



The Bacteria Material E-Pocket Book to Improve Learning Outcomes and Motivation and Curiosity of Class X Students

Enggar Ayu Nugraheni, Aditya Marianti^{1✉}

¹Biology Department, FMIPA, Universitas Negeri Semarang, Indonesia

Article Info

Article History:

Received : January 2022

Accepted : March 2022

Published : August 2022

Keywords:

Learning Media, e-pocket book, bacteria material, learning outcomes, student motivation and curiosity

Abstract

This study aims to produce a valid and effective e-pocket book media development product for bacteria material to improve learning outcomes, motivation, and curiosity of students in class X Mathematics and Natural Sciences. This research uses Research and Development research. The data taken include validity, practicality, and effectiveness (motivation and curiosity and learning outcomes). The data collection technique was carried out by non-test (questionnaire) and tests. Data analysis techniques include validity analysis, practicality analysis, and effectiveness analysis. The e-pocket book was tested at SMA PL Don Bosko Semarang for a small-scale test in one class, namely X MIPA 1 and a large-scale test in 3 classes, namely X MIPA 1, 2, and 3. The results showed that the e-pocket book media was declared very good. Valid, based on the percentage of scores obtained by media and material experts, namely 93% and 85%, with an average of 89%. It is stated to be very practical, based on the acquisition of percentage scores by teachers and students, namely 95% and 90%, with an average of 93%. It was stated that it was effective in increasing students' motivation and curiosity, based on the acquisition of the average score percentage per class $\geq 70\%$, namely X MIPA 1 = 80%, X MIPA 2 = 78%, X MIPA 3 = 79%. The results of the pre and posttests resulted in an average N-gain score for each class of more than 0.30 and less than 0.70, namely X MIPA 1 = 0.47, X MIPA 2 = 0.57, X MIPA 3 = 0.61 scale currently. Based on the results of the study, it can be concluded that the e-pocket book material developed by bacteria is effectively used as a learning media in class X MIPA SMA PL Don Bosko Semarang to improve student learning outcomes, motivation, and curiosity.

© 2022 Universitas Negeri Semarang

✉ Correspondence Address:

D6 Building 1st Floor Jl Raya Sekaran Gunungpati Semarang

E-mail : aditya.marianti.am@mail.unnes.ac.id

p-ISSN 2252-6579

e-ISSN 2540-833X

INTRODUCTION

The success of learning is very dependent on the use of appropriate learning resources, which is being able to achieve learning objectives, like encouraging, attracting attention, and motivating students through learning materials. Based on the statement above, in carrying out their duties as designers and learning managers, teachers are required to have skills in preparing teaching plans and interacting with students, namely managing classes by preparing interesting learning media as learning resources.

The development of science and technology is increasingly innovating the use of media in the learning process. Teachers are required to be able to use the tools or media used in learning and have the skills to make learning media that will be used if the media is not yet in school.

Therefore, we need a tool or learning media as a means of support. In addition to learning through conventional methods or so-called face-to-face (lectures) in the classroom, the use of learning aids or media is an inseparable part. Tools have an important role in the learning process of students. The use of learning media aids can be maximized so that it can make an uninteresting learning atmosphere turn into an interesting one. Currently, there are so many learning media tools created for independent study, but to find the best solution for the tool, so that the learning process becomes effective, practical, efficient, interesting, and interactive and fun is a problem that needs to be solved. Aids or independent learning media in the current era are very much needed during the learning process to make humans who do not depend on the lecture method carried out by formal and non-formal educational institutions.

According to Diva, et al., (2021) in their research entitled *Online Learning in the Covid-19 Pandemic Period*, this pandemic causes all schools to carry out learning activities that are usually face-to-face into online learning. The total results of 95 respondents were obtained from 63 student respondents, 30 high school/vocational students and 2 junior high school students. 58% of respondents admitted that online learning causes students not to have the motivation to learn, causes boredom or boredom because activities are centered at home, there are too many tasks to be done by students and also a lot of material that must be read and understood. 42% of respondents admit that online learning has a positive impact, namely it can foster independent learning for students. Online learning is more learner-centered which causes them to be able to create responsibility and autonomy in learning (learning autonomy). The results of the analysis and survey on solutions to challenges and obstacles in online learning are for educators to make presentations using interesting, easy-to-understand, and concise media.

According to the Big Indonesian Dictionary, a pocket book is a small book that can be stored in a pocket and easy to carry everywhere. Pocket books are included in print media, but print media gets less attention from students because they are less interesting and boring. In the era of online learning, electronic and communication media are factors, especially in the field of education. According to Mahfud (2018) in his research on the use of gadgets to create effective learning, using gadgets can improve students' thinking skills and create interesting and effective learning. Therefore, it is necessary to modify the book format from print to electronic format. Pocket books have been developed through mobile learning electronic applications.

