



ANALYSIS OF THE NEED FOR VIRTUAL REALITY LEARNING MEDIA IN ANIMAL DEVELOPMENTAL STRUCTURE COURSES

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ABSTRACT

Biology learning on the Animal Development Structure-2 (SPH 2) course, mostly contains material of an abstract nature, and is difficult for students to understand. The difficulties of understanding the concept are supposed to be a contributing factor in the low graduation rate of students, so it requires a 3D visualization media instrument to make learning more active and meaningful. The study aims to reveal the needs of lecturers and students towards the use of virtual reality learning media in SPH-2 subject. The research data was collected using a questionnaire to analyze the percentages, while the qualitative data describe the responses of lecturers and students. The Questionnaires are distributed openly using google form, then the data cleansing process is carried out. The research instrument was developed utilizing five indicators; teaching preparedness, respondent knowledge, respondent experience, media advantages and shortcomings, and general user responses. The research results based on indicators show that (1) lecturers' teaching readiness is categorized as high ($\geq 70\%$); (2) lecturers' knowledge of virtual reality was 92.9% and students' knowledge was 86.8%; (3) the experience of respondents as many as 71.43% of lecturers and 39.47% of students who have used VR; (4) the main obstacle in creating and using VR is expensive costs (36.54%); (5) the topics chosen by respondents were Gametogenesis (36.49%) and Fertilization (28.38%). A total of 95% of respondents felt happy and assisted when learning using virtual reality, and 86.8% of students stated that virtual reality learning media can be applied to SPH-2 subjects. The results of this study can be used as a preliminary test at the stage of development of virtual reality learning media for the students.

Keywords: needs analysis, learning media, animal development structure, virtual reality

1. INTRODUCTION

Currently, echoes of the industrial revolution are being echoed by the Ministry of Education, Culture, Research and Technology. It cannot be avoided that the digitalization phenomenon has spread to various sectors, including education. Therefore, the curriculum and educational methods must be adjusted. The signifier of this phenomenon is the application of online technology and the rise of digital platforms in various industrial sectors so that the demands of the current era are speed and accuracy (Thammasaeng et al., 2016).

Student-centered learning can be mediated by providing interactive learning media, and student learning outcomes can be measured by providing interactive forms of assessment as well. Students generally consider science subjects as abstract material, so they require in-depth understanding and visualization skills (Gilbert, 2004). Students who have difficulty understanding concepts well can give rise to misconceptions. According to Larkin (2012), misconceptions among students must be considered because they can interfere with students' learning of scientific principles and concepts. Thus, choosing learning media is an important factor in minimizing student misconceptions (Heinich et al., 2002; Larkin, 2012).

The use of virtual reality in scientific learning procedures is believed to improve student learning outcomes. This is because science learning has many complicated procedures and intuitive processes that are difficult to imagine and understand in the correct way. Therefore, science learning with the addition of technological tools in the form of virtual reality is needed to extract intuitive and abstract learning content so that it can be understood well by students (Gopalan et al., 2017). Virtual media can be used to present abstract or complex concepts in a visual form (Liyuan, 2020), that is easier for students to understand. In addition, virtual media also allows students to experience situations or environments that may be difficult or dangerous in real life, such as airplane flights, space exploration, animal surgery or medical simulations. Virtual reality can provide an immersive experience for students (Beck, 2019), and can provide real sensations to increase retention and understanding of learning material (Arini, 2023).



Learning the structure and development of animals-2 has many topics that are abstract and difficult for students to understand. The limited availability of teaching materials and less varied learning media further increase problems for students in learning. Research on student responses to the use of augmented reality learning media among SMA Negeri 5 Ternate City students also provides an overview of the phenomenon of using technology-based media (Ahmad et al., 2022). This research is material for consideration in developing virtual media for several topics in the animal structure and development course-2. One of the basic considerations in developing learning media is determining the topic and initial responses from users (lecturers and students), so that the learning media developed is in accordance with the needs and characteristics of students.

