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Trends in the Development of Interactive Flipbooks in Physics Learning in the 2014-2024 Time Range: Literature Review

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ABSTRACT: The history of developing a research topic is significant to study at the beginning of the research. This will assist researchers in shaping current field exploration and future research. This research examines the development trend of using interactive flipbooks in physics learning over the last decade (2014-2024). Through a literature review method from various academic sources, both national and international journals, this article will explore various studies conducted regarding the use of interactive flipbooks in physics learning and the learning theories that underlie the use of interactive flipbooks. The study results found that interactive flipbooks have experienced a significant increase in their use at various levels of physics learning, especially in increasing concept understanding, student involvement, and learning effectiveness. In addition, this literature review also shows a significant increase in the adoption of interactive flipbooks driven by technological advances and the need for more exciting and interactive learning methods. The conclusion is that the development of interactive flipbooks in physics learning has been very significant in the last five years. However, no use of interactive flipbooks has been found in modern physics lectures at the university level.

KEYWORDS: Development trends, Interactive flipbook, Interactive learning, Literature review, Literature review, Physics learning

INTRODUCTION

In the digital era, information and communication technology development has significantly impacted various aspects of life, including education (1,2). Education has significantly transformed in the last ten years by integrating digital technology into the learning process (3). One of the innovations that emerged from this development is the interactive flipbook, a learning medium that combines visual, audio, and interactive elements to convey material more interestingly and effectively. An interactive flipbook is a digital version of a printed book that allows users to turn pages virtually and integrate with the content through various features such as videos, animations, quizzes, and interactive links (4). The advantage of interactive flipbooks lies in their ability to present complex material in a way that is easier to understand and increases student involvement and motivation in the learning process (5). In physics learning contests, interactive flipbooks offer innovative solutions to overcome challenges often faced by educators, such as difficulties in explaining abstract concepts and students' lack of interest in material that is considered problematic. The use of interactive flipbooks allows educators to present physics concepts visually and interactively, thereby facilitating understanding and increasing the attractiveness of the material for students (6).

The use of interactive flipbooks in learning is based on several learning theories. One of the underlying theories is the constructivist learning theory, which Piaget and Vygotsky put forward. According to this theory, students build their knowledge through interaction with the environment and direct experience. Interactive Fipbooks provide a rich and dynamic learning environment where students can explore physics concepts independently and interactively, thus supporting a more profound knowledge construction process. Apart from that, the cognitive learning theory put forward by Mayer emphasizes the importance of multimedia in learning (7). Mayer developed the multimedia cognitive theory, which states that learning will be more effective if information is conveyed through various media such as text, images, and audio. Interactive flipbooks utilize these principles by combining multiple forms of media to present information, helping students better process and understand the material.

This research aims to examine the development trend of the use of interactive flipbooks in physics learning during the 2014-2024 period. Through a literature review from various academic sources, this research will evaluate the impact of interactive flipbooks on the effectiveness of physics learning, student engagement, and concept understanding. Apart from that, this research will also

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identify challenges and opportunities in implementing interactive flipbooks at various levels of education. Understanding the development trend of interactive flipbooks in physics learning is hoped to provide deeper insight for educators, researchers, and learning media developers to continue innovating and optimizing digital technology in education. It is also expected that this research can become a basis for developing more effective and exciting learning strategies.

METHOD

The method used in this research can be described into several stages: research design, data collection, selection criteria, data analysis, validity testing, and synthesis of research results.

A. Research Design

This research design uses a qualitative approach with a systematic literature review method to examine the development trend of interactive flipbooks in physics learning from 2014-2024. This literature study aims to collect, analyze, and synthesize data from various scientific sources to understand the use and effectiveness of interactive flipbooks in physics learning (8).

B. Data Collection

Data for this research was collected through systematic searches in several major academic databases, namely Google Scholar, Journal Storage (JSTOR), ScienceDirect, and other supporting websites. The keywords used in the search are interactive flipbooks, physics education, digital learning tools, and technology in learning. The sources selected are national journal articles, international journals, and conference articles with research topics from 2014-2024.

C. Selection Criteria

Articles are selected based on previously established criteria; these criteria are: a) publication in a peer-reviewed journal or conference proceedings; b) focus on the use of interactive flipbooks in physics learning; c) research that reports empirical findings regarding the effectiveness, impact on learner engagement, or implementation of technology; d) articles published in the 2014-2024 period.