The advantages of electronic pocket books according to the research results of Irawan, et al., (2016) entitled *Making Android-Based Mobile Pocket Book Learning Media Using Adobe Flash Professional CS6 on Business and Energy Materials* are concise presentations of material that can be used on cell phones to make this book practical to carry anywhere and read anytime via cell phone and has student response results stating that the media is very good from the display, readability, and usefulness categories, and is effective in learning with the post-test learning outcomes completeness which is 100% which is classified as very good .

During the Field Experience Practice at SMA Don Bosco Semarang last September 2020, bacteria material was one of the most difficult materials for class X Mathematics and Natural Sciences students, as evidenced by the results of daily test scores from 36 students, only 16 students passed the KKM. The learning process is still limited using PowerPoint media and lectures via zoom. Students feel bored and tired. Based on these problems, a learning media innovation is needed. The e-pocket book is expected to attract students'

attention to have the motivation to learn and foster curiosity and improve learning outcomes in bacterial material. Therefore, the researchers conducted research on the development of an e-pocket book on bacteria material to improve learning outcomes as well as the motivation and curiosity of class X high school students.

RESEARCH METHODS

This type of research uses Research and Development research according to Sugiyono (2017) with the following steps: (1) potency and problems, (2) data collection, (3) product design, 4) design validation, (5) design revision, (6) product trial, (7) product revision, (8) usage trial, (9) product revision, (10) final product. The data taken include validity, practicality, and effectiveness (motivation and curiosity and learning outcomes). The data collection technique was carried out by non-test (questionnaire) and tests. Data analysis techniques include validity analysis, practicality analysis, and effectiveness analysis. The e-pocket book was tested at SMA PL Don Bosko Semarang for a small-scale test in one class, namely X MIPA 1 and a large-scale test in 3 classes, namely X MIPA 1, 2, and 3.

RESULTS & DISCUSSION

Potency and Problem

The results of the field study show that the learning process for class X MIPA still seems one-way. Teachers mostly use the lecture method. Online situations require the learning process to use video conferencing. The media used are zoom, PowerPoint, and worksheets. Learning is carried out within 60 minutes and does not involve students to ask questions or provide questions and discussions. Students are only listeners. After learning is complete, students must work on worksheets with very fast deadlines. This causes students to be bored and there is no motivation to learn to make learning outcomes not in accordance with the target. In online learning, Smartphones are very important to support the learning process, and have not been applied to students. The smartphone has not been used optimally, students use it to play games and open social media.

Media and Material

Product validation is carried out by filling out an assessment questionnaire by media experts and material experts. The results of data collection using data collection instruments, then analyzed using percentage data analysis techniques, after getting each result, then the average is calculated from the results of the media expert and material expert validator. Here are the results of the evaluation of the bacterial material e-pocket media by media experts.

Table 1. Recapitulation of e-pocket book learning media assessment by media experts results.

Aspect	Indicator	Score
A. Programming	Ease of use.	4
	Clear instructions for use.	4
	Media can be used in various places, times and circumstances	4
	Image efficiency.	3
	Media can motivate students to learn independently	3
B. Visual	Font selection.	4
	Font size selection.	4
	Use of line spacing.	4
	Text legibility.	4
	Image display	3
	Image placement.	4
	Layout (layout).	4
	Background color compatibility with text	3
	Consistent presentation between pages.	4
Initial display interest.	4	
Total score obtained		56
Instrument total score		60
Validity Percentage		93%

Based on table 1, the evaluation of the e-pocket book media by media experts, obtained the results, of: 93% with very valid criteria. Meanwhile, the results of the e-pocket book media assessment by material experts are presented in table 4.2 below.

From the percentage of assessment scores obtained by media experts, which is 93%, which means that the e-pocket book media for bacterial material is considered very valid to be applied. The content of the material presented in the form of clear images is obtained through various internet literature studies to attract students' curiosity to learn the material. Archaeobacteria and Eubacteria. The application developed is easy to use by students and the selection of type and size of letters, color harmony, placement of layouts, layouts, and images is right. equipped with supporting material presentations such as titles, table of contents, quizzes, mind mapping, videos, and presentation of problems in everyday life. This is in accordance with the opinion of Haryoko (2009) that the effectiveness of learning through visual media can be seen when students learn (read) illustrated texts. Pictures, symbols, or visual symbols can arouse students' emotions and attitudes.

