveryCircuit-Based Virtual Laboratory, there are 3.125% who Strongly Disagree, 9.375% who Disagree, 14.0625% who Disagree, 46.875, who Agree and 26.5625 who Strongly Agree. For more details, see the diagram below:

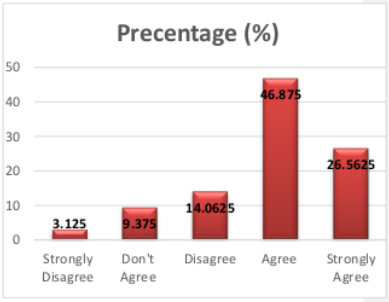


Figure 2. Average Percentage of Students Who Strongly Disagree, Don't Agree, Disagree Agree, and Strongly Agree (S), and Strongly Agree (SS) on aspects of Using the EveryCircuit-Based Virtual Laboratory

The figure above shows that in the aspect of using the EveryCircuit-based Virtual Laboratory, the majority of students answered in the affirmative, meaning that the majority of students agreed with the use of the EveryCircuit-based Virtual Laboratory, namely on dynamic electricity material.

3. Motivational and Skills Aspects

In this aspect, researchers want to see how students' motivation and skills are in using the EveryCircuit-based Virtual Laboratory. In this aspect, students give their opinions on 10 point statements. These statements can be seen in the following table:

Table 7 lists the Motivational and Skills Aspect statements

Number	Question
1	I feel interested and happy to complete the practicum using EveryCircuit
2	I enjoyed working with a group to complete the Dynamic Electricity practicum, using EveryCircuit
3	I liked the practicum carried out on the subject of Dynamic Electricity using EveryCircuit
4	Doing Dynamic Electricity practicum using EveryCircuit made me more motivated than direct practicum using equipment in the laboratory

5	Dynamic Electricity Practicum with the help of EveryCircuit motivated me to do other practicums.
6	Practicum with the help of EveryCircuit, made me feel like trying again with other materials
7	I felt happy doing practicum with the help of EveryCircuit
8	I feel skilled in assembling tools with the help of EveryCircuit
9	I feel proud that EveryCircuit exists so that I can assemble equipment properly and correctly
10	I feel happy with EveryCircuit, so it is easy to set up Dynamic Electrical experiments

The table above is a list of statements filled in by students with the opinions of Strongly Disagree, Disagree, Disagree, Agree and Strongly Agree. After the data has been filled in, it is then analyzed so that the results in the following table are obtained

Table 8 Data on Motivation and Skills Results

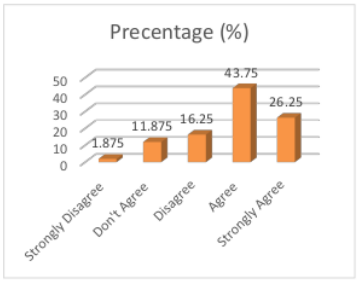
Number	Strongly Disagree	Don't Agree	Disagree	Agree	Strongly Agree
1	0 %	12.5 %	12.5 %	50 %	25 %
2	0 %	18.75 %	12.5 %	43.75 %	25 %
3	0 %	12.5 %	25 %	37.5 %	25 %
4	6.25 %	12.5 %	12.5 %	37.5 %	31.25 %
5	0 %	6.25 %	18.75 %	43.75 %	31.25 %
6	0 %	12.5 %	12.5 %	50 %	25 %
7	0 %	0 %	18.75 %	56.25 %	25 %
8	6.25 %	12.5 %	12.5 %	50 %	18.75 %
9	6.25 %	18.75 %	18.75 %	31.25 %	25 %
10	0 %	12.5 %	18.75 %	37.5 %	31.25 %

