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REVIEW

The emerging of digital revolution: A literature review study of mobile and android based e-pocket book in physics learning

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Abstract: The elaboration of the education sector as one of the main pillars for the progress of the nation's next generation and the digitalization of technology need to adjust to the times so as not to be left behind both in the field of education technology and the learner curriculum compared to developed countries. However, using the digital pocketbook in Physics learning boosts academic motivation, literacy ability, and student learning achievements. This study summarizes several literature reviews on the advantages, practical implementation, limitations, and opportunities of using the digital pocketbook in Physics learning. This research uses literature study methods with qualitative descriptive analysis. According to the literature study results, we developed and implemented an e-pocket book in Physics learning, proven to improve student learning outcomes. These e-pocket books can be one of the alternative learning media that attract the interest and attention of the students. Therefore, teachers could develop or implement the e-pocket book in Physics learning with further learning models to support the digital revolution.

Keywords: 5.0 Society, educational media, electronic book, M-learning environment, natural science, phone-based learning, technology-based teaching

1 Introduction

The digital world has become "critical" to today's society, but perhaps more should be addressed to realize its democratizing possibilities (Brody et al., 2018; Hantrais et al., 2021). Digitalization of technology with the help of online-based machines has become very dominant in connectivity between people in various parts of the world (Antoniadi, 2023; Skaraki, 2023; Sholekah et al., 2022). New digital technologies at pace and scale, its open application in some sectors prompted legal, social, and security problems, along with increasing threats for underprivileged groups (Budd et al., 2020; Marabelli et al., 2021; Mumtaz et al., 2021). The education sector is one of the main pillars for the progress of the nation's next generation (Abu-Alruz et al., 2018; Dhahri & Omri, 2018; Agbedahin, 2019; Catal & Tekinerdogan, 2019; Mensah, 2019; Pradana et al., 2021), also needs to adjust to the times so as not to be left behind both in the field of education technology and the learner curriculum compared to developed countries (De La Cruz et al., 2023; Dito & Pujiastuti, 2021).

However, the use of mobile technology in education has increased—especially the use of the digital pocketbook in Physics learning (Papadakis et al., 2023). Pocketbooks can boost academic motivation, literacy ability, and student learning achievements (Nurmala et al., 2019; Majid et al., 2020). In the development of Bakri et al. (2021), the Android-based Pocket Book device is simple and easy to use. The Android-based Pocket Book may be viewed anytime and from anywhere (Yaqin & Rochmawati, 2017; Haque & Kurniawan, 2021; Jannah & Hashanah, 2021). Developing e-pocket books can be an opportunity to develop teaching media in classroom learning (Drolia et al., 2020; Yirci et al., 2016), especially in Physics subjects. In previous research, much research was trying to develop e-pocket books and their implementation in each educational form (Yaqin & Rochmawati, 2017).

This research was conducted because there still needs to be more previous research on a literature review of digital pocketbooks, especially in physics learning. Thus, it cannot be known in detail and as literature support for using digital pocketbooks in physics learning (Bakri et al., 2021). Ulfiyatul & Kustijono (2019) research analyzed the mobile pocketbook's effectiveness, but not specifically in Physics. Furthermore, Nugraheni & Marianti (2022) and Saputra et al. (2018) recommend conducting further research related to the e-pocket book, either Android-based or mobile-based, in learning aside from Biology and Mathematics subjects (Zourmpakis et al., 2023). However, the author wants to provide an analysis related to the

advantages, disadvantages, opportunities, novelties, development, and implementation of the use of digital pocketbooks in physics learning in schools and specific academic units, which can serve as literature support for further research that will develop related e-pocket books in physics learning (Zourmpakis et al., 2022). Thus, future research has a clear picture regarding using e-pocket books in physics learning regarding strengths, weaknesses, deficiencies, development, and other recommended things. Thus, this study summarized several literature reviews that provide the advantages, practical implementation, limitations, and opportunities of using the digital pocketbook in Physics learning.