D. Data Analysis

The collected data was analyzed using the content analysis method. The analysis stages include data coding, categorization, and thematization. Each article was reviewed to identify key themes related to interactive flipbooks, such as pedagogical design, technology used, learning outcomes, and implementation challenges. These themes are then integrated to build a coherent narrative regarding the development of interactive flipbooks in physics education.

E. Validity testing

To ensure the validity of the research, source triangulation and peer review were carried out. Source triangulation was carried out by combining findings from various types of publications. In contrast, peer review was carried out by fellow researchers in the field of physics education to obtain critical perspectives and feedback on the analysis.

F. Synthesis of Research Results

Synthesis of research results is a process in which the findings of the various studies or articles analyzed are integrated to form a coherent and comprehensive picture of the topic under study. In the context of this research, the synthesis of research results involves combining information from various sources regarding the use of interactive flipbooks in physics learning from 2014 to 2024.

RESULT AND DISCUSSION

This section presents the results of a systematic literature review regarding using interactive flipbooks in physics learning during the 2014-2024 period. The data collected was analyzed to identify key themes, including learning effectiveness, student engagement, adaptation during the COVID-19 pandemic, and technological innovation. The results of this study provide in-depth insight into the development, challenges, and opportunities for using interactive flipbooks in the context of physics education. The following analysis presents findings from various studies that have been integrated to provide a comprehensive picture of the impact and benefits of interactive flipbooks in physics learning. Fifteen articles meet the criteria to be used as literature in this research, which are divided into national and international journals and published international conferences. This research can be explained in detail in Table 1. Mapping the Development of Learning Technology - Interactive Flipbook in Physics Learning.

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Table 1. Mapping the Development of Interactive Flipbooks in Physics Learning.

Period (Year)	*Category*	*Explanation*
2014-2016	Initial Exploration	- In this period, interactive flipbook learning technology in physics learning is still in the exploration stage. Several early studies show the potential of interactive flipbooks in improving understanding of basic physics concepts. - Shen's (2015) study examines the need to change the science learning experience in higher education to meet the needs of the growing digital era. The integration of digital technology such as computer simulations, web-based collaborative learning tools, and instructional videos in learning science can increase interactivity and student involvement in the learning process (9). - The application of the Augmented Reality (AR) learning approach in science learning, through the use of AR intervention books in science books, especially physics in secondary schools in Malaysia has had a big impact on students and motivates them to pursue careers in higher education (10). - Lee's (2015) study examined the use of high-speed cameras and stop-motion animation software to assist students in modeling human body movement. This study aims to increase students' understanding of biomechanics through learning technology that allows students to analyze and visualize movements in more detail (11). - Hernandez's (2015) study discusses various types of videos used in physics learning in virtual and blended environments, as well as their effectiveness. This research focuses on the use of videos in physics learning at the University of Oberta de Catalunya, a university that has widely adopted online and blended learning (12).
2017-2019	Improved implementation	- Use of interactive digital teaching materials in online-based applied physics learning. Kustijono's (2018) study used a quasi-experimental design with a time-series design to evaluate four dimensions of students' knowledge and responses to online learning using interactive digital teaching materials (13). - Apart from being a learning resource, interactive digital flipbooks are also used in assessments and evaluations using the Kvisoft Flipbook Maker application in the context of Industry 4.0 (14). - Pratama Study (2019) discusses the development of student books based on research-based learning models using 3D Pageflip Professional for science lessons in secondary schools. This research received positive responses from students and teachers, who assessed that the research-based approach with 3D Pageflip Professional technology was proven effective in improving the quality of physics learning in secondary schools (15).
2020-2022	Adaptation During the COVID-19 Pandemic	- The COVID-19 pandemic has driven a significant increase in the use of digital learning media, including interactive flipbooks. - Sriyanti (2021) discusses the impact of using flipbook-based e-modules on student learning outcomes. This research uses a quasi-experimental design with a one-group pretest-posttest approach to evaluate the effectiveness of e-modules in learning transversal waves. The research results showed a significant increase in students' post-test scores after using flipbook-based e-modules, indicating that this media was effective in improving students' understanding and learning outcomes (16). - Rahayu's study (2021) explores the development of learning media using flipbook-based Canva to improve students' digital technopreneurship competencies. The

