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Development e-booklet learning media with the mnemonic method on the material of the motion system

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ABSTRAK

Penelitian ini bertujuan untuk mengembangkan media pembelajaran e-booklet dengan metode mnemonik pada materi sistem gerak untuk mengatasi kesulitan siswa dalam menghafal materi Biologi yang memiliki banyak istilah asing. Penelitian ini menggunakan metode ADDIE yang terdiri dari lima tahap, yaitu analyze, design, develop, implement, dan evaluate. Hasil penelitian menunjukkan bahwa e-booklet yang dikembangkan dinyatakan "Valid" oleh ahli materi maupun ahli media dengan persentase rata-rata berturut-turut adalah 93,3 persen dan 83,75 persen. Respon guru dan siswa terhadap e-booklet yang dikembangkan tergolong "Sangat Praktis" dengan persentase rata-rata berturut-turut adalah 98,75 persen dan 89,62 persen. Hasil belajar kognitif siswa menunjukkan rata-rata perolehan nilai siswa sebesar 92,14. Dan yang memperoleh nilai ≥75 sebanyak 27 siswa sehingga diperoleh persentase ketuntasan sebesar 96,42 persen yang tergolong sangat efektif. Hal ini menunjukkan bahwa media pembelajaran e-booklet efektif digunakan pada materi sistem gerak untuk mempermudah siswa dalam mengingat.

ABSTRACT

This research aims to develop e-booklet learning media with the mnemonic method on the material of the motion system to overcome student's difficulties in memorizing Biology material which contains various foreign terms. This form of study qualifies as research and development (R&D) and employs the ADDIE method which consisted of five stages, namely analyze, design, develop, implementation, and evaluate. The results demonstrate that the developed e-booklet was declared "valid" by material experts and media experts with an average percentage of 93.3 percent and 83.75 percent, respectively. The response of teachers and students to the developed e-booklet is classified as "very practical" with an average percentage of 98.75 percent and 89.62 percent, respectively. The average student score on cognitive learning outcomes was 92.14. Among the participants, 27 students obtained a score of ≥75 were 27 students, thereby resulting in completeness percentage of 96.42 percent, classified as very effective. This indicates that the e-booklet learning media is an effective tool for facilitating memory retention.

INTRODUCTION

In the learning process, students are encouraged to recall and memorize information, then relate the information to everyday life. This is particularly relevant to the Biology learning process which is closely related to everyday life (Marlina et al., 2018). In the context of Biology learning, efforts are needed to make the learning process more optimal so that learning objectives can be achieved optimally. In biology learning, there is movement system material that is difficult for students to understand dur to its broad coverage usage of scientific language or foreign terms. Therefore, it is essential to utilize learning media that is both practical and interesting, as this will make it easier for students to remember the material they have learned. Lack of explanation of the material can make it difficult for students to understand (Sakti, 2021).

Learning activities are insparable from the learning media as a means to achieve learning goals (Amalia, & Setiyawati 2020). One of the most significant challenges in the learning process is the utilization of learning media as a learning resource (Miftah, 2014). In the learning process, optimizing the development of materials or teaching materials can facilitate communication during the learning process. These materials can be referred to as learning media. In teaching material, teachers must innovate in order to facilitate the understanding of the material being taught (Maman, & Rajab 2016).

Learning media is designed to facilitate the stimulation of students' thoughts, interests and desires, thereby promoting effective learning (Sukiman 2018). According to Wahid (2018), media is defined as a tool to improve learning process activities, where the use of media can help convey messages or material content in the learning process. Learning media is used to achieve learning objectives which play a pivotal role in the learning process.

In accordance with the advancement in technology and science, teachers are expected to be able to utilize a variety of learning media by leveraging technology to meet students' learning needs. The use of media in the form of electronic booklets may serve as a solution for students in achieving learning goals. Books in electronic form are considered capable of overcoming some of the limitations of printed books (Asrowi et al., 2019). Using e-books can make learning more interesting and fun (Roslina et al., 2013).