The table above is the data from the analysis from the aspects of student motivation and skills after using the EveryCircuit-based Virtual Laboratory. Where in this indicator there were 10 statements submitted to respondents and where the respondents were 16 people. In statement 1 there are 0% who Strongly Disagree, 12.5% who Disagree, 12.5% who Disagree, 50% who Agree, 25% who Strongly Agree. Then in the second statement there were also 0% who Strongly Disagree, 18.75% who Disagree, 12.5% who Disagree, 43.75% who Agree, 25% who Strongly Agree. For the third statement, there

are 0% who Strongly Disagree, 12.5% who Disagree, 25% who Disagree, 37.5% who Agree, 25% who Strongly Agree. For the fourth statement, there were 6.25% who Strongly Disagree, 12.5% who Disagree, 12.5% who Disagree, 37.5% who Agree, 31.25% who Strongly Agree. For the fifth statement, there are 0% who strongly disagree, 6.25% who disagree, 18.75% who do not agree, 43.75% who agree, 31.25% who strongly agree. For the sixth statement, there are 0% who strongly disagree, 12.5% who disagree, 12.5% who do not agree, 50% who agree, 25% who strongly agree. For the seventh statement, 0% strongly disagree, 0% disagree, 18.75% disagree, 56.25% agree, 25% strongly agree. For the eighth statement, 6.25% strongly disagree, 12.5% disagree, 12.5% disagree, 50% agree, 18.75% strongly agree. Meanwhile, for the 19th statement, there were 6.25% who Strongly Disagree, 118.75% who Disagree, 18.755% who Disagree, 37.5% who Agree, 31.25% who Strongly Agree. And for the tenth statement there are 0% who Strongly Disagree, 12.5% who Disagree, 18.75% who Disagree, 37.5% who Agree, 31.25% who Strongly Agree.

After the data/results of student work are analyzed using equation (1), they are then averaged so that we can see the average percentage of students who Strongly Disagree, Disagree, Disagree, Agree and Strongly Agree on each given aspect. For the aspect of using EveryCircuit-Based Virtual Laboratory, there are 1.875% who Strongly Disagree, 11.875% who Disagree, 16.25% who Disagree, 43.75% who Agree and 26.25 who Strongly Agree. For more details, see the diagram below

Figure 3. Average Percentage of Students Who Strongly Disagree, Don't Agree, Disagree Agree, and Strongly Agree on the Motivation and Skills aspects



The figure above shows that in the aspect of motivation and skills, the majority of students answered in the affirmative, meaning that the majority of students are motivated and skilled in EveryCircuit-based Virtual Laboratory.

For the aspect of understanding the material, there were 5 statements given to respondents. With the aim of seeing how many people or what percentage of students strongly disagree, disagree, disagree, agree and strongly agree with the EveryCircuit-based virtual laboratory. And after being given to 16 students, the first statement read: I feel that the Virtual Laboratory based on EveryCircuit can help understand the material on Dynamic Electricity. There were 2 people who strongly disagreed, 3 people disagreed, 2 people did not agree, agreed. 6 people, and 3 people who

Strongly Agree. Then for the second statement, namely "I can easily understand Dynamic Electrical material when using the EveryCircuit Based Virtual Laboratory" from this statement 1 person strongly disagrees, 2 people disagree, 2 people disagree, 7 people agree, and 4 people disagree. people who Strongly Agree. Then for statement 3 which reads "I can practice well regarding Dynamic Electricity after using the EveryCircuit Based Virtual Laboratory application", there are 0 who Strongly Disagree/no one strongly disagrees, 1 person who Disagrees, 3 people who Disagree, people who Agree, 3 people who Strongly Agree. For the 4th statement with the sound "I feel helped in assembling tools on Dynamic Electrical material after using the EveryCircuit Based Virtual Laboratory application", 2 people strongly disagree, 1 person disagrees, 1 person disagrees, 7 people agree, 5 people who Strongly Agree. And for statement 5 which reads "I feel helped by understanding how laboratory equipment works, especially regarding electricity after using the EveryCircuit Based Virtual Laboratory application" there is 1 person who Strongly Disagrees, 2 people who Disagree, 2 people who Disagree, 5 people those who Agree, 6 people who Strongly Agree.

From the results of the data analysis above, it can be said that the majority of students agree with the use of the EveryCircuit-based virtual laboratory in Dynamic Electricity material. Because at every point, many students understand Dynamic Electricity material with the help of the EveryCircuit Based Virtual Laboratory.

For aspects of using the EveryCircuit-based Virtual Laboratory, 4 statements were given and given to 16 respondents. Where in the first statement "I can easily use the EveryCircuit-based Virtual Laboratory application" there is 1 person who Strongly Disagrees, 1 person Disagrees, 2 people Disagree, 7 people Agree, and 5 people who Strongly Agree. Then for the second statement, namely "All the components needed to make a circuit in Dynamic Electrical material are available in EveryCircuit" from this statement there are no people who Strongly Disagree, 3 people who Disagree, 1 person who Disagrees, 9 people who Agree, and 3 people who Disagree. people who Strongly Agree. Then for statement 3 which reads "I know the components in EveryCircuit that are needed for Dynamic Electrical material", no one strongly disagreed, 1 person disagreed, 2 people disagreed, 8 people agreed, and 5 people disagreed. Strongly agree. And for the 4th statement with the words "I can easily create circuits and run simulations in EveryCircuit" there is 1 person who Strongly Disagrees, 1 person who Disagrees, 4 people who Disagree, 6 people who Agree, and 4 people who Strongly Agree.

From the results of the data analysis above, it can be said that the majority of students agree with the use of the EveryCircuit-based virtual laboratory in

Dynamic Electricity material. Because at every point, many students have mastered it.

For the Motivation and Skills Aspect, 10 statements were given and given to 16 respondents. Where in the first statement "I feel interested and happy to complete the practicum using EveryCircuit" there were no respondents who Strongly Disagree, 2 people Disagree, 2 people Disagree, 8 people Agree, and 4 people Strongly Agree. For the second statement, namely "I am happy to work with a group to complete the Dynamic Electricity practicum, using EveryCircuit" from this statement there were no respondents who Strongly Disagree, 3 people who Disagree, 2 people who Disagree, 7 people who Agree, and 4 people who Strongly Agree. For statement 3 which reads "I like the practicum carried out on the subject of Dynamic Electricity using EveryCircuit", where there are no respondents who Strongly Disagree, 2 people who Disagree, 4 people who Disagree, 6 people who Agree, and 4 people who Strongly Agree. For the 4th statement which reads "Doing Dynamic Electrical practicum using EveryCircuit makes me more motivated than direct practicum using laboratory equipment" where there is 1 person who Strongly Disagrees, 2 people who Disagree, 2 people who Disagree, 6 people agree, and 5 people strongly agree. For the fifth statement, namely "Dynamic Electrical Practicum with the help of EveryCircuit motivates me to do other practicums" from this statement there were no respondents who Strongly Disagree, 1 person who Disagree, 3 people who Disagree, 7 people who Agree, and 5 people people who Strongly Agree.

From the results of the data analysis above, it can be said that the majority of students agree with the use of the EveryCircuit-based virtual laboratory in Dynamic Electricity material. Because at every point, many students are motivated by using the EveryCircuit-Based Virtual Laboratory on Dynamic Electricity material.

For the sixth statement, namely "Practicum with the help of EveryCircuit, made me feel like trying it again with other materials" from this statement there were no respondents who Strongly Disagree, 2 people Disagree, 2 people Disagree, 8 people Agree , and 4 people who Strongly Agree. For the seventh statement, namely "I feel happy doing practicum with the help of EveryCircuit", from this statement there were no respondents who Strongly Disagree, there were no respondents who Disagree, 3 people Disagree, 9 people Agree, and 4 people who Strongly agree. For the eighth statement, namely "I feel skilled in assembling tools with the help of EveryCircuit" from this statement, 1 person strongly disagrees, 2 people disagree, 2 people disagree, 8 people agree, and 4 people strongly agree. Meanwhile, for the ninth statement, namely "I feel proud of the existence of EveryCircuit so that I can assemble devices properly and correctly" from this statement there is 1 person who Strongly Disagrees, 3 people who Disagree, 3 people who Disagree,

5 people who Agree, and 4 people who Strongly Agree. And for the tenth statement, namely "I feel happy with EveryCircuit, so it is easy to set up Dynamic Electrical experiments" from this statement there were no respondents who Strongly Disagree, 2 people who Disagree, 3 people who Disagree, 6 people who Agree, and 5 people who strongly agree.