2 Methods

This qualitative descriptive study uses data-gathering procedures based on the library research method. The first library research collected 40 articles related to e-pocket books. Then, the article was reduced to 30 articles relevant to the e-pocket book to Physics subjects. This research produces descriptive analysis in a series of written sentences. According to Miles and Huberman (Sugiyono, 2017), the analysis stages for qualitative research are generally depicted in Figure 1.

Qualitative data analysis includes four stages (Suliyanah et al., 2021), namely (1) Data collection is obtaining data from various trusted sources to obtain the required information that supports the ability of research objectives; (2) Data reduction is sorting out important things focused on the needs of the author to facilitate obtaining the desired data in line with the research objectives (Sovacool et al., 2018; Shafi et al., 2020). The data reduction is conducted by filtering to a specific title or keyword. The authors filter manually to the most relevant papers; (3) Presentation of data is the exposure of research data which is generally in the form of short descriptions, charts, relationships between subjects, and so on for qualitative research types (Bauer & Scheim, 2019); (4) Conclusion and verification are the final results obtained after conducting a series of previous processes to attract new findings for the study's purpose.

3 Results

The literature review results of 30 papers on using and developing e-pocket books in Physics learning can be seen in Table 1. The table shows 30 results of journal reviews that contain findings and recommendations of the research.

Table 1 Active components of herb pairs

No.	Author(s)	Findings	Recommendation(s)
1	(Reza, 2017)	Learning media applications in the form of digital pocketbooks based on Android, motion, and style teaching materials are developed through the waterfall model through the four stages of needs analysis, design, implementation (application development), and testing.	Teachers can apply Android-based digital pocketbooks as an alternative learning media so students do not feel bored. This research proves that students' responses to Android-based digital pocketbooks teaching materials of motion and style are categorized as feasible. It is hoped that the Android-based learning media application will be applied to learning media. Further research will be better if it is not only limited to motion and force material but is also expected to discuss other materials.
2	(Irwandani et al., 2017)	Based on the results and discussion, it can be concluded that: 1) This research produced a product in the form of an Articulate Studio'13-Based Interactive Digital Module on circular motion material for grade X SHS; 2) Quality and feasibility according to experts, namely very feasible from the results of validation of the format of the material with an average percentage score of 80.4%, the percentage of media experts is 82.85% according to expert practitioners 84.1%; 3) Student response to the attractiveness of the module is fascinating with an average percentage of small scale and large scale respectively obtaining an average score of 84.40% and 85.00%	As for suggestions for further research, namely: 1) R & D needs to be followed up again for research in the field of developing even better teaching materials; 2) The developed Articulate Studio'13-Based Interactive Digital Module can be used in schools as learning support so that it is useful; 3) Articulate Studio'13-Based Interactive Digital Module which was developed only on circular motion material for grade X SHS then needs to be further developed for other materials with more varied content.
3	(Widodo & Wiyatmo, 2017)	Based on the analysis of the research results, this research can be concluded as follows: 1. The Android-based digital pocketbook application developed is suitable for use in physics learning. This was assessed from the results of the CVI validator of 1, and the results of the students' responses got excellent results. 2. Increasing students' learning interest in the limited and operational tests has a common gain value of 0.475 (medium) and 0.649 (moderate). 3. Increasing student learning outcomes in the limited and operational tests have a common gain value of 0.734 (high) and 0.876 (high).	Suggestions for improving development research for advanced stages are as follows 1. Researchers must develop a digital pocketbook learning media application with an operating system other than the Android operating system 2. For teachers, it is necessary to develop a digital pocketbook application with other materials that will make learning more enjoyable. 3. For researchers, it needs to be made online so that the questions in the application can be updated. 4. For researchers, to get more accurate results about the effect of the application on students, product testing must be carried out in several classes and schools
4	(Sairi, 2018)	Product development is carried out through several stages: defining, designing, developing, and deploying. The definition stage is obtained from the curriculum analysis, concept analysis, needs analysis, and student analysis. From this defining activity, an android-oriented thermodynamics pocketbook (media) was determined as a teaching material to be developed and continued to the product design stage. This design stage is carried out per the rules and structure of the textbook but is oriented to the Android system. This android-oriented thermodynamics pocket book (e-media) consists of a main page. This menu page replaces the table of contents page in the book, materials pages, and a bibliography page.	The author suggests that in implementing this Android-oriented thermodynamics pocket book (e-media), lecturers should allow students to use smartphones when lecture activities are carried out because the products developed use applications that can only be opened on smartphones with Android OS. Then the lecturer should consider the allocation of time in lecture activities so that every activity made and planned can be carried out correctly. In addition, advanced researchers are expected to be able to carry out product development on materials or even on different subjects to obtain even better results. In addition, it can be used as another option in choosing teaching materials in the future.