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		research uses the R&D model from Borg & Gall and shows that the media developed is valid and suitable for use, with a significant increase in the digital technopreneurship competence of students who use this media compared to the control class who do not use it (17). - Study by Damayanti (2022) explores the development of interactive learning media based on local wisdom that combines problem-based learning models to improve students' critical thinking skills. Interactive flipbooks based on local wisdom combined with the PBL model have proven effective in improving students' critical thinking skills. This article emphasizes the importance of integrating local context and innovative learning methods to create more engaging and effective learning experiences (4). - Agustini (2022) discusses the development of interactive flipbooks for vocational school students. This research used the ADDIE development model and was tested on 27 students. The results show that this interactive flipbook is valid, practical, and quite effective in increasing students' conceptual understanding of data communications and computer networks. The N-gain value obtained is 0.495, which is included in the quite effective category (18).
2023-2024	Continued innovation and development	- In this period, further innovation occurred in the development of interactive flipbooks with the integration of guided learning models with interactive flipbooks. Khaerunnisa's (2023) study examined the feasibility of using guided inquiry-based digital flipbook learning media for physics modules on sensor systems. This research uses the ADDIE (Analysis, Design, Development, Implementation, Evaluation) development model. Data was collected through observation, interviews, and questionnaires distributed to junior high school science teachers, high school physics teachers, and science education students. The research results show that this digital flipbook module is suitable for use with a feasibility percentage of 80%, which is classified as very good. This media is considered effective as teaching material and learning media for students in understanding physics material related to sensor systems (19). - The development of Android-based physics flipbook learning media that integrates Pancasila values was researched by Arifin (2023), obtaining eligibility with a very good score. Limited trials on students show that this flipbook is effective in increasing students' understanding of Newton's Law material and instilling Pancasila values (20). - Other research that also integrated interactive flipbooks with Augmented Reality received positive responses from users. The developed flipbook and AR based physics e-book is suitable for use as a learning medium in high school. This media not only helps students understand physics concepts better, but also increases their motivation and involvement in the learning process (21). - Similar research integrates the use of flipbook-based e-modules with the 8E learning cycle model to determine high school students' mastery of concepts in heat and heat transfer. The flipbook-based e-module integrated with the 8E learning cycle model is effective in increasing students' mastery of concepts in heat and heat transfer. This media can be used as an interesting and effective alternative in learning physics in high school (22).

Based on the findings in several previous studies, it can be assumed that there have been several studies related to the development of interactive flipbooks in the world of education, especially in physics learning, Both at primary, secondary, and tertiary levels.

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The development of a significant research trend towards interactive flipbooks started during the 2019 pandemic and continues until now (2024).

In the 2014-2016 period, interactive flipbooks in physics learning were at the initial exploration stage. Research and development of this media is focused on exploring the potential of flipbooks to increase understanding of complex physics concepts. An initial study by Hernandez (2015) used various types of videos in virtual and blended physics learning, which can improve understanding of physics concepts. During this period, interactive flipbooks began to be introduced in multiple educational institutions to create a more engaging and interactive learning experience. Research shows that interactive flipbooks can help overcome the limitations of printed books by providing more dynamic and immersive visualizations, which are especially useful in explaining abstract physics concepts. Although still in the early stages, the results show the great potential of interactive flipbooks as an innovative and effective learning tool. Flipbook development in this period also involved limited testing to get feedback from students and teachers, which was used to refine the design and content of the flipbook. The main focus at this stage is to ensure that the interactive flipbook is visually attractive and effective in conveying learning material clearly and comprehensively.

In the 2017-2019 period, interactive flipbooks in physics learning experienced a significant increase. More educational institutions are adopting this technology as the primary tool in teaching and learning activities. Research by Pratama (2019) on the development of student books based on a research-based learning model using 3D Pageflip Professional for science lessons in secondary schools. This research received positive responses from students and teachers, who assessed that the research-based approach with 3D Pageflip Professional technology had proven effective in improving the quality of physics learning in secondary schools. During this period, interactive flipbooks were used to deliver material and evaluation activities and to interact with teachers and students. Besides being a learning resource, interactive digital flipbooks are also used in assessments and evaluations using the Kvisoft Flipbook Maker application in Industry 4.0. Interactive flipbooks allow teachers to include multimedia elements such as videos, animations, and interactive quizzes that make learning more engaging and effective.

