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DEVELOPMENT OF AUDIOVISUAL-BASED LEARNING MEDIA ON THE SUBJECT OF IMMUNE SYSTEM AT SMA NEGERI 12 MEDAN

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ABSTRACT

This research aims to develop audiovisual-based learning media on the topic of the immune system in class XI of SMA Negeri 12 Medan during the academic year 2021/2022. The method used in this study is research and development. The research subjects consist of Subject Matter Experts, Learning Media Experts, Biology Subject Teachers, and students of class XI MIA at SMA Negeri 12 Medan. Data collection was conducted through instruments such as expert validation assessment sheets, teacher assessments, and student responses. The development of learning media was carried out using the 4D instructional development model (Define, Design, Development, and Disseminate). Each stage of this model underwent revisions to produce high-quality audiovisual learning media products. The results of the study showed that the assessment by subject matter experts obtained a percentage of 100% (Highly Suitable), the assessment by learning media experts obtained a percentage of 82.81% (Suitable), and the assessment by the biology subject teacher obtained a percentage of 100% (Very Good). The students' feedback and responses to the learning media also obtained a percentage of 81.66% (Very Good). The results of the comprehension test on the learning media for the students, based on the pretest scores, showed an average of 49.75 (Low), while the posttest results showed an average of 76.96 (High). Thus, it can be concluded that the audiovisual learning media on the topic of the immune system meet the criteria of being "Highly Suitable" and fulfill the requirements in the biology learning process.

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INTRODUCTION

Blended learning, which combines elements of online and face-to-face learning, is important due to technological advancements and the increasing complexity of educational needs (So & Kim, 2021; Martin et al., 2020). However, implementing blended learning presents challenges for both students and teachers (So & Kim, 2021; Martin et al., 2020). One of the challenges in managing blended learning is providing contextually meaningful learning experiences, particularly in subjects like biology (Brata et al., 2020). Biology, as a scientific discipline that studies living organisms, encompasses concepts that range from concrete and observable to abstract and non-observable (Anwar & Ratnasari, 2021; Wahyuni & Kuswanto, 2020). Therefore, the use of appropriate learning media is crucial in biology education (Anwar & Ratnasari, 2021; Wahyuni & Kuswanto, 2020). Using suitable learning media allows students to directly witness and demonstrate concepts discussed in the lessons (Ikhsan, 2019).

Interviews conducted with biology teachers at SMA Negeri 12 Medan revealed that the distance learning process was not effective, as many students felt bored and struggled to comprehend the material. Teachers also faced challenges due to a lack of learning media that supported blended learning (Handayani & Suryani, 2021). Teachers mentioned that the topic of the immune system was particularly difficult for students, as indicated by low scores. Only 30% of students were able to answer questions and achieve scores above the minimum passing grade. One common obstacle faced by teachers is the limited availability of learning media that facilitate effective and engaging learning experiences (Khasanah & Aini, 2021).

In this context, it is crucial to find solutions to enhance the learning process. The utilization of engaging media and creating a pleasant classroom environment can significantly impact student comprehension and help achieve learning objectives. The use of appropriate, creative, effective, interesting, and ICT-based (Information and Communication Technology) learning media can assist teachers in improving student learning outcomes (Fahmi & Ardianto, 2020). Implementing such biology learning approaches can provide meaningful learning experiences for students, fostering understanding, active participation, and an enjoyable classroom atmosphere (Yendrita & Syafitri, 2019).

Previous research has also demonstrated the significant role of audiovisual media in education, contributing to the increased effectiveness of learning. Audiovisual media stimulates students through sound and visuals, aiding teachers in delivering learning materials in an engaging manner (Widiyatmoko et al., 2021). The use of audiovisual media by teachers indirectly enhances their skills in developing instructional models. Teachers adeptly operate and present learning materials using audiovisual media, displaying content via LCD screens in the classroom, and conveying captivating information through pictures, slides, and short films (Agung et al., 2021). The development of biology interactive learning media aligned with learning objectives has shown improvements in the quality of learning experiences (Faizah, Rianto, & Rachmawati, 2021).