Apart from textbooks, booklets can be used as additional teaching materials for students, for increasing the learning effectiveness (Yudistira et al., 2021). Booklets are compact and lightweight learning media that contain information with appealing illustrations. Booklets can serve as a supplementary learning aid that enhances students' effectiveness in achieving learning objectives (Novianti & Syamsurizal, 2021). Following this definition, booklets can be used as a biology learning medium or as a support for textbooks which are limited in number (Apriyeni et al., 2021). The booklet presented is packaged attractively and includes mnemonic methods in the material. This can improve students' memory and interest in learning.

In the movement system material, there are many scientific names, which necessitate the use of certain methods to facilitate the recall and memorize the movement system material. One such method is the mnemonic method. Students' difficulties in remembering learning material can be overcome by using the mnemonic method. Mnemonics are techniques that can be used to make it easier for someone to remember something. Mnemonic term is derived from the name of the god *mnemosyne*, who was god of memory (Amiryousefi, 2011). Mnemonics refers to the brain's ability to create a series of certain words or abbreviations, facilitating someone to remember something. In essence, mnemonics can be defined as the ability to associate words or ideas through an image (Wahyudi, 2018).

In mnemonics learning, the material is presented in a concise form with simple language, thereby facilitating easier understanding for students. Using mnemonic methods or coding information can make it easier for students to remember information (Saparina et al., 2017). The utilization of the mnemonic method allows the material to be converted into abbreviations by combining words or sequences, with the aim of facilitating the recall of the learning material.

It is anticipated that the utilization of the mnemonic method in conjunction with the booklet will facilitate the recall and comprehension of the lesson material, thereby enabling the attainment of the learning objectives. The booklet is presented in electronic form which can make it easier for students in terms of flexibility as it is accessible via smartphone anytime and

anywhere. With limited time, the use of electronic learning media can represent the material (Pujiasih et al., 2021). Based on the explanation above, it is necessary to design research with the title "Development of e-booklet learning media using the mnemonic method on movement system material".

METHOD

This research is development research or R & D (Research and Development). Development research is aimed at developing an effective product for schools such as teaching and learning materials and media (Gustriani, 2019). The development process was performed following the ADDIE development model which consisted of the Analyze, Design, Development, Implementation and Evaluation stages. Further, this research involved validators (media experts and material experts), biology teachers and class XI students at a high school in the city of Medan, Indonesiatotaling 28 people. Meanwhile, the object of this research was an e-booklet with a mnemonic method on movement system material. The variable of interest in this study is a single variable, namely the development of E-Booklets using the mnemonic method, while the independent variable is e-booklet product development and the dependent variable is student learning outcomes.

A total of five research instruments was employed to measure or assess the developed product. First, material expert validation sheet filled out by a material expert for providing criticism and suggestions for the development of the motion system e-booklet. Second, learning media validation sheet filled out by media experts with the aim of providing criticism and suggestions on the design of the e-booklet product being developed. Third, teacher response sheet filled out by the biology teacher at the school, serving as input material in the form of responses or criticism and suggestions for improving the product. Fourthe, student response sheets filled in by students to see student responses to the use of e-booklet products as alternative learning media, especially regarding movement system material. Fifth, student test instruments. The data collection was performed using 3 techniques, namely interviews, questionnaires and tests.

The data collected from this research comprise of result of validation of media and learning materials as well as teacher and student responses. The garnered data was analyzed using descriptive analysis. Media feasibility data is presented in the form of a 1-4 Likert scale (Table 1), with the following steps.

(a) Give score for each item

Table 1. Booklet validity assessment category

Range	Kategory
4	Very Good
3	Good
2	Pretty Good
1	Not Good

(b) Add up the total score of each validator for all indicators

(c) Provide validity and practicality values with the Formula 1:

$$\text{Eligibility percentage} = \frac{Score\ obtained}{Highest\ score\ total} \text{ x } 100\% \quad (1)$$

The level of E-Booklet product validity category by media experts and material experts are presented in Table 2.