Widespread implementation has also been driven by software and hardware technology advances, making creating and using interactive flipbooks more accessible and more affordable. Many teachers are starting to develop their interactive learning materials using the various digital platforms and tools available, thereby creating more prosperous and more varied learning resources. This period marked an important transition in which interactive flipbooks began to be recognized as an essential learning tool and not just a complement to physics education.

In the 2020-2022, interactive flipbooks in physics learning experienced a significant spike as an adaptive response to the COVID-19 pandemic. With limited face-to-face learning, schools are switching to distance learning methods, and interactive flipbooks are becoming one of the main tools used to maintain educational continuity.

Innovation and continued development in the 2023-2024 show that interactive flipbooks are increasingly becoming an essential and sophisticated tool in physics education. Integrating new technologies, better interface design, device flexibility, and research-based learning approaches have all contributed to the increased effectiveness and appeal of interactive flipbooks as a learning medium. So far, there has been no research on interactive flipbooks used in universities to teach modern physics. With all their advantages, interactive flipbooks can be a bridge for teaching abstract modern physics.

CONCLUSION

Over the last ten years, interactive flipbooks have experienced significant developments in physics learning. In the 2014-2016 period, initial exploration showed the potential of flipbooks in increasing understanding of fundamental physics concepts. In the 2017-2019 period, the implementation of interactive flipbooks increased with various educational institutions adopting this technology, showing increased student engagement and understanding. During the COVID-19 pandemic in 2020-2022, interactive flipbooks became the primary tool in distance learning, helping students learn independently and increasing learning motivation. In 2023-2024, continued innovation and development, such as integrating augmented reality (AR) and improved interface design, make interactive flipbooks even more effective and engaging, demonstrating their potential as an essential learning tool in the digital era. So far, there has been no research on interactive flipbooks used in universities to teach modern physics. With all their advantages, interactive flipbooks can be a bridge for teaching abstract modern physics. The results of this conceptual study then became one of the bases for developing an interactive flipbook-based modern physics electronic textbook.