Based on the findings of a questionnaire administered to students at SMA Negeri 12 Medan, it was revealed that the majority of students have a positive attitude towards the use of learning media, particularly audiovisual learning media, as they are perceived to facilitate learning and enhance their enthusiasm for learning. Hence, the objective of this research is to cultivate students' enthusiasm for learning, motivate them, and foster their understanding by developing audiovisual-based learning media for the topic of the immune system in SMA Negeri 12 Medan.

METHOD

This research was conducted at SMA Negeri 12 Medan from September to June 2022. The study involved 32 class XI students, one biology educator, one biology lecturer specialized in learning media, and one biology lecturer specialized in the subject matter. The main objective of this research was to assess the suitability of audiovisual-based learning media for the topic of the body's defense system in class XI MIA at SMA Negeri 12 Medan. The research followed a research and development (R&D) approach, specifically utilizing the 4D model (define, design, develop, and disseminate), which has been adapted into the 4-P model (definition, design, development, and deployment). The research procedure is visually presented in Figure 1.

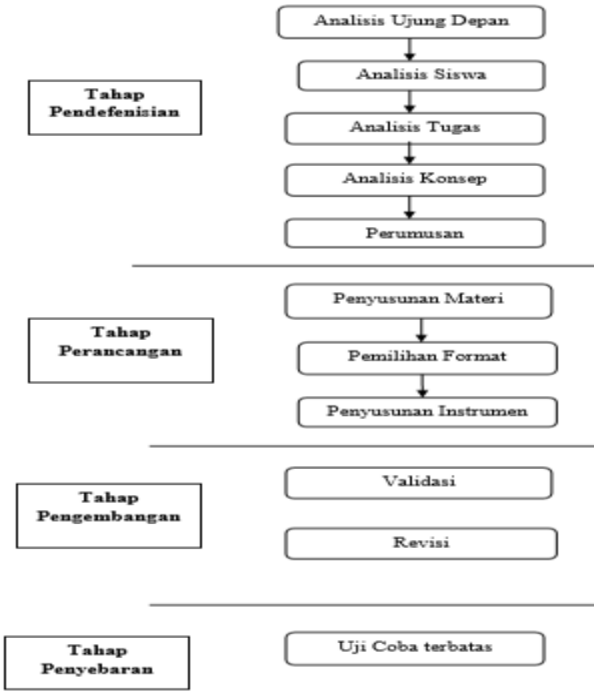

Figure 1. Procedure modification of the Four-D development model

The research utilized various instruments to collect data on validity, practicality, and effectiveness. Product validity was assessed through the use of validation sheets evaluated by subject matter and media experts. Product practicality was determined based on feedback gathered from teacher and student response questionnaires. The effectiveness of the audiovisual learning media was evaluated through student comprehension tests. The validation analysis was conducted following the method outlined by Damayanti (2018).

$$Xi = \frac{\Sigma\, s}{\Sigma\, \text{Max}}\ x\ 100\ \%$$

Note:

Xi : Feasibility Value of Each Questionnaire
Σ s : Total score
Σ Max : Max Score
85% - 100% Very feasible
65% - 84% Feasible
45% - 64% Feasible enaough
0% - 44% not feasible (Wulandari dan Purwanto, 2017)

RESULTS AND DISCUSSION

Teacher and Student Responses to Learning Media

The teacher's response to the biology learning media material on the immune system is categorized as "very good." This aligns with the findings of Samsinar's research (2019), which indicates that even the best learning resources in the world cannot fulfill their functions and roles if the teaching materials are not favored by the teacher. The teacher's assessment of the biology study and the developed learning media confirms its suitability for use in learning.

Regarding the suggestions for improvement based on student responses to the developed learning media, it was observed that the presentation of materials through the learning media facilitated students' understanding of the subject matter, provided the opportunity for repeated engagement, and assisted in completing assignments.

Student Learning Outcomes

Following the positive responses from students, a media comprehension test was

conducted using the cognitive level of Bloom's Taxonomy. The data in Table 4.9 reveals that the average Pretest score was 49.75%, while the average Posttest score was 79.96%, resulting in an N-Gain value of 65.25%. This finding aligns with the viewpoint of Eka et al., who suggest that the effectiveness of learning outcomes can be categorized as moderate based on N-Gain results. The students' interest in independent learning using the learning media, coupled with the time constraint during the media comprehension test, influenced these results. This learning media can serve as an engaging resource for students in studying the immune system material. It is expected to foster their interest, motivation for independent learning, and active participation. Furthermore, the learning media will enhance students' curiosity and encourage them to explore the topics in more depth while completing their assignments.