5	(Mikraj et al., 2019)	The results of the research and discussion that have been disclosed in the previous section, it can be concluded that there is a significant influence on the physics learning outcomes of experimental class students by using a physics bulletin in the form of a pocketbook with the control class using conventional learning models in grade X students at MAN 2 Bima Tahun Lesson 2018/2019.	Based on the conclusions above, it can be suggested as follows: 1. For students, the results of this study can improve student learning outcomes in studying physics subjects. 2. For teachers, as a reference for teachers who want to implement formal learning in the teaching and learning process in physics education. 3. For schools, the results of this study can make an excellent contribution to improving learning in schools, especially in physics education. In addition, schools can provide recommendations to other teachers to implement educational learning.
6	(Mulhayatiah et al., 2019)	The findings revealed that learning implementation was classed as excellent, and there were disparities in the problem-solving skills of the two groups of learners. This demonstrates that Pocket Book, based on Android, may increase students' problem-solving ability in optical instrumentation.	The Pocket Book based on Android in optical materials can be implemented in other institutions and add other variables to further research.
7	(Noviatika et al., 2019)	This problem-based learning model, assisted by the mobile physics pocketbook, can be applied to improve students' physics problem-solving abilities by paying attention to several things, namely setting the time allocation as best as possible so that each stage of learning can take place optimally.	Before learning is carried out, the media must be ensured that it is correctly installed on the smartphone of each student so that it does not reduce the time during the learning process. A conducive classroom atmosphere also plays an active role in stimulating students' creativity.
8	(Perdana et al., 2019)	The conclusion obtained in this study is that the learning media for the Android Pocket Book application that has been developed has tested its validity. The media developed is suitable for learning physics on static electricity. According to the design expert's assessment, a score of 3.61 was obtained, the material expert received a score of 3.50, and the practitioner's test received a score of 3.09, with the category suitable for use. Then the attractiveness test obtained a score of 3.36 with an exciting category, ease obtained a score of 3.40 with a specific category, and expediency obtained a score of 3.53 with a beneficial category.	Future research needs to compile material and videos by reducing the size of the save so that the size of the final application is not too large so that it can run smoothly on smartphones with low storage capacity specifications.
9	(Ulfiyatul & Kustijono, 2019)	Based on the study's results, using an Android-based pocketbook application in the teaching and learning process effectively trains students' critical thinking skills. Critical thinking, referred to here, is interpreting, analyzing, evaluating, concluding, and explaining. The definition of critical thinking according to researchers and the definitions from several journals differ, thus allowing inaccuracies in research results.	The android-based learning pocketbook can be implemented in schools and other institutional and educational fields.
10	(Robiyanto & Dwikoranto, 2019)	The practicality of learning media is based on the implementation results and constraints in the learning process using the Android pocketbook media; the criteria are 'very good.' These results indicate that the developed Android Pocket Book learning media can be feasible based on the practicality of the tool. The effectiveness of learning media is based on the pretest and posttest scores of students using the gain/n-gain normality test to obtain the results of the average criterion of 'moderate,' while based on the results of the questionnaire, the responses of students are of the 'very good' criteria. Based on the analysis and discussion of the research data obtained, the validity of the Android-based interactive learning media that has been developed is a very valid criterion.	Media has been considered feasible to be applied in the learning process. also, it can be implemented in other schools and add more variables to further research