Table 2. Recapitulation of the results of the e-pocket book learning media assessment by material experts.

Aspect	Indicator	Score
A. The suitability of the material with KD, Indicators and Learning Objectives	The material is in accordance with KD, indicators and learning objectives	3
B. The validity of the material concept	The validity of the concept of material in the e-pocket book media	3
C. Submission of the material in sequence	The material contained in the e-pocket book media is presented systematically.	4
D. The suitability of the image to clarify the material	The images contained in the e-pocket book media can clarify the material	3
E. Language aspect	Use of language according to EYD	4
	The suitability of language with students' thinking level	4
	Ease of text to understand	4
	Accuracy of use of terms	3
	Simple language	4
F. Media benefits	Cultivate students' curiosity	3
	Growing students to have learning motivation	3
	Provide opportunities for students to learn independently	3
Total score obtained		41
Instrument total score		48
Percentage		85%

Based on table 2, it can be seen that the evaluation of the e-pocket book media by material experts, obtained the results of 85% with valid criteria.

From the percentage of assessment scores obtained by material experts, which is 85%, which means that the bacterial material e-pocket book media is considered very valid to be applied and is considered appropriate and meets the material needs, objectives, conditions, and strategies applied according to material and media experts. This is because the material presented in the media is in accordance with competency standards and basic competencies. In addition, the material listed on the media is in accordance with the indicators of learning achievement. The material is presented in a coherent manner from basic concepts to more complex concepts, making it easier for students to understand the essence of the material. The compiled application media also presents issues/conditions that exist around students, so that students are able to relate learning to their surrounding environment.

Based on the acquisition of an assessment score by media experts, which is 93% and by material experts, which is 85%, then the average score percentage for total media assessment is 89%, which means

that the e-pocket book media material for bacteria is considered very valid to be tested. After the media is declared valid by both material experts and media experts, a small-scale trial is carried out.

Analysis of e-pocket book media practicality

The small-scale trial aims to determine the responses of students and teachers, using a questionnaire distributed to students and teachers, regarding the practicality of the e-pocket book learning media for bacteria in increasing motivation and curiosity and student learning outcomes. The results of input and suggestions from students and teachers are used to improve the e-pocket book media before it is tested on a large scale. The following is the result of the practicality assessment score of the e-pocket book by the teacher.

Table 3. Recapitulation of the practicality assessment of e-pocket book media by teachers

Aspect	Indicator	Score
A. The suitability of the material with KD, indicators, and learning objectives	The material is in accordance with KD, indicators, and learning objectives	4
B. Quality	The use of the developed digital e-pocket book fulfills a practical function as a learning medium	4
	Good digital e-pocket book design (clarity of letters, pictures and background)	4
C. Effectiveness	The suitability of the developed media with learning needs	3
	Media can be used in various places, times and circumstances	4
	Media can motivate students to learn independently	3
D. Presentation	The suitability and accuracy of the illustration with the material	4
	Clear instructions for use	4
	Ease of choosing the menu	4
	Ease of use of media	4
	General appearance of interesting e-pocket book media	4
Total score obtained		42
Instrument total score		44
Validity Percentage		95%
Criteria		Very Practical

It can be seen based on table 4.6 that the percentage of assessment is 95% with very practical criteria. These results show that e-pocket books are very practical to use as learning media.

In addition to the practicality assessment by the teacher, a practical assessment by the students is also carried out. The recapitulation of the e-pocket book media practicality assessment by students is presented in table 3

Table 4. Recapitulation of the practical assessment of e-pocket book media by students.

Interval percentage	Criteria	Frequency	Percentage
85%-100%	very practical	21	62%
70%-84%	Practical	13	38%
60-69%	less practical	0	0%
50-59%	impractical	0	0%
Amount		34	100%
Average		90%	
Criteria		very practical	

Then calculated the average of the results of the practicality assessment scores by teachers and students.

Table 5. Recapitulation of the results of the practicality assessment of e-pocket book learning media by teachers and students.

Respondent	Score Percentage
Biology teacher	95%
Student	90%
Total percentage	93%

Based on table 4.8, it can be seen that the percentage score obtained by the teacher is 95% and the student is 90%. By obtaining an average evaluation result of the e-pocket book media, 91%. This shows that the e-pocket book media is included in the very practical criteria so that it can be used in learning. This is because the e-pocket book media is considered to meet the aspects of practicality assessment as a medium for learning biology, especially on bacteria. The media is considered very practical because it fulfills the assessment aspect, especially in the aspect of the suitability of the material with KD, indicators and learning objectives, the quality aspect, namely the e-pocket book fulfills a practical function as a learning medium, the design of the e-pocket book is considered good in the clarity of letters, pictures and background, fulfills the effectiveness aspect, namely the suitability of the media developed with learning needs, the media can be used anytime and anywhere, the media can motivate students to learn independently, then the presentation aspect, namely the illustrations given to the e-pocket book media are appropriate and appropriate with the material, instructions for use clear, the menu is easy to choose, the media is easy to use, and the general appearance of the e-pocket book media is attractive.

Analysis of e-pocket book media effectiveness

The effectiveness of e-pocket book media is measured from the results of increasing motivation and curiosity as well as student learning outcomes after using e-pocket book media in learning. The e-pocket book media is declared effective if the results of increasing motivation and curiosity exceed 70% are in the criteria of increasing and are effective for improving student learning outcomes, if the results of the analysis of the data calculation of the average N-gain score of the pretest and posttest scores of students in the test class try the results of the analysis beyond 0.3 which can be categorized as an increase in student learning outcomes on a medium to high scale.

1. Student Motivation and Curiosity

The field test to determine students' motivation and curiosity was carried out in 3 classes, namely class X MIPA 1 with 34 students, X MIPA 2 with 32 students, and X MIPA 3 with 33 students, with a total of 99 students. The results of the assessment are obtained from student assessments through a questionnaire.

Table 6. Frequency Distribution of Students' Motivation and Curiosity Results

No	Interval Percentage	Criteria	The number of students			Percentage		
			X MIPA	X MIPA	X MIPA	X MIPA	X MIPA	X MIPA
			1	2	3	1	2	3
1	85%-100%	Greatly Improved	8	6	8	24%	19%	24%
2	70%-84%	Improved	26	26	25	76%	81%	76%
3	60%-69%	Improved Enough	0	0	0	0	0	0
4	50-59%	Not Improved	0	0	0	0	0	0

From table 6, it can be seen that the average score is 70% with increasing criteria. The data shows that the results of students' motivation and curiosity increase. This means that e-pocket books can increase motivation and curiosity.

Based on this score, the media is considered to be improving, because all aspects of the assessment are almost fulfilled. This is because students are more enthusiastic about the learning media. Students are more enthusiastic in learning and motivated to study independently because the e-pocket book media

provides summaries and important points on bacterial material. The attractive appearance design of the e-pocket book, equipped with many pictures, and concise makes students more motivated and enthusiastic to learn. This is in line with the opinion expressed by Asrullah, et al., (2019) that professional teachers should have skills and knowledge that are constantly being developed by utilizing available technological resources such as computers or smartphones in order to be able to apply learning media in accordance with the times and developments. accepted by students, so that students feel more enthusiastic about learning.

2. Student Learning Outcomes

Field tests to determine student learning outcomes were also carried out in 3 classes, namely class X MIPA 1 totaling 34 students, X MIPA 2 totaling 32 students, and X MIPA 3 totaling 33 students, with a total of 99 students. Student learning outcomes were analyzed by calculating the average N-gain score data from the pretest and posttest scores of the test class students.

Table 7. Recapitulation of Student Learning Results

No.	N-gain	Criteria	The number of students			Percentage		
			X MIPA 1	X MIPA 2	X MIPA 3	X MIPA 1	X MIPA 2	X MIPA 3
1	$N_gain > 0,70$	High N-gain	4	7	11	12%	22%	33%
2	$0,30 \leq N_gain \leq 0,70$	Medium N-gain	21	23	20	62%	72%	61%
3	$N_gain < 0,30$	Low N-gain	9	2	2	26%	6%	6%

In table 7 we can see that the average N-gain score of more than 0.30 and less than 0.70 can be categorized as moderate, after treatment using e-pocket book media there was an increase in moderate-scale student learning outcomes. Based on this, it can be concluded that the use of e-pocket book media for bacteria material in Biology subjects can improve medium-scale learning outcomes.

The use of e-pocket books can improve learning outcomes because the content of the material in the media is easy to understand and very concise so that it helps students to understand the concept of bacterial material. It is supported by many pictures and illustrations, then videos and additional information that can be accessed on the internet, as well as the presentation of exploratory activities related to everyday life. In addition, the e-pocket book media that is run using this smartphone provides a lot of convenience for students to learn. Reinforced by Suherman's statement (2019), Smartphones are able to make one of the interesting learning media, because students can learn biology material in different ways, namely using cellphones as a learning resource. In addition to making learning more fun, students can learn material that is not limited by time, meaning that students can study outside of learning hours, so that it can have a positive impact on students using cellphones/smartphones as a learning tool. The use of mobile learning has many advantages, this is conveyed by Tamimuddin in Sari (2018) some of the advantages of m-Learning compared to other learning media are 1) Can be used anywhere at any time 2) Learning outcomes increase 3) Small device size and light and easy to carry.