Table 1. Student Comprehension Test Results

Students	Pretest	Postest	Posttest-Pretest	Ideal score – Pretest	N- Gain	Persentasi
01	48	92	44	52	0,84	84,61
02	32	84	52	68	0,76	76,47
03	56	68	12	44	0,27	27,27
04	76	76	0	24	0	0
05	84	88	4	16	0,25	25
06	28	92	64	72	0,88	88,88
07	56	76	20	44	0,45	45,45
08	44	56	12	56	0,21	21,42
09	52	92	38	48	0,79	79,16
10	48	72	24	52	0,46	46,15
11	64	88	24	36	0,66	66,66
12	76	88	12	24	0,5	50
13	28	84	56	72	0,77	77,77
14	32	76	44	68	0,64	64,70
15	56	72	16	44	0,36	36,36
16	36	72	36	64	0,56	56,25
17	60	76	16	40	0,4	40
18	60	92	32	40	0,8	80
19	44	76	32	56	0,57	57,14
20	28	64	36	72	0,5	50
21	36	93	57	64	0,89	89,06
22	32	76	44	68	0,64	64,70
23	80	96	16	20	0,8	80
24	28	72	44	72	0,61	61,11
25	80	92	12	20	0,6	60
26	56	76	20	44	0,45	45,45
27	48	68	20	52	0,38	38,46
28	64	80	16	36	0,44	44,44
29	44	84	40	56	0,71	71,42
30	64	88	24	36	0,66	66,66
31	36	76	40	64	0,62	62,5
32	16	52	36	84	0,42	42,85
Average	49,75	79, 96	29,46	50,25	0,56	56,25

CONCLUSION

Based on the analysis of research data regarding the development of audiovisual-based animation learning media on the immune system, it can be concluded that, based on the evaluations from experts and users, the developed audiovisual

media is suitable for learning purposes. The assessment by the subject matter expert regarding the learning media for the immune system material falls under the "Very Suitable" category in terms of material presentation. The assessment by the learning media expert regarding the developed learning media components is rated as "Good" in terms of learning media quality. The biology teacher at SMA Negeri 12 Medan rated the media as "Excellent" for use in learning. The student responses from the limited group test categorized the developed learning media as "Agreeable" for use as learning media or references.

REFERENCES

Andari, I, Y. 2019. Pentingnya Media Pembelajaran Berbasis Video Untuk Siswa Jurusan IPS Tingkat SMA Se-Banten. Prosiding Seminar Nasional Pendidikan FKIP. Universitas Sultan Ageng Tirtayasa: 2(1) 263-275

Anwar, K., & Ratnasari, Y. (2021). Efektivitas Pembelajaran Daring dalam Meningkatkan Hasil Belajar Siswa. Jurnal Riset Pendidikan Matematika, 8(1), 11-20.

Ari, G.Y., dan Desi, P. 2015. Pengembangan Media Pembelajaran Interaktif Biologi Untuk Meningkatkan Hasil Belajar Siswa SMP. Jurnal Pendidikan dan Pengajaran. 48(3) : 45-51

Agung, G.A., Astawan, G., dan Parmiti, D.P. 2021. Enabling Student Active Participation to Learn Human Digestive System with Learning Videos. Jurnal Sekolah Dasar. 5(3) : 21-38

Brata, W. W. W., Wibowo, F. C., & Rahmadina, N. (2021). Implementation of discovery learning in a digital class and its effect on student learning outcomes and learning independence level. F1000Research, 10(386), 386.

Chaeruman, U. A. 2015. Instrumen Evaluasi Media Pembelajaran, Jakarta. Pusat Teknologi Informasi dan Komunikasi Pendidikan dan Kebudayaan. 1(15)

Daud, F., dan Rahmadana, A. 2015. Pengembangan Media Pembelajaran Biologi berbasis E-Learning Pada Materi Sistem Ekskresi Kelas XI IPA 3 SMAN Makassar. Jurnal Bionaturre. 16(1) : 56-59

Ernawati. 2014. Pengembangan Perangkat Pembelajaran Berdasarkan Model 4 D pada Materi Getaran dan Gelombang dan Bunyi dalam Meningkatkan Pemahaman Konsep Siswa SMP Negeri 6 PALU. Jurnal Sains Dan Teknologi. Tadulako. Palu.3(1). 62-72

Faizah, F., Riyanto, Y., & Rachmawati, D. (2021). Pengembangan Media Pembelajaran Interaktif untuk Meningkatkan Pemahaman Konsep Sistem Reproduksi pada Siswa Kelas XII. BioEdu, 6(1), 46-53.