Table 2. Criteria for determining booklet validity levels

Range (%)	Category
25-40	Not valid, can't be use
41-60	Less valid, can be used with many revisions
61-80	Valid enough, can be used with minor revisions
81-100	Valid, can be used without revision

The practicality analysis criteria for teacher and student responses is shown in Table 3.

Table 3. E-booklet practicality criteria

Range	Category
25-40	Less Practical
41-60	Quite Practical
61-80	Practical
81-100	Very Practical

Data analysis of student learning outcomes on the use of E-Booklets was performed using a methodology that involved assigning textual scores to student learning outcomes using a Formula 2 from Jainuri (2021).

$$N = \frac{\sum R}{Highest\ score\ total}\ x\ 100 \quad (2)$$

Note: N = student score; R = student's correct answer

To percentage of effectiveness of using E-Booklet learning media was calculated using the Formula 3 from Jainuri (2021).

$$P = \frac{F}{N}\ x\ 100\% \quad (3)$$

Note: P = percentage of completeness; F = number of students who scored above ≥ 75; N = total number

The criteria for the effectiveness of e-booklet learning media is presented in Table 4.

Table 4. E-booklet effectiveness criteria

Achievement Level	Kategory
90%-100%	Very Effective
75%-89%	Effective
65%-74%	Less Effective
55%-64%	Ineffective
0%-54%	Very Ineffective

Source: (Jainuri, 2021)

RESULT

The development of e-booklet product are in accordance with the ADDIE development model, thereby, the implementation of this research is divided into five stages, as described in the following.

Analyze

The analysis stage was carried out to determine basic needs and the occurring problems. Analysis was carried out by observing directly and conducting pre-research interviews to determine the needs in the learning process that underlie the development of this learning media, as outlined in the 2013 curriculum. The analysis carried out in this stage included curriculum analysis, analysis of student needs, problem analysis, concept analysis, and goal analysis.

The results of observations and interviews suggest that students face difficulty remembering biology material that utilized a significant number of foreign terms or languages, particularly in material related to movement systems. In particular, as many as 80.6% of students had difficulty following learning on movement system material because the materials use numerous foreign terms or languages. Apart from that, there is a diversity of student characters and learning styles wich affects their understanding on learning materials. This becomes an obstacle for teachers in achieving learning objectives. Apart from that, students have difficulty concentrating during learning, thereby impeding remembering learning material. Further, their greater interest in technology media, especially the use of smartphones, has worsen their issue of concentrating in the learning material. In the movement system material, the structure of bones and skeleton, muscles and joints can only be seen through pictures and video illustrations. Accordingly, e-booklets can help provide detailed explanations or descriptions to ease students to remember and master the material using the mnemonic method. Besides, it also provides concise material,

accompanied by certain abbreviations, interesting pictures and videos that enables students in memorizing the material.

The results of these observations serves as a reference for this development research to produce alternative learning media on movement system material to help students to remember and understand the learning material.

Design

The design stage was carried out by designing the initial product according to students needs observed from the analysis results. Media was designed by compiling material and images from various sources, choosing a booklet format, compiling research instruments, and preparing an initial draft.

The material was prepared by identifying relevant sources from journals, books or the internet in accordance with the material to be developed, namely human movement system material. The collection of material was also accompanied by pictures and videos that support the contents of the motion system e-booklet.

Format selection process involved reviewing existing booklet formats and determining the booklet format to be developed. The selection of booklet format align with the research of Prastowo (2014) with some modifications. The process of creating an e-book begins with determining typography, including the layout of text and images, spacing, the suitability of images for the material, and the suitability of the material itself. The price of the content, the combination of yellow and blue with black, dark blue and red writing colors, as well as the size and appeal of the e-booklet. The e-booklet is designed using the classic Montserrat font, with the e-booklet cover title occupying a width of 60 sizels. The font size of the title selection is 16 points, while the booklet content is 12 points with 1.5 spacing.