CONCLUSION

Based on the results of the study it can be concluded that:

1. The bacteria e-pocket book media was declared very valid by media experts and material experts.
2. Bacteria e-pocket book media to improve learning outcomes as well as the motivation and curiosity of class X high school students are stated to be very practical by teachers and students.
3. The bacteria e-pocket book for class X SMA students is effective in improving learning outcomes, motivation and curiosity, on a moderate scale.

REFERENCES

- Abdullah, R. (2017). Urgensi penilaian hasil belajar berbasis kelas mata pelajaran IPS di madrasah tsanawiyah. *Lantanida Journal*, 3(2), 168-181.
- Adam, S., & Syastra, M.T. (2015). Pemanfaatan Media Pembelajaran Berbasis Teknologi Informasi Bagi Siswa Kelas X Sma Ananda Batam. *CBIS Journal*, 3(2), 78-90.
- Asfuriyah, S., & Nuswawati, M. (2015). Pengembangan Majalah Sains Berbasis Contextual Learning Pada Tema Pemanasan Global Untuk Meningkatkan Minat Belajar Siswa. *Unnes Science Education Journal*, 4(1), 739-746
- Irawan, B., I., Musthofa, J. A., & Iriyanto, M. Y. (2016). "Pembuatan Media Pembelajaran Mobile Pocket Book Berbasis Android Menggunakan Adobe Flash Professional CS6 Pada Materi Usaha Dan Energi. *Seminar Nasional Pendidikan dan Saintek*, 683-688
- Mahfud, M., & Aprilya, W. (2018). "Penggunaan Gadget Untuk Menciptakan Pembelajaran yang Efektif." *Seminar Nasional Pendidikan 2018*.58-63
- Nurjanah, J. R., Sukarmin, S., & Rahardjo, D. T. (2014). Pengembangan Media Pembelajaran Interaktif E-Magazine Pada Materi Pokok Dinamika Rotasi untuk SMA Kelas XI. *Jurnal Materi dan Pembelajaran Fisika*, 4(1), 18-25.
- Permendikbud Nomor 104 Tahun (2014) tentang Penilaian Hasil Belajar Oleh Pendidik Pada Pendidikan Dasar dan Pendidikan Menengah.
- Sari, W. M., Riswanto, R., & Partono, P. (2019). Validitas mobile pocket book berbasis android menggunakan adobe flash pada materi suhu dan kalor. *Berkala Ilmiah Pendidikan Fisika*, 7(1), 35-42.
- Sugiyono. (2015). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung : Alfabeta.
- Sugiyono. (2017). *Metode Penelitian Kuantitatif, Kualitatif dan R&D*. Bandung : Alfabeta.
- Sulistiyani, N. H. D., Jamruzi, & Dwi, T., R. (2013). Perbedaan Hasil Belajar Siswa Antara Menggunakan Media Pocket Book dan Tanpa Pocket Book pada Materi Kinematika Gerak Melingkar Kelas X. *Jurnal Pendidikan Fisika*, 1(1), 164.
- Suratman, A., Afyaman, D., & Rakhmasari, R. (2019). Pembelajaran berbasis TIK terhadap hasil belajar matematika dan motivasi belajar matematika siswa. *Jurnal Analisa*, 5(1), 41-50.
- Susanto, A. (2015). *Teori Belajar Dan Pembelajaran Disekolah Dasar*. Jakarta: Prenada Media.
- Susanto, J. (2012). Pengembangan Perangkat Pembelajaran Berbasis Lesson Study dengan Kooperatif Tipe Numbered Heads Together. *Journal of Primary Educational*, 1(2), 71-77
- Syafi'i, M.T., & Rodiyah, S. K. (2018). Studi tentang prestasi belajar siswa dalam berbagai aspek dan faktor yang mempengaruhi. *Jurnal Komunikasi Pendidikan*, 2(2), 115-123.
- Yunianto, T., Suyadi, S., & Suherman, S. (2020). Pembelajaran abad 21: Pengaruhnya terhadap pembentukan karakter akhlak melalui pembelajaran STAD dan PBL dalam kurikulum 2013. *Premiere Educandum: Jurnal Pendidikan Dasar Dan Pembelajaran*, 10(2), 203- 214.