Fahmi, R., & Ardianto, D. (2020). Penerapan Media Pembelajaran Berbasis Teknologi Informasi dan Komunikasi (TIK) dalam Meningkatkan Hasil Belajar Siswa. Jurnal Teknologi Pendidikan dan Pembelajaran, 8(2), 101-112.

Handayani, D., & Suryani, E. (2021). Kendala Guru dalam Pembelajaran Jarak Jauh di Masa Pandemi Covid-19. Journal of Education, Teaching and Learning, 6(1), 129-135.

Hasan, H. 2016. Penggunaan Media Audiovisual Terhadap Ketuntasan Belajar IPS Materi Perkembangan Teknologi Produksi, Komunikasi, Dan Transportasi Pada Siswa Kelas IV SD Negeri 20 Banda Aceh. Jurnal Pesona Dasar. 3(4): 44

Ikhsan, M. 2019. Identifikasi Pemanfaatan Media Pembelajaran Biologi dan Korelasinya dengan Disposisi berpikir Kritis Siswa di SMA Negeri 2 Labuapi. Jurnal Ilmu Sosial dan Pendidikan. 3(3): 2656-6753

Januszewski, A. 2001. Educational Technology; The Development of a Concept. Englewood, Colorado: Libraries Unlimited, Inc. 1(1): 1511-1568

Khasanah, I. N., & Aini, Q. (2021). Kendala Guru dalam Pembelajaran Daring di Masa Pandemi COVID-19. Jurnal Pendidikan dan Kebudayaan, 27(2), 194-202.

Mulyasa. 2011. Manajemen Berbasis Sekolah, Konsep, Strategi Dan Implementasi. Bandung: PT Remaja Rosdakarya

Mufidah, I., Nulhakim, L., dan Alamsyah, T.P. 2020. Development Of Learning Media for Video Audio-Visual Stop Motion Based On Contextual Teaching And Learning In Science Learning Water Cycle Material. Jurnal Ilmiah Sekolah Dasar. 4(3) : 15-32

Mulyasa. 2011. Manajemen Berbasis Sekolah, Konsep, Strategi dan Implementasi. Bandung: PT Remaja Rosdakarya.

Murdiyani, Isni. 2012. Pembelajaran Biologi Menggunakan Metode E-learning Berbasis Multiple Intelligences Pada Materi Sistem Gerak Pada Manusia. Innovative Journal Of Curriculum And Educational Technology. 1(1) : 1-5

Prasetyo, S. 2012. Pengembangan Media Pembelajaran Menggunakan Microsoft Powerpoint 2007 Dalam Pembelajaran IPA di SD/MI. Skripsi UIN Sunan Kalijaga. Yogyakarta. 1-3

Pujiyanto, Sri. 2016. Menjelajah dunia biologi. Solo. PT Tiga Serangkai Pustaka Mandiri. 978-602-320-224-9

Purwono, J., Yutmini, S., Anitah, S. 2014. Penggunaan Media Audio-Visual Pada Mata Pelajaran Ilmu Pengetahuan Alam di Sekolah Menengah Pertama 1 Pacitan. Jurnal Teknologi Pendidikan dan Pembelajaran. 7(2) : 618-622

Ramdhani, E.P., Khoirunnisa, F., dan Siregar, N.A.N. 2020. Efektifitas Modul Elektronik Terintegrasi Multiple Representation Pada Materi Ikatan Kimia. Journal Of Research and Tecnology. 6(1): 162-167

Rihanah, A., Dan Irma, N.C., 2022. Kelayakan Isi dan Bahasa Pada Buku Teks Bahasa

Indonesia di SMA Negeri 1 Sirampong. Jurnal Hasta Wiyata. 5(1) : 1-6

Samsinar, S., 2019. Urgensi Learning Resources (Sumber Belajar) Dalam MeningkatkanKualitas Pembelaja ran. Jurnal Kependidikan. Fakultas Tarbiyah IAIN Bone.