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REFERENCES

1. Triyanti, Murtono, Utaminingsih &. Problem Based Technology and Science Development to Improve Science Learning Outcomes in Elementary Schools. Anp J Soc Sci Humanit [Internet]. 2021;2(2):151–6. Available from: https://journalarsvot.com/index.php/anp-jssh
2. Marisda DH, Rahmawati, Ma'ruf, Bancong H. Preliminary research on the development of digital hypercontent modules in mathematical physics subjects. In: The 3rd IInternational Conference On Science, Mathematics, Environment, And Education: Flexibility in Research and Innovation on Science, Mathematics, Environment, and education for sustainable development. 2023. p. 090002.
3. Maruf, Sultan AD, Marisda DH. Problem-Based Learning Model Supported Phydia (PBL-Phydia) to Improve ICT Abilities. Int J Res Rev. 2024;11(4):145–57.
4. Damayanti NS, Handoyo E, Suratno S. Developing A Local Wisdom-based Interactive Flipbook with the Problem-based Learning Model to Enhance Critical Thinking Skills. J Prim Educ. 2022;11(1):178–90.
5. Susanto R, Lestari ES. The Effect Of Flipbook-Based Field Teaching Materials With Anchored Instruction Model To Improve Students' Critical Thinking Skills. Eur J Educ Stud [Internet]. 2020;7(12):642–52. Available from: www.oapub.org/edu
6. Andini S, Budiyono, Fitriana L. Developing flipbook multimedia: The achievement of informal deductive thinking level. J Math Educ. 2018;9(2):227–38.
7. Marisda DH, Rahmawati ., Riskawati ., Basri S, Anisa . Analyzing the Validity of Interactive Multimedia-based Learning on Acid Rain Content. KnE Soc Sci. 2022 Aug 1;
8. Valverde-Berrocoso J, Garrido-Arroyo MD, Burgos-Videla C, Morales-Cevallos MB. Trends in Educational Research about e-Learning: A Systematic Literature Review (2009–2018). Vol. 12, Sustainability. 2020.
9. Shen J, Jiang S, Liu OL. Reconceptualizing a College Science Learning Experience in the New Digital Era: A Review of Literature. In: Ge X, Ifenthaler D, Spector JM, editors. Educational Communications and Technology: Issues and Innovations ((ECTII)) [Internet]. Cham: Springer International Publishing; 2015. p. 61–79. Available from: https://doi.org/10.1007/978-3-319-02573-5_4
10. Gopalan V, Zulkifli AN, Mohamed NFF, Alwi A, Mat RC, Bakar JAA, et al. Augmented Reality Books For Science Learning-A Brief Review. Int J Interact Digit Media. 2016;4(1):6–9.
11. Lee VR. Combining High-Speed Cameras and Stop-Motion Animation Software to Support Students' Modeling of Human Body Movement. J Sci Educ Technol [Internet]. 2015;24(2):178–91. Available from: https://doi.org/10.1007/s10956-014-9521-9
12. García-Hernández VJ, Pérez-Navarro A, Conesa J. Analysis Of The Kind Of Videos And Their Utility in Physics Subjects in Virtual and Blended Environments. In: EDULEARN15 Proceedings. Barcelona, Spain: IATED; 2015. p. 1211–20. (7th International Conference on Education and New Learning Technologies).
13. Kustijono R, Hakim SR. Online-Based Applied Physics Learning Effectiveness of Interactive Digital Teaching Materials. In: Proceedings of the International Conference on Science and Technology (ICST 2018) [Internet]. Atlantis Press; 2018. p. 1112–5. Available from: https://doi.org/10.2991/icst-18.2018.224
14. Divayana DGH, Suyasa PWA, Ariawan IPW, Mahendra IWE, Sugiharni GAD. The Design of Digital Book Content for Assessment and Evaluation Courses by Adopting Superitem Concept Based on Kvisoft Flipbook Maker in era of Industry 4.0. J Phys Conf Ser [Internet]. 2019;1165(1):12020. Available from: https://dx.doi.org/10.1088/1742-6596/1165/1/012020
15. Pratama DJ, Ranti S, Usmeldi U, Syafriani S. Preliminary analysis of learners in developing student book oriented research based learning models using 3D pageflip professionals on science lessons junior high school. J Phys Conf Ser [Internet]. 2019 Apr;1185(1):12125. Available from: https://dx.doi.org/10.1088/1742-6596/1185/1/012125
16. Sriyanti I, Almafie MR, Marlina L, Jauhari J. The effect of Using Flipbook-Based E-modules on Student Learning Outcomes. Kasuari Phys Educ J. 2021;3(2):69–75.
17. Rahayu WP, Zutiasari I, Munadhiroh S. Learning Media of Canva Based on Flipbook in the Subjects of Creative Products and Entrepreneurship to Improve Students' Digital Technopreneurship Competence. Proc Sixth Padang Int Conf Econ

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www.ijcsrr.org

Educ Econ Bus Manag Account Entrep (PICEEBA 2020). 2021;179(Piceeba 2020):220–9.
18. Agustini K, Wahyuni DS, Mertayasa INE, Sugihartini N, Subawa IGB. Digital Learning Media Innovation and Learning Experience: Creating Interactive Flipbook for Vocational Student. In: IConVET 2021. Singaraja: Universitas Pendidikan Ganesha; 2022.
19. Khaerunnisa N, Jumadi J, Yusri H, Indahsari HK, Febrian A. The Feasibility of Guided Inquiry-Based Digital Flipbook Learning Media: Physics Module in Sensing Systems. J Pendidik Fis Indones. 2023;19(1):16–23.
20. Arifin I, Ariswan A. Development of Integrated Android Physical Flipbook with Pancasila Values on Newton's Law Material. J Pendidik Fis Indones. 2023;18(2):156–64.
21. Azzarkasyi, M., Rizal, S., & Kasmawati K. Asian Journal of Science Educatio. Asian J Sci Educ. 2019;3(1):81–9.
22. Putri NA, Liliawati W, Efendi R. Flipbook E-Module-Assisted 8e Learning Cycle Model on Improving High School Students ' Concept Mastery on Heat and Heat Transfer Material. J Pendidik Fis dan Teknol. 2024;10(1).

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