2. METHODS

This research uses a quantitative descriptive approach, with data collection techniques carried out through open Google Form questionnaires, interviews and documentation. The questionnaire instrument has five indicators, namely lecturer readiness in teaching, respondent's knowledge about VR, respondent's experience of VR, obstacles in using VR, and selection of course topics. The questions in the questionnaire instrument use a Likert scale and Guttman scale, and are analyzed using a percentage formula. Presentation of data in tabular and graphical form. To determine the category level of the lecturer's teaching readiness indicator, a categorization auxiliary table with interval ranges and percentage values is used as follows:

Table 1. Categorization of Lecturers' Readiness Levels.

Category	Interval	%	Max score	Ideal score
High	21-30	≥ 70	30	30
Middle	11-20	34-69		
Low	0-10	≤ 33		

3. RESULTS & DISCUSSION

After clearing and analyzing the data, 52 respondents were determined, consisting of 14 respondents who work as lecturers and 38 students. All respondents (lecturers and students) came from 3 universities in North Maluku province. The research results can be detailed as follows:

3.1 *Lecturer Preparation in Teaching*

Lecturer readiness in teaching includes readiness of learning tools with sub-indicators; syllabus readiness, Lecture Event Unit (SAP) readiness, readiness to make LKM, learning media readiness, observation sheet readiness, and Evaluation readiness). The results of the analysis show that lecturers' readiness in teaching is categorized as high ($>70\%$) with a score frequency of 12, and in the medium category (34-69% interval) with a score frequency of 2. In this indicator, there are no lecturers who are not ready to prepare. learning tools. Generally, lecturers have prepared Syllabus, SAP, Learning Media, LKM, Observation Sheets and Evaluation. Of the 6 sub-indicators measured, there were 5 lecturers who were still low in 3 sub-indicators, namely the Syllabus sub-indicator (1 person answered that they rarely prepare), readiness to make LKM (1 person answered that they rarely prepare), and readiness to make Evaluations (3 people answered rarely prepare).

According to Maryani et al. (2020) lecturers in the normal era need to prepare strategies and variations of models in learning. Apart from that, the learning equipment which is an administrative requirement for higher education Tri-Dharma needs to be prepared by the lecturer before carrying out lectures. Meanwhile, according to the research results of Dina, (2018), lecturers must be able to prepare learning tools well, including formulating learning objectives accurately and clearly. Planning learning tools is a preventive action to prevent deviations from learning objectives and/or teaching materials.



3.2 Respondents Knowledge about Virtual Reality

There were 13 lecturers who knew about VR (92.9%), while 1 person (7.1%) stated that they did not know about VR, while 33 students (86.8%) said they did not know about VR. (0.13%) stated that they did not know about VR.

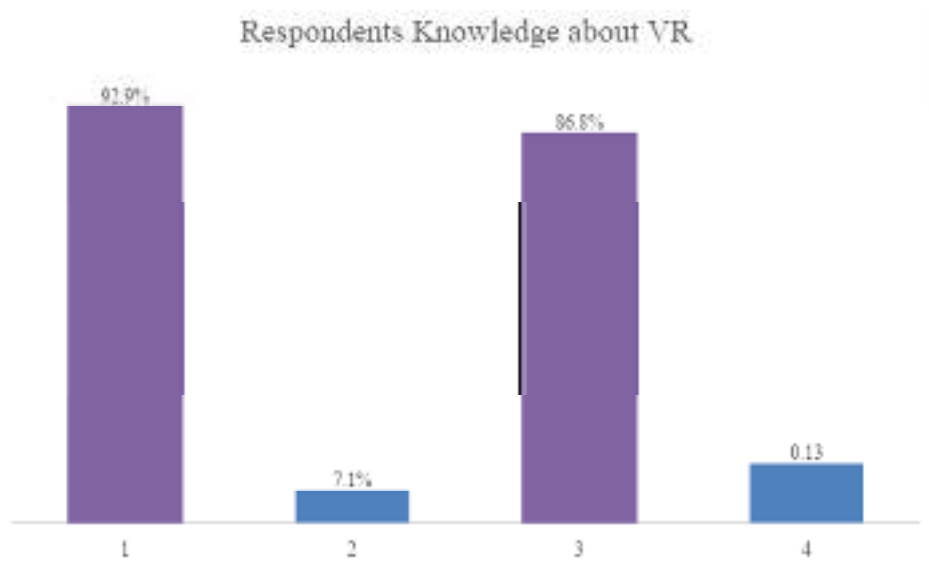


Figure 1. Respondents' Knowledge about Virtual Reality.