The research instrument was designed with guidance from the thesis supervisor to determine the suitability of the booklet from the aspects of material, media and instructional design. An instrument for teacher and student responses to the developed booklet were also compailed.

The initial draft is the result of compiling material in a booklet. It was followed by production of a prototype product that is ready to be corrected and revised by supervisors and expert lecturers, as shown in the Figure 1 and 2.

Develop

At the development stage, the product display was designed in the chosen format using the Canva application. It was compiled in pdf form to then be made into an e-booklet using Heyzine Flipbook Maker. Products developed using Canva and Heyzine Flipbook Maker produce displays that are in accordance with the initial planning.

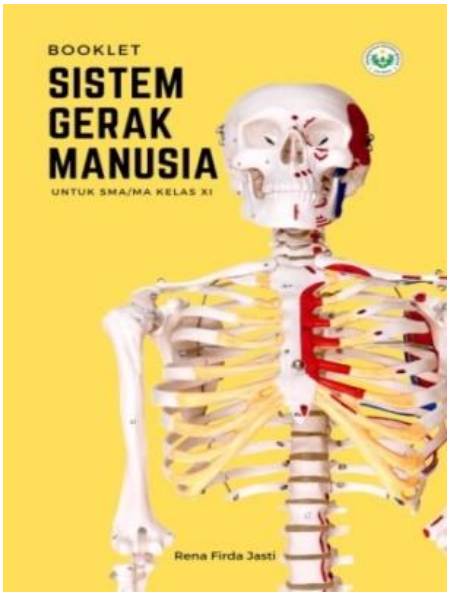

Figure 1. Cover e-booklet

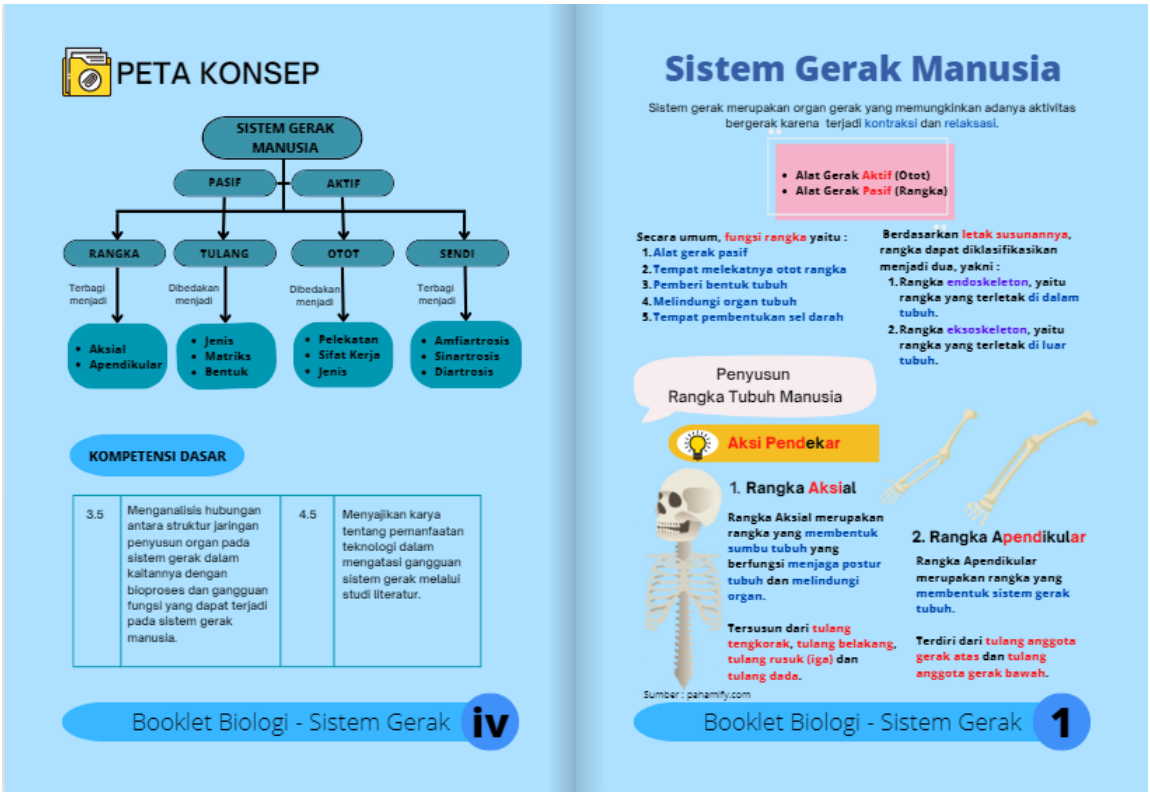

Figure 2. View of e-booklet contents

At the initial product feasibility test stage, the product validity test was carried out to obtain data in the form of validator assessments or suggestions. This test was carried out by involving two validators each, comprising of material experts and media experts. The results of validity test are presented in Table 5.

Table 5. Recapitulation of validation results from all validators

No	Material Expert	Validator percentage	Criteria
1.	Validator 1	91,6%	Valid
2.	Validator 2	95%	Valid
Average		93,3%	Valid
No	**Media Expert**	**Validator percentage**	**Criteria**
1.	Validator 3	87,5%	Valid
2.	Validator 4	80%	Relatively valid
Average		83,75%	Valid
Overall average		88,52%	Valid

Based on the calculation results, the average validation percentage of all validators for the developed e-booklet is 88.52%, which is classified as "Valid". The results of validation by experts were used as a reference for revising the e-booklet.

Implementation

At the implementation stage, trials were carried out in the field. The trial was carried out in two stages, as described in the following.

(a) One-to-one-trial

This one-on-one trial was carried out by inquiring biology teacher from State Senior High School 13 Medan, Indonesia, to fill out a questionnaire concerning the input for the development of the e-booklet. The obtained responses became the basis for the e-booklet evaluation process in the evaluate stage. Statements in the questionnaire items were prepared based on three aspects, namely appropriateness of content, appropriateness of presentation, and appropriateness of