11	(Sari et al., 2019)	The mobile pocketbook is valid because it meets four eligibility criteria for learning media: software engineering, visual communication, learning design, and instructional quality. Based on the average of the three percentage aspects, it is concluded that the mobile pocketbook has very valid criteria to be used in learning activities. Meanwhile, in terms of student response, they received an excellent response that fulfilled the aspects of practicality, usability, and design that attracted the attention of users or students.	As for suggestions for users and further research, research and development needs to be followed up again for research in the field of developing even better teaching materials
12	(Larasyati et al., 2020)	The android-based learning pocketbook developed in this study is categorized as suitable for learning.	The android-based learning pocketbook can be implemented in other schools, adding more variables to further research.
13	(Kholiq, 2020)	This signifies that after studying with BDF-AR2, learners could read. The BDF-AR2 that has been built can be utilized to promote physics education and teach learners science understanding, particularly in the context of global warming.	These results are interpreted to deliver government-promised multimedia that promotes 21st education.
14	(Apriliyani & Hidayati, 2020)	The findings of this study result in a pocketbook (handout) that uses barcodes to teach learners digital skills on environmental pollution content.	Thorough research in pocketbook (handout) utilizing a barcode in environmental degradation to train digital abilities of grade VII JHS has shown various recommendations that will be useful again for further pocketbook studies with new themes, offer additional world exhaustive web information to education in literacy to ease classes get the details, and become used to refer each assignment constantly.
15	(Fatmi & Hadiya, 2020)	Based on the research that has been carried out, it is concluded that the pocketbook that has been developed has a decent quality for use in learning that is oriented towards improving students' generic science skills if it is equipped with a worksheet containing mini research steps and a column for each result obtained from the learning step. implemented	The suggestions for further research are to research students' understanding of environmental physics material presented in pocketbooks and to make more in-depth observations of student activities (mini-research activities) to assess students' generic skills (SGS) on each SGS indicator.
16	(Sulistri et al., 2020)	The ethnoscience-based digital pocketbook on heat and its displacement material generated fulfilled the valid category and was eligible for use in scientific literacy at Singkawang City primary schools. The employment of ethnoscience-based digital pocketbooks in science learning can also successfully increase the capacity of fifth-grade primary school children in the subject aspect with the medium range on the four components of scientific literacy.	Furthermore, this study may be utilized as a model for generating comparable textbooks with various variables based on the characteristics of the necessary skills to be acquired, not just in fifth-grade primary school children but also at higher stages of education.
17	(Bakri et al., 2021)	Professionals use a reliable and valid four-scale tool to evaluate the viability of the topic, instructional materials, and application. Short materials, instructional videos, sample questions, and interactive evaluation concerns are arranged in a mind map format in the Android-based pocketbook. The final pocketbook was judged practical as a platform for confidently learning physics based on computer programming, multimedia, and instructional content characteristics.	The Android-based pocketbook needs implementation by the relevant educational institution to provide the product's effectiveness to the school. Hence, further research can use the Andorid-based Pocketbook in the learning process.
18	(Bani & Masruddin, 2021)	The results showed that this program was effectively produced and could be utilized as a physics instructional tool. The Android-based Harmonic Oscillation Pocket Book proved helpful in improving students' cognitive academic achievement, and pupils liked the app.	The Android-based Harmonic Oscillation Pocket Book can be implemented in other schools and add more variables to further research.
19	(Rosdiana & Kholiq, 2021)	As a result, these digitized graphics were appropriate for usage as a tool to enhance online courses and successfully provide content.	This study's implications will aid in the learning and teaching process from home or at School from Home (SFH) throughout the outbreak and are likely to be further explored in future research.