The above research is supported by several previous researchers, such as research conducted by (Sudarmono, 2022), the analysis of which states that by using virtual laboratories and the everycircuit application, learning is very effective, as for research conducted by Putri Iman Sari where the results are that by using virtual laboratory, students are better at mastering the concept. Next, there is research by (Wiryanto., 2019) with the results of her research saying that the use of everycircuit is good in developing physics teaching modules.

The implication of the results of this research is that using a virtual laboratory based on every Circuit provides a new atmosphere for students where they are very happy and motivated when doing practicum, namely on dynamic electricity material. And also by implementing the Every Circuit application, students don't feel bored when doing practicum compared to when they do practicum in the laboratory.

IV. CONCLUSION AND SUGGESTION

Based on the results of data analysis calculations, descriptions of research results, it can be concluded that the perception of Physics Education students at Cenderawasih University regarding the use of the EveryCircuit-based Virtual Laboratory in Dynamic Electricity material is good and students agree with the use of the EveryCircuit-based Virtual Laboratory, but there needs to be improvement for several points in learning. One of them is the motivation and skills aspect that needs to be improved. The following are the average results of respondents whose answers agreed to the criteria for each aspect obtained in the research, namely the aspect of understanding the material was 42.5% with the criteria of agreeing, the aspect of using the EveryCircuit-based Virtual Laboratory was 46.875%, and the motivation and skills aspect was 43.75%. Thus, it is hoped that the results of this survey research can be used as a basis for selecting learning media to carry out simulations with the help of the EveryCircuit-based Virtual Laboratory, especially in the Physics Education Department by correcting several shortcomings. And the limitations of researchers are that with the implementation of the EveryCircuit-based Virtual Laboratory in the UNCEN physics education study program, there are still some students who are not yet skilled in using the EveryCircuit-based Virtual Laboratory. One of the causes is that students

Commented [L4]: 1.The conclusions largely repeat the findings without offering new insights or broader implications.
2.While there are some suggestions for further research and improvements, they are general and lack specificity. More detailed recommendations based on the study's findings would be more useful.
3.The conclusions tend to overgeneralize the effectiveness of EveryCircuit-based virtual labs without acknowledging the limitations of the study or the need for further research in diverse educational settings.

still lack knowledge regarding electricity. Therefore, further research needs to be done regarding this matter.

It is hoped that lecturers/educators use the EveryCircuit-based Virtual Laboratory in a room that has/available WiFi so that students do not feel burdened. And it is best if learning using everycircuit-based virtual laboratory media is carried out in a computer laboratory room.

REFERENCES

A. Swandi, B. D. (2020.). Harnessing Technology-Enabled Active Learning Simulations (Tealsim) On Modern Physics Concept. *J. Phys. Conf. Ser, Vol. 1521, No. 2*.

A. Swandi, d. (2021, November). A.Pelatihan Pembuatan Perangkat Pembelajaran Berbasis Laboratorium Virtual Dan Blended Learning Untuk Guru Ipa Di Sma Islam Athirah 1 Makassar. *J-AbdiJurnal Pengabdian Kepada Masyarakat , Vol.1, No.6*, 1231-1240.

Hidayati, A. F. (Hidayati, A. F., & Puspitarini, I. D). Pengembangan Media Pembelajaran Berbasis VBA (Visual Basic Application) Dalam Excel Pada Materi Hukum II Newton. *Seminar Nasional Fisika (SNF)*, , 132–139.

Katoch, S. K. (2020). MS-Excel Spreadsheet Applications in Introductory Under-. *Graduate Physics-A Review. Journal of Science and Technology, 5*(3).

Makiyah, Y. S. (2022). Implementasi Software Circuit Wizard Pada Mata Kuliah Elektronika Dasar Untuk Meningkatkan Motivasi dan Hasil Belajar Siswa. *Radiasi: Jurnal Berkala Pendidikan Fisika, 15(1)*, 22-27.

Maryuliana, S. I. (2016). Sistem Informasi Angket Pengukuran Skala Kebutuhan Materi Pembelajaran Tambahan Sebagai Pendukung Pengambilan Keputusan Di Sekolah Menengah Atas Menggunakan Skala Likert. *Jurnal Transistor Elektro dan Informatika, 1 (2)*, 1-12.

Muhajarah, K. &. (2020). Pengembangan Laboratorium Virtual sebagai Media Pembelajaran: Peluang dan Tantangan. . *Justek : Jurnal Sains Dan Teknologi, 3(2)*,. doi:77.https://doi.org/10.31764/justek.v3i2.35 53

Palloan, P. &. (2019). Development of learning instrument of active learning strategy integrated with computer simulation in physics teaching and learning on makassar state university. *Journal of Physics: Conference Series, 1157 (3)*.

Palloan, P. R. (2021). Student Self-Regulated in Remote Learning With the Implementation of Local Virtual Lab Based on Online Tutorial (LVL-BOT). *Indonesian Review of Physics , 4(1)*, 20-26. doi:https://doi.org/10.12928/irip.v4i1.3783

Rais, A. A. (2020). Pemahaman Konsep Siswa Melalui Model Inkuiri Terbimbing Berbantuan Simulasi PhET. *Physics Education Reseach Journal, 2 (1)*.

Riduwan. (2015). *Dasar-Dasar Statistika*. Bandung: Alfabeta.

Sartika, R. (2022). Implementasi Aplikasi Everycircuit Dalam Pengembangan Modul Fisika. *Skripsi Universits Islam Negeri Antasari Banjarmasin*.

Series, C. (2019). Effect of Higher Order Thinking Virtual Laboratory (

HOTVL) in Electric Circuit on Students ' Creative Thinking Skills Effect of Higher Order Thinking Virtual Laboratory (HOTVL) in Electric Circuit on Students ' Creative Thinking Skills. doi:https://doi.org/10.1088/1742-6596/1204/1/012025

Sudarmono, R. &. (2022). Analisis Efektivitas Praktikum Virtual Menggunakan aplikasi Everycircuit Berbasis Android pada Pembelajaran Era Pandemi Covid 19. *SAINTIFIK: Jurnal Matematika, Sains, dan Pembelajarannya, Vol.8, No.2*, 168-175. . doi:DOI:10.31605/saintifik.v8i2.363

Sugiyono. (2013). *Metode Penelitian Kuantitatif, Kualitatif, dan R & D*. Bandung: Penerbit CV Alfabeta.

Swandi, A. A. (2020). Harnessing technology-enabled active learning simulations (TEALSim) on modern physics concept. *Journal of Physics:Conference Series,, 1521(2)*. doi: https://doi.org/10.1088/1742-6596/152

Tarisahfira, B. (2022). Pengembangan Modul Pembelajaran Berbantuan Every Circuit Pada Materi Listrik Dinamis Di SMK-SMTI Banda Aceh. Skripsi. Fakultas Tarbiyah Dan Keguruan Universitas Islam Negeri Ar-Raniry Darussalam, Banda Aceh.

Wahyudi, W. &. (2019). Pengaruh Modul Praktikum Optika Berbasis Inkuiri Terhadap Keterampilan Proses Sains dan Sikap Ilmiah Mahasiswa. *Jurnal Pendidikan Fisika Dan Keilmuan (JPFK), 5(1)*. doi:https://doi.org/10.25273/jpfk.v5i1.3317

Wiryanto., E. Y. (2019). Pengembangan Modul Pembelajaran Everycircuit Pada Mata Pelajaran DLE (Dasar Listrik Dan Elektronika) Di SMK Negeri 2 Bojonegoro. . *Jurnal Pendidikan Teknik Elektro., Volume 08 Nomor 02*, 181 – 188.

Yundra, I. I. (2020). Pengembangan Perangkat Pembelajaran Menggunakan Model P2oew Berbantuan Software Everycircuit Pada Mata Pelajaran Penerapan Rangkaian Elektronika Kelas Xi Tav Di SMK Negeri 3 Surabaya. *Jurnal Pendidikan Teknik Elektro., 9 (1)*, 17-25.

Yuri Yanti, Y. M. (2020). Pengaruh Media Virtual Laboratory dalam Pembelajaran Fisika Terhadap Kompetensi Siswa. *Jurnal Penelitian dan Pembelajaran Fisika, VOL 6 NO.2*. , 146-154.

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