language. Based on the results of score calculations and classification guidelines, teacher responses to the e-booklet developed were classified as "very practical" for use as learning media with a percentage of 98.75%.

(b) Field try-out

In the field trial, the e-booklet learning media product was tested involving 28 eleventh grade students from State Senior High School 13 Medan. Following the administration of product, students were given a questionnaire and a test, consisting of 20 multiple choice questions on motion system material via the link listed in the e-booklet in the form of Google Form. The results of the study are presented in Table 6, which outlines the effectiveness of e-book learning media in facilitating self-directed learning outcomes.

Table 6. Test results

Number	Scores	Relation		Information
		Frequency	Relatively (%)	
1	100	4	14,28%	Complete
2	95	12	42,85%	Complete
3	90	10	35,71%	Complete
4	85	1	3,5%	Complete
5	55	1	3,5%	Not Complete
Total		**28**	**96,42%**	**Complete**

Based on data from Table 6, the average score obtained by students on the movement system material test is 92.14. There are 27 students who got a score of ≥75, resulting in a completion percentage of 96.42% which was classified as "Very effective".

It is crucial to comprehend the student's response to the developed e-booklet considering that this application was developed to assist in the learning process. Student response sheets to the e-booklet was distributed via the link listed in the e-booklet using Google Form. The results of the scoring calculations and classification guidelines indicate that student responses to the e-booklet developed were classified as "very practical" used as learning media with a percentage of 89.62%.

Evaluation

The evaluation stage was carried out to correct errors and deficiencies in the development process of e-booklet learning media. At the product revision stage, improvements were made according to suggestions and input from material experts and media experts. Once the product was declared as valid, the implementation stage was performed. The obtained data, suggestions and input at the implementation stage served as guidelines in perfecting the developede-booklet that has been developed.

The effectiveness of e-booklet learning media is contingent upon students' ability to complete the tests. The effectiveness of learning media was measured from the number of students who attain a score of ≥ 75, or reaching the minimum passing criteria. There were 27 students who got a score of ≥75, resulting in a completion percentage of 96.42%, classified as "Very effective". This shows that e-booklet learning media is effectively used in learning.

DISCUSSION

The results of the analysis become a reference for developing e-booklet learning media using the mnemonic method. The final product aims to aid students to remember learning material, especially the material on human movement systems. The use of learning media can facilitate the learning process, enabling the mediation of learning and the achievement of learning objectives in an effective and efficient manner (Aini & Habibi, 2020). Booklets are one of the recommended teaching materials to be developed because they provide detailed explanations of difficult material or concepts for students (Syamsurizal et al., 2021). The e-booklet contains all the necessary components for students. Booklets can be used as learning media as long as the presentation is derived from the Basic Competencies (KD) that students must master, so the content designed was not excessively complex (Yani et al., 2018). The e-booklet was developed

using the mnemonic method which is arranged in concise material and accompanied by pictures and videos. This e-booklet is also accessible via smartphone. The mnemonic strategy is expected to aid students to remember information. Mnemonics or often referred to as "donkey bridges" are memory aids for remembering information (Emalia et al., 2019). According to Nisak (2017) learning strategies using the mnemonic method can improve memory because it requires imagination in the teaching process so that students are able to truly appreciate the material being taught.

At the design stage, an initial product design (prototype) was carried out in accordance with the results of the analysis and preparation of materials as well as determining the format which produces an initial draft. In the development stage, the appearance of the booklet was designed using Canva according to the specified format. Analicia et al. (2021) posited that visual learning media on human movement systems designed using Canva presents excellent results. The learning media developed using Canva can increase students' enthusiasm for learning and is accessible for online and offline learning. Canva was chosen according to its advantages. As outlined byRahmasari et al. (2021) Canva provides various graphic designs, animations, templates and attractive page numbers. Apart from that, it facilitates flexible design, and the results can be downloaded in various formats.

After being designed using Canva, the results were downloaded in PDF form. Then, the learning media was formed into an e-booklet using Heyzine Flipbook Maker to enhance its ease of use. Heyzine is a free online PDF to flipbook converter website that provides an electronic book effect on every page accessible at anywhere and anytime by sharing the link for free (Rahmawati, 2013). The utilization of Helyzinel facilitates more engaging and interactive learning experiences, eliminating the potential for boredom. One of the key advantages of Helyzinel is its ability to organize books in a manner that is both intuitive and flexible, allowing users to navigate and explore content in a way that suits their individual preferences. In essence, the use of video, audio, text, and images to support the context of the book (Pratiwi et al., 2020).

The effectiveness of learning process by utilizing e-booklet development products with the mnemonic method on movement system material was measured by conducting trials and administering test instruments at the implementation stage. Among the 28 students, 27 students obtained a score of ≥75. Therefore, the obtained percentage of completion is classified as "very effective". This shows that e-booklet learning media with the mnemonic method can be effectively used in learning movement system material.

This research contributes to aid students to remember biological material, especially movement system material. The mnemonic method used by the data helps students remember learning material easily because it uses abbreviations for words and songs. This certainly facilitates teachers to achieve learning goals easily and quickly. As described in the research of (Syamsurizal et al., 2021) that the use of e-booklet learning media on movement system material is recommended because it can explain material or concepts that are difficult for students to remember. The use of booklet media can improve student learning outcomes in the cognitive, affective and psychomotor domains (Rani et al., 2020). Therefore, it can be used as complementary teaching material (Ginting et al., 2022).

CONCLUSION

E-booklet learning media with the mnemonic method on movement system material influences students' ability to remember learning material easily and quickly. This is evident from the completion percentage obtained at 96.42% which is classified as "very effective". This shows that e-booklet learning media has been effectively used in learning. However, the development of e-booklet learning media using the mnemonic method on movement system material has several limitations, including the involvement of expert lecturers consisting of two material experts and two media experts. Product trials were only carried out on a limited basis at one school in Medan. During this process, to see the effectiveness of the e-booklet learning media, students were given a test of 20 questions. Based on the results of the development research, it is concluded that the e-booklet learning media with the mnemonic method on movement system material can be effectively used in the learning process on movement system material.

Author contributions

The authors made significant contributions to the study's conception and design. The authors was in charge of data analysis, interpretation, and discussion of results. The final manuscript was read and approved by the authors.

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The authors declare that there is no potential conflict of interest.

Data availability statement

All data are available from the authors.

REFERENCES

Aini, C.N., & Habibi, M.W. 2020. Development of booklet based science learning media for junior high school. *Integrative Science Education and Teaching Activity Journal, 1*(2), 155-167. https://doi.org/10.21154/insecta.v1i2.2269

Amalia, A., & Setiyawati, D. 2020. Application of pop up book to optimize science learning outcomes. *Indonesian Journal of Integrated Science Education, 2*(2), 143-151. https://dx.doi.org/10/29300/ijisedu.v2i2.3018.

Amiryousefi, M., & Ketabi S. 2011. Mnemonic instruction: a way to boost vocabulary learning and recall. *Journal of Language Teaching And Research, 2*(1), 1798-4769. https://doi.org/10.4304/jltr.2.1.178-182.

Analicia T. & Yogica R. 2021. Visual learning media using *canva* on movement system material. *Jurnal Edutech Undiksha, 9*(2), 260-266. https://doi.org/10.23887/jeu.v9i2.38604.

Apriyeni O. & Gusti U A. 2021. The urgency of developing a booklet on bacterial material for class x sma students. *Journal of Biology Education,* I(1), 23-31. https://doi.org/10.21043/jobe.v4i1.10164.

Asrowi, Hadaya, A., & Hanif, M. 2019. The impact of using the interactive e-book on students learning outcomes. *International Journal of Instruction, 12*(2), 709-722. https://doi.org/10.29333/iji.2019.12245a.

Emalia, E., Juanengsih, & Siregar, S. 2019. The influence of the guided discovery learning model assisted by mnemonic strategies on understanding movement system concepts. *Jurnal Pendidikan Biologi, 12*(2). https://doi.org/10.20961/bioedukasi-uns.v12i2.29806.

Ginting Et Al., 2022. The effectiveness of virus material booklets as teaching material supplements to increase students' interest in learning. *Journal of Biology Education*, *11*(1), 102-107. https://doi.org/10.15294/jbe.v11i1.55085

Gustriani, S. 2019. Research and development (r&d) method as a model design in educational research and its alternatives. *Jurnal Holistik, 11*(1), 12-22.

Jainuri, M., Riyadi, S. & Wiwit, R. 2021. Development of mathematics flash card learning media in mathematics learning. *Jurnal Pendidikan Matematika, 6*(1): 37–44.

Maman, M., & Rajab, A. 2016. The implementation of coperative learning model number heads together (nht) in improving the students ability in reading comprehension. *International of Evaluation And Research in Education*, *5*(2), 174-180. https://doi.org/10.11591/ijere.v5i2.4536.

Marlina, S., Chandra, S. & Cahyani, D. 2018. Development of mathematics flash card learning media in mathematics learning. *Jurnal Ilmu Alam Indonesia, 1*(1), 1–13.

Miftah M. 2014. "Utilization of learning media to improve the quality of student learning. *Jurnal Kwangsan, 2*(1), 1–11. https://doi.org/10.33511/misykat.v3i1.52.

Nisak, U.C. 2017. Validity of integrated video media mnemonics rhymes and songs on human movement system material and its influence on retention of class xi sma students. *Jurnal Unesa, 6*(1).

Novianti, P. & Syamsurizal, S. 2021. Booklet as a supplement to teaching materials on kingdom animalia material for class x sma/ma students. *Jurnal Edutech Undiksha, 9*(1), 225–300. https://doi.org/10.23887/jeu.v9i2.40438.

Prastowo, A. 2014. *Creative Guide To Making Innovative Teaching Materials*. Yogyakarta: Diva Press.