Based on Figure 1, it shows that the majority of lecturers (92.9%) and students (86.8%) already know about virtual reality. Information about VR is obtained from various internet sources and social media which is increasingly popular in the 4.0 era. For lecturers who don't know about VR (7.1%), this is due to a lack of information about the term virtual reality, while for students who don't know about VR (0.13%) it is due to not having a smartphone and rarely accessing the internet.

3.3 Respondents' Experiences

The results of data analysis show that 71.43% of respondents (lecturers) stated that they had used virtual reality, and 28.57% had never used VR. Meanwhile, for students, 39.47% said they had used VR and 60.53% said they had never used VR.

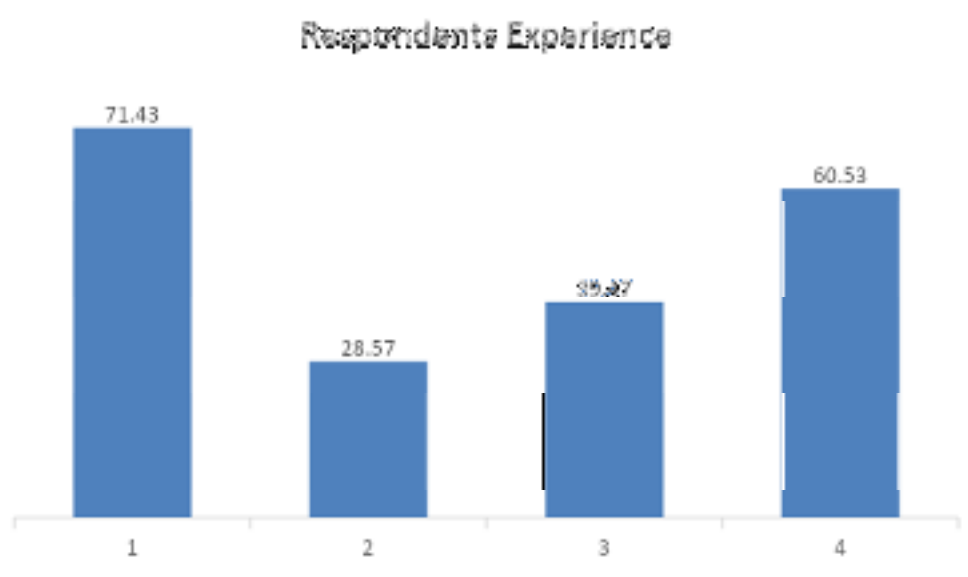


Figure 2. Respondents' Experience about Virtual Reality.

Based on Figure 2, it shows that there are lecturers and students who already know about virtual reality, but have never used it. As many as 71.43% of lecturers have used VR, and 28.97% have never used VR. Meanwhile, among students, 39.47% said they had used virtual reality, and 60.53% had never used VR. The relationship between knowledge and use of virtual reality can be clustered as follows:

Table 2. Level Categories Between Knowledge and Use of VR among Respondents.

Cluster	%	Category
Individuals who know VR, and have used VR	48,08	Middle
Individuals who know VR, but have never used VR	40,38	Middle
Individuals who are not familiar with VR, but have used VR	0,00	No data
Individuals who are not familiar with VR, and have never used VR	11,54	Low

Based on Table 2, it shows that someone is said to have knowledge about an object, but may not necessarily have used the object that they already know. A person's knowledge is still at the epistemological level, so it needs to be proven through empirical facts. Interestingly, there were 11.54% of respondents who did not know about VR and had never used it. In this cluster, there is 1 lecturer and 5 students.

3.3 Respondents Facing Problems

This indicator provides information about respondents' opinions regarding the obstacles faced in creating and using virtual reality learning media. According to respondents, the main obstacles in creating and using VR are expensive costs (36.54%), technical aspects of creating VR media (in terms of time, learning style, syntax) amounting to 21.15%, internet and network constraints amounting to 15.38 %, who answered there were no obstacles was 13.46%, support for facilities and infrastructure was 9.62%, and teacher and lecturer readiness was 3.85%.