13(2). 13-22

Setiawan dan Igan. 2008. Penerapan Pengajaran Kontekstual Berbasis Masalah Untuk Meningkatkan Hasil Belajar Biologi Siswa Kelas X 2 SMA Laboratorium Singaraja. Jurnal Penelitian dan Pengembangan Pendidikan. 2(1) : 42-59

Siahaan, M. 2019. Dampak Pandemi Covid-19 Terhadap Dunia Pendidikan. Jurnal Kajian Ilmiah. 1(1) : 1-3

Slamet, Prawirohartono. 2016. Konsep dan Penerapan Biologi SMA/MA Kelas XI.

Jakarta. PT Bumi Aksara. 978-602-217-725-8

Sugandi dan Rasyid. 2019. Developing Of Adobe Flash Multimedia Learning Biology Through Project Based Learing To Increase Student Creativity In Ecosystem Concepts. Jurnal Ilmiah Pendidikan Biologi. 5(3) : 1-4

Suhardi. 2012. Pengembangan Sumber Belajar Biologi. Yogyakarta. UNY Press

Sukmadinata, Nana Syaodih. 2006. Metodologi Penelitian Pendidikan. Bandung: Remaja Rosda Karya

Susilo, M,J. 2018. Analisis Potensi Lingkungan Sekitar Sebagai Sumber Belajar Biologi yang Berdayaguna. Biologi Education Excenge. Yogyakara. 15(1) : 22-35

Thiagarajan, S., Semmel,D.S., M.I (1974). Intructional Development For TrainingTeacher Of Exceprional Children. University Of Minnesita

Valentina, N.D.R., Nurmilawati, M., Sulistiyowati, T.I. 2019.Respon Siswa Terhadap Modul Pembelajaran Terhadap Pembelajaran Berbasis Savi (Somatic, Auditory, Visualitation, Intellegency) Pada Materi Ekosistem di SMA Negeri 1 Papar. Jurnal Biologi dan Pembelajaran. 6(1) : 1-8

Viani, N.A.O dan Mulianingsih, F. 2021. Pemanfaatan Sumber Belajar IPS dalam Proses Pembelajaran Daring di MTs Sultan Agung. Sosiolium. Universitas Negeri Semarang. 1(7)

Wahyuningsih, A.N., (2011), Pengembangan Media Komik Bergambar Materi Sistem Saraf untuk Pembelajaran yang Menggunakan Strategi PQ4R, Jurnal PP 2 (1): 102-110.

Wahyuni, E., & Kuswanto, H. (2020). Pembelajaran Jarak Jauh dalam Masa Pandemi Covid-19: Kendala, Solusi, dan Tantangan. Journal of Education Technology, 4(1), 53-60.

Widiyatmoko, A., Yaniawati, P., & Candra, D. D. (2021). Penggunaan Media Audio Visual dalam Pembelajaran Biologi Siswa SMA. Bioedukatika: Jurnal Pendidikan Biologi, 9(2), 190-200.

Syamsurizal, S. (2020). Pembelajaran Daring (Online) pada Masa Pandemi Covid-19.

Wulandari, Y., dan Purwanto Wachid E.W. 2017. Kelayakan Aspek Materi dan Media dalam Pengembangan Buku Ajar Sastra Lama. Jurnal Penelitian Pendidikan Bahasa dan Sastra Indonesia.3(2) : 33-38

Yendrita dan Syafitri, S. 2019. Pengaruh Penggunaan Media Video Pembelajaran Terhadap Hasil Belajar Biologi. BIODUSAINS. Jurnal Pembelajaran Biologi dan Sains. 2(1). 2598 -7453

Yossa, Irnaningtyas. 2016. Biologi Untuk MA/MA Kelas XI Kurikulum 2013 Yang Disempurnakan Peminatan Matematika dan Ilmu Pengetahuan Alam. Jakarta. Erlangga

Yuliarsih. 2017. Developing Learning Media Using Audio-Visual For Student Grade VII MTS Miftahul Ihsan. Interaksi. 12(1) : 1-4