Pratiwi, W., Hidayat, S., & Suherman. 2020. Development e-module based heyzine in the menes cluster. *Jurnal Ilmiah Ilmu Pendidikan, 14*(1), 156-163. https://doi.org/10.31932/ve.v14i1.2173

Pujiasih., Isnaeni, W., & Ridlo, S. 2021. Android-based e-booklet development to train students critical thinking and attitude of caring for environment. *Journal of Innovative Science Education, 10*(1), 95-101. http://journal.unnes.ac.id/sju/index.php/jise.

Rahmasari, E. A., & Yogananti, A. F. 2021. Usability study canva application (study case of design student users). *Andharupa: Jurnal Desain Komunikasi Visual & Multimedia, 7*(1), 165-178. https://doi.org/10.33633/andharupa.v7i01.4292.

Rahmawati, N. L., Sudarmin, S., & Pukan, K. K. (2013). Pengembangan buku saku ipa terpadu bilingual dengan tema bahan kimia dalam kehidupan sebagai bahan ajar di mts. *Unnes Science Education Journal*, *2*(1), 157-164. https://doi.org/10.15294/usej.v2i1.1769

Rani, B. K., Widiyaningrum, P., & Anggraito, Y. U. (2020). Effectiveness of research based booklet media of conventional biotechnology application as a supplement of biotechnology teaching materials in senior high school. *Journal of Innovative Science Education*, *9*(3), 295-300. https://doi.org/10.15294/jise.v8i3.36051

Roslina, N., Fahmy, S., Fariha, Z., Haslinda, N., Yacob, A., Sukinah, N., & Suhana, N. 2013. The effect of e-book on students learning styles a study in Trengganu, Malaysia. In *2013 International Conference On Advanced ICT And Education (ICAICTE-13)* (Pp. 211-214). Atlantis Press. 228-231. https://doi.org/10.2991/icaicte.2013.45.

Sakti, I., & Napsawati. 2021. The developing of learning media using powtoon for junior high school. *Jurnal Pendidikan Fisika, 9*(3), 198-208. https://doi.org/10.26618/jpf.v9i3.5565.

Saparina, S., Setiadi, A.E. & Muldayanti, N.D. 2017. Effectiveness of mnemonic-based pocket books on student retention using the sq3r method in bone sub-material in class xi IPA MAN 2 Pontianak. *Jurnal Bioedukasi, 4*(1), 39–46. https://doi.org/10.29406/521.

Sukiman. 2018. *Development Of Learning Media*. Jakarta: Rajawali Press.

Syamsurizal, S., Syarif, E. A., Darussyamsu, R., Farma, S. A. 2021. Developing human movement system booklet as a biology teaching material supplement for xi grade student. *JPBI (Jurnal Pendidikan Biologi Indonesia), 7*(1), 413-422. https://doi.org/10.22219/jpbi.v7i1.12828.

Wahid, A. 2018. The importance of learning media in improving learning achievement. *Jurnal Pendidikan dan Pemikiran Islam Istiqra'*, *5*(1), 1–11.

Wahyudi, Saman, M., & Patriantoro. 2018. Effectiveness of acrostic type mnemonic techniques in learning indonesian affixation. *Jurnal Pendidikan dan Pembelajaran Khatulistiwa, 7*(1), 1–10. http://dx.doi.org/10.26418/jppk.v7i1.23680.

Yani, A., Muhsyanur., Sahriah., & Haerunnisa. 2018. The effectiveness of the scientific approach with the higher media booklet order thinking against biology learning outcomes of high school students in Wajo Regency. *Journal of Biology Science & Education, 7*(1), 272-282. https://doi.org/10.33477/bs.v7i1.387.

Yudistira, O.K., Syamsurizal, Helendra, & Attifah, Y. 2021. Analysis of the need for development of a human immune system booklet as a supplement for class xi high school biology teaching materials. *Journal for Lesson and Learning Studies, 4*(1), 39–44. https://doi.org/10.21154/insecta.v1i2.2269