20	(Samala et al., 2021)	An E-job sheet built on a digital pocketbook designed as an extra instructional tool for basic programming and algorithmic courses got total validation analysis results within a legitimate category, with such a learner reaction to the E-job sheet in the responses area being excellent.	The E-job sheet pocketbook can be implemented in other schools, adding more variables to further research.
21	(Anita et al., 2021)	STEM-based digital pocketbooks on students' problem-solving abilities are learning media that have a feasible and exciting category so that they can be applied to students.	STEM-based digital pocketbooks have also been considered feasible for the learning process. It can be implemented in other schools and add more variables to further research
22	(Dewi et al., 2021)	The conclusions from this study are (1) the procedure for developing electronic learning modules consists of the preparation, manufacturing, and completion stages. (2) It is considered very good based on validating experts and reviewers and assessing the developed electronic learning module. The mean scores for each are as follows: expert validation 153, reviewer validation 159, student assessment 172, one-to-one trials 86.1%, small group trials 100%, and field trials 91.2%.	The researchers' suggestions from the results of the development of the developed electronic learning modules are (1) the developed electronic learning modules can be used as physics learning media in the subject of Equilibrium and Rotational Dynamics, (2) similar electronic learning modules can be developed with other materials
23	(Hardila et al., 2021)	Based on these results, it was concluded that the Android-based physics learning application is valid and practical to be used as an independent learning media for students and as a teacher learning media.	For other researchers, it is hoped that there will be further research to add an attractive appearance to the application and reach the effectiveness stage.
24	(Bakri et al., 2021)	The creation of the physics pocket book 'Physics in Pocket,' complete with QR-Code, is appropriate to be utilized in high school Physics grade X. Beyond school hours, students can utilize it for individual learning. This pocketbook's content is briefer, but there includes photos, visuals, and audio-visual media to assist pupils in grasping the information. Audio-visual media is put into the QR-Code in the video format and animated. The pocketbook's content can stimulate children to learn, positively influencing learning results.	Furthermore, this study may be utilized as a model for generating comparable textbooks with various variables based on the characteristics of the necessary skills to be acquired.
25	(Rahmandita et al., 2021)	As a result, the pocket book of Newton's law material on Physics for class X senior high school students agrees with the relevant curriculum. It may be used as an instructional tool for learning Physics.	Furthermore, this study may be utilized as a model for generating comparable textbooks with varied variables based on the characteristics of the necessary skills to be acquired
26	(Yanti et al., 2022)	The findings demonstrated that the development of a digital-based physics pocketbook with such rapid topic modelling was acceptable and usable by JHS students.	The pocketbook's efficacy still needs to be evaluated. As a result, the research findings need to include the findings of an exhaustive evaluation of the usage of physics pocketbooks.
27	(Aditia, 2022)	This research demonstrates that the designed inquiry-based digital pocket book is required to increase the scientific literacy of Toroh District sixth-grade primary school pupils. This suggests that instructors seek and create the learning material required to improve learning results while instilling character education. The article's inquiry-based digital pocketbook is appropriate for improving pupils' scientific literacy abilities.	This study suggests that instructors may identify and create the learning media required to enhance learning goals by meeting learning objectives and promoting character education. Furthermore, this study may be utilized as a model for generating comparable textbooks with various variables based on the characteristics of the necessary skills to be acquired, not just in grade VI primary school but also at higher stages of education.
28	(Wulandari et al., 2022)	Based on the percentage results obtained from experts, teachers, and students, and based on an increase in the average value of students, it was found that the android-based pocket book teaching material product in the form of this application is included in the very good category. This product is suitable for teaching material in learning science material properties of light grade IV elementary school.	Furthermore, this study may be utilized as a model for generating comparable textbooks with various variables based on the characteristics of the necessary skills to be acquired, not just in fourth-grade primary school children but also at higher stages of education.
29	(Yanti & Fauzi, 2022)	Based on the results of the research and discussion, it can be concluded that: 1) the SHS Physics e-book integrated with earthquake material based on problem-based learning effectively increases the competence of students' responsiveness to earthquake disasters in the physics learning process with a very good category; 2) SHS Physics e-book integrated with earthquake materials based on problem-based learning models effectively improves students' knowledge competence with an N-gain score in the high category); 3) the SHS Physics e-book integrated with earthquake material based on the problem-based learning model effectively increases the competence of students' skills in the physics learning process in the very good category.	The SHS Physics e-book integrated with earthquake material based on problem-based learning effectively be applied in the learning process. Also, it can be implemented in other schools and add more variables to further research.
30	(Khair & Fauzi, 2022)	The conclusion obtained is that the physics e-book is integrated with earthquake material with an effective research-based learning model to increase attitude competence with a score of 64% in the good category, knowledge with a score of 93% in the high category, and student skills with a score of 92% in the high category.	For other researchers, it is hoped that there will be further research to add an attractive appearance to the application and reach the effectiveness stage.

4 Discussion

Based on Table 1, we agree that e-pocket books in physics learning can be used as a source of learning for students. The analysis mentions that developing digital pocketbooks in either Android-based or mobile-based physics learning improves student learning outcomes. These e-pocket books can be one of the alternative learning media that attract the interest and attention of the students. In line with Saputra et al. (2018) research, using e-pocket books is proven to increase the strengthening of concepts in learning. However, one of the ways to attract learners' attention in learning is by using innovative learning media and, as much as possible similar to what is in our everyday life (Tamrin et al., 2017; Puspitarini & Hanif, 2019; Iivari et al., 2020; Andriyani & Suniasih, 2021). Furthermore, the advantages of the emerging e-pocket book in the educational environment are likely in Figure 1.

Learning media development must improve learners' understanding of where it must represent interested learning (Kalogiannakis & Papadakis, 2017; Karakose & Malkoc, 2021). Learning development through mobile and Android-based can improve students' motivation (Anita et al., 2021), learning outcomes such as problem-solving ability (Mulhayatiah, 2019) and critical thinking (Ulfiyatul & Kustijono, 2019), and concept understanding (Kholiq, 2020; Bani & Masruddin, 2021). The application of e-pocket book media has advantages related to the flexibility of learners to playback the presented learning any time and anywhere. Nonetheless, there are main obstacles when using ICT-based learning media, such as inadequate devices,

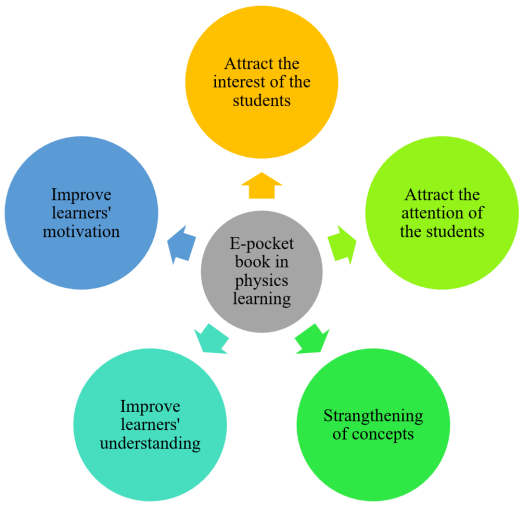

Figure 1 The advantages of the emerging e-pocket book in physics learning

lack of digital technology, and a less stable internet network (Asiimwe et al., 2017; Lavidas et al., 2022; Lawrence & Tar, 2018; Ngao et al., 2022; Warioba et al., 2022). Furthermore, the learning model should be student-oriented so the students can seek their knowledge through the used learning media (Papadakis, 2023). Therefore, both teachers and students must be capable of using information technology so that the learning process can run well.

5 Limitation – Novelties forthcoming research

This study has a limitation in the article's sources that have been identified, which only provides by Google Scholar and Scopus. In addition, the literature review results are limited to the Physics field, ranging from primary education to higher education. Nonetheless, this research is essential as a reference for teachers in developing or implementing the e-pocket book as learning media in Physics subjects. The level of education greatly influences the determination of the learning models and media use. Recommendations are submitted to the next researcher to conduct a more specific literature review on the type of learning model or the other learning subject, education level, and curriculum used.

6 Conclusions

According to the literature study results, researchers developed and implemented e-pocket books in Physics learning, which have proven to improve student learning outcomes. These e-pocket books can be one of the alternative learning media that attract the interest and attention of the students. Therefore, teachers could develop or implement the e-pocket book in Physics learning with further learning models to support the digital revolution. This study has a limitation in the article's sources that have been identified, which only provides by Google Scholar and Scopus. In addition, the literature review results are limited to the Physics field, ranging from primary education to higher education. The level of education greatly influences the determination of the learning models and media use. Recommendations are submitted to the next researcher to conduct a more specific literature review on the type of learning model or the other learning subject, education level, and curriculum used.

Conflict of interest and funding

There is no conflict of interest.

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