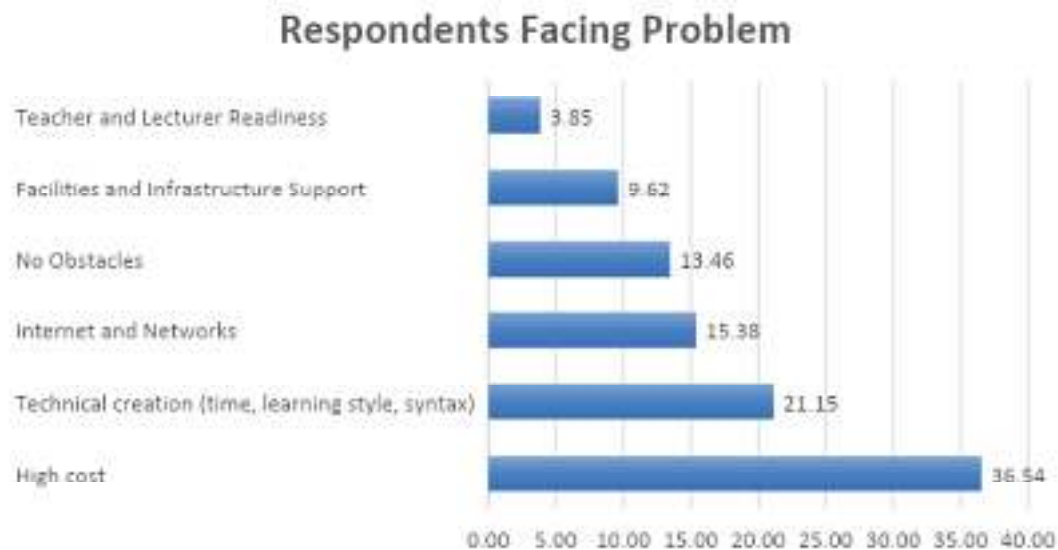


Figure 3. Respondents Facing Problems.

Based on Figure 3, it shows that the problem in learning using virtual learning is the high costs, including the procurement of VRBox headsets and controllers. The high cost of procuring VR equipment is positively correlated with the hardware and software specifications produced by the development company (Farra et al., 2019). The higher the specifications, the price offered is quite high. Apart from that, technical manufacturing factors are also educators' biggest complaints. Respondents stated that they had a strong desire to apply virtual reality learning media in their learning topics, but had difficulty in the process of creating it. The third biggest problem is the unstable internet and network, making it difficult for lecturers and students to apply it in class.

3.4 Topic Selection

Most of the topics in the SPH-2 course are abstract and difficult to explain conventionally. Of the several topic choices in the SPH-2 course, as many as 27 respondents (36.49%) chose the topic Gametogenesis, as many as 21 respondents (28.38%) chose the topic Fertilization, 12 respondents (16.22%) chose the topic organogenesis and embryonic membrane formation, 8 respondents (10.81%) chose the topic of Blastula and Neurulation, 4 respondents (5.41%) chose the topic of regeneration, and 2 respondents (2.7%) chose the topic of metamorphosis.



Figure 4. Topic Selection.

The selection of topics by respondents can provide researchers with an idea of the topics needed to be developed in virtual reality learning media. Most of the topics in studying Animal Development Structure-2 can



be taught using virtual reality learning media, but researchers need to choose the main topic based on considerations from users (lecturers and students). Selection of learning topics is the initial product development stage in development research procedures adapted from Borg & Gall 1983 in (Richey & Klein, 2014; Setyosari, 2016).

4. CONCLUSION

A total of 95% of respondents felt happy and assisted when learning using virtual reality, and 86.8% of students stated that virtual reality learning media can be applied to SPH-2 subjects. According to the respondents' opinion, the material topics in the animal development structure course-2, which are needed for the application of virtual reality learning media, are the topics of Gametogenesis (36.49%) and Fertilization (28.38%).

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