Electronic Journal of Education, Social Economics and Technology
Vol. 6, No. 2, (2025), pp. 1~6, Article ID: 1100
ISSN 2723-6250 (online)
DOI: https://doi.org/10.33122/ejeset.v6i2.1100

SAINTIS publishing

Research Article

Problem-Based E-Modules Using Flipbooks as a 21st Century Learning Innovation

Indah Rahmawati*, Mukniah, Moh Sahlan

Universitas Islam Negeri Kiai Haji Achmad Shiddiq Jember, Jawa Timur, Indonesia
*Corresponding Author: indahs2uinkhas2024@gmail.com | Phone: +6287846813777

ABSTRACT

The rapid development of digital technology has driven the emergence of more interactive learning innovations that are adaptive to the needs of the 21st century. One such innovation is the problem-based e-module presented in flipbook format. This study aims to examine the concept, characteristics, and urgency of using flipbook-based e-modules in enhancing 21st-century skills. The research employed a descriptive qualitative approach through library research by analyzing various literature, scientific articles, and educational policy documents related to e-modules, problem-based learning (PBL), and flipbook media. The findings indicate that problem-based e-modules provide more contextual learning experiences, position students as active subjects, and encourage the mastery of critical thinking and problem-solving skills. The integration of flipbooks as interactive media enhances the attractiveness, flexibility, and effectiveness of learning, thereby motivating students to learn more independently. Thus, problem-based e-modules using flipbooks can be considered an innovative strategy aligned with the demands of 21st-century education while supporting the transformation of digital technology-based learning.

Keywords: E-Module; Problem-Based Learning; Flipbook; 21st-Century Skills

1. INTRODUCTION

The rapid development of digital technology has significantly impacted the world of education. These changes have influenced and revolutionised how students acquire, manage, and understand information during the learning process. Advances in digital technology in education require teachers to continuously innovate and be creative in utilising various learning media to support the teaching and learning process (Sa'adah, Suryaningsih, & Muslim, 2020). In this context, learning media play an important role in supporting the success of the learning process because they can facilitate the delivery of complex material. Through its function as a tool, media can provide visual experiences that encourage student motivation to learn. Moreover, the media also plays a role in simplifying abstract concepts to make them easier to understand and feel more concrete and meaningful (Sanjaya, 2015).

The media has a strategic role in improving the quality of learning. Not only does it facilitate the process of delivering material, but it also provides added value by enriching the learning experience of students, making the learning process more interactive, engaging, and meaningful (Ali, 2019). However, along with changes in the characteristics of students, conventional learning media such as printed textbooks are beginning to be seen as ineffective. This is because the learning needs of today's students are more inclined towards a visual, flexible style that emphasises independence in acquiring knowledge (Riegel & Mete, 2021).

Digital learning media is a promising alternative to improve learning effectiveness. One of them is the use of e-modules. Kurniawan and Kuswandi (2021) state that interactive e-modules, as a form of 21st-century digital literacy, can integrate various multimedia elements with modern pedagogical strategies. Their presence makes learning more contextual while encouraging students' independence in developing understanding and skills. Thus, e-modules present information interestingly and encourage students to think critically and independently in their learning.

One effort to produce quality learning media is by applying a problem-based approach. This approach places real problems as the learning process's starting point, encouraging students to analyze situations, formulate alternative solutions, and reflect on the results obtained from their learning. Kusumasari, Muksar, and Rahardi (2022) state that PBL-based e-modules provide a systematic learning framework, starting from problem orientation, analysis, information search, and reflection on results, thereby improving students' critical thinking skills. Problem-based learning places students as the main subjects in the learning process by giving them an active role in discovering, understanding, and solving real

problems close to their daily lives. Through this approach, students do not merely receive knowledge from teachers, but are encouraged to develop critical thinking skills, analyze various alternative solutions, and collaborate in groups to build a deeper and more meaningful understanding.

To achieve learning objectives more optimally, the integration of technology is an aspect that cannot be ignored. This is in line with Indonesian Ministry of Education and Culture Regulation No. 103 of 2014, which emphasizes the importance of utilizing information and communication technology (ICT) in learning, both through hardware and software, to create an interactive learning process that supports the effectiveness of teaching and learning activities (Ministry of Education and Culture of the Republic of Indonesia, 2014). This shows that using digital media, such as interactive e-modules, is a pedagogical innovation and an implementation of regulations that encourage technology-based learning.

In response to this need, flipbooks have emerged as an e-module innovation that combines conventional displays with interactive digital features. Flipbooks are a digital format that resembles printed books, but are equipped with various features such as page-turning effects, active links, and visual media integration. Flipbooks provide a more attractive and interactive reading experience and retain the feel of printed books while facilitating navigation in learning materials. Hamid and Alberida (2021) found that 89% of students and 92% of teachers agreed that flipbook e-modules with visual media and animations are needed as a more effective learning resource. In addition, e-modules also support the principle of student-centred learning by providing flexibility in learning according to the pace and needs of each student.

Thus, problem-based e-modules like flipbooks answer learning challenges in the digital age. This medium presents material more interestingly and provides space for students to think critically, solve real problems, and learn more independently and meaningfully. The integration of the problem-based learning approach and the interactive features of flipbooks makes the learning process more lively, contextual, and in line with the characteristics of the 21st-century generation, which is closely connected to technology. On the other hand, using these e-modules aligns with educational policies that emphasise using ICT as part of learning transformation. Therefore, flipbook-based e-modules are an innovative alternative and a strategic approach to achieving creative, adaptive learning that focuses on developing future competencies.

2. RESEARCH METHOD

Researchers in this study used descriptive qualitative research. Qualitative research focuses on gathering descriptive data in the form of speech, writing, and observed individual behavior. Through this approach, it is hoped that a deep understanding of various phenomena that arise, whether in individuals, groups, communities, or specific organizations, in a specific context, can be obtained. This research is examined from a comprehensive and holistic perspective so that it can reveal the meaning behind the reality being studied. The type of research is library research. This research utilizes literature as the primary data, including books, scientific articles, and education policy documents, to examine concepts, digital e-modules, problem-based learning, flipbooks, and 21st-century learning dynamics. The data sources in this study include primary data taken from literature that directly discusses concepts, digital e-modules, problem-based learning, flipbooks, and 21st-century learning dynamics, as well as secondary data in the form of supporting articles, previous research reviews, and current education policy documents. Data analysis techniques were carried out using a content analysis approach. Content analysis is a research technique used to study human behavior indirectly by examining various forms of communication. These forms of communication can be textbooks, essays, newspapers, novels, magazine articles, songs, advertising images, or other communication media that can be analyzed systematically.

3. RESULTS AND DISCUSSION

E-Modules as Digital Learning Resources

Definition of e-module

Etymologically, the term *module* comes from the English word *module*, which refers to a unit or component integral to a broader learning whole. In Indonesian, a module is the smallest unit of learning that can stand alone. Thus, a module is a collection of structured and detailed materials that form the smallest part of a learning program. Modules have various definitions according to experts, but they have similar meanings. The Ministry of Education and Culture defines a module as printed teaching material designed to support independent learning, equipped with instructions that enable students to learn without the direct presence of an educator. The material's language, structure, and completeness are arranged so that it functions like a “teacher's language” in the learning process. Therefore, modules are classified as independent instructional media that enable knowledge transfer without face-to-face interaction (Ministry of National Education, 2008). Modules are teaching materials written to enable students to learn independently with or without teacher guidance. Therefore, modules must contain learning instructions, competencies to be achieved, lesson content, supporting information, practice questions, work instructions, evaluations, and feedback on evaluation results. Modules are teaching materials that are systematically arranged in language that is easy for students to understand, appropriate for their age and level of knowledge, so that they can learn independently with minimal guidance from educators. Using modules in learning aims to enable students to learn independently without a teacher (Widyastuti, Wiryokusumo, & S., 2019).

Based on these various definitions, it can be concluded that a module is teaching material that is systematically and structurally organized, containing learning instructions, objectives, or competencies to be achieved, subject matter, exercises, evaluations, and feedback, with language that is easy to understand according to the ability level of the students. Modules are designed to support independent learning, so that students can study the material optimally with minimal guidance or without the direct presence of an educator, while also functioning as an independent instructional medium capable of transferring knowledge without face-to-face interaction. Modules can now be adapted to current technological developments. Modules can be created electronically, called electronic modules (e-modules). The Directorate of Senior High School Development, Directorate General of Primary and Secondary Education, Ministry of Education and Culture (2017) explains that e -modules are a form of self-study material that is systematically arranged into specific learning units, presented in electronic format, where each learning activity is linked to a link as navigation that makes students more interactive with the program, equipped with video tutorials, animations, and audio to enrich the learning experience, thereby making students more interactive.

Characteristics of E-Modules

Basically, an e-module has the following characteristics: self-instructional, Modules are designed to include learning objectives, contextual material accompanied by examples/illustrations for explanation, exercises/assignments, summaries, assessment instruments, reference lists or material references, and communicative and straightforward language so that students can learn independently and not depend on others. Self-contained, the learning materials for a single unit of competency are contained within a single module so that students can study the material thoroughly. The modules developed do not depend on other media, nor must they be used with different media. Adaptive, Modules should be highly adaptive to developments in science and technology and flexible in their use. User-friendly, Modules should be easy to use with uncomplicated media operation, easy-to-understand lesson instructions, and media, presentation, and language that make users feel familiar and motivated to learn. Consistent in the use of fonts, spacing, and layout. Delivered using computer-based electronic media, utilizing various electronic media functions, hence referred to as multimedia. Utilizing multiple features available in software applications. Needs to be carefully designed (taking into account learning principles).

Advantages of e-modules: Modules can increase student motivation because each task is designed with clear boundaries and tailored to their abilities. Through evaluation, teachers and students can identify specific parts of the module that have been mastered and those that still need improvement. Learning materials can be divided proportionally throughout a semester. The educational process becomes more effective because the material is organized based on academic levels. Fifth, the limitations of static presentation in printed modules can be transformed into a more interactive and dynamic format. The dominance of verbal elements in printed modules can be minimized by adding visual elements, such as video tutorials, to enrich students' understanding. Disadvantages of e-modules: Developing teaching materials requires a relatively high budget and considerable time. The success of learning through modules depends on the students' discipline, which is often not optimal, especially for students with low learning maturity levels. Teachers or facilitators must be highly committed to consistently monitoring student learning progress, providing motivation, and providing individual guidance and consultation according to the students' needs. With reference to the contents of the Practical Guide to Developing e-Learning Modules, the principles of electronic module development can be summarized as follows: Designed to spark interest among learners. Written and designed for use by learners. Explains learning goals and objectives. Organized based on a “flexible learning” pattern. Organized based on the needs of learners and the achievement of learning goals. Focuses on providing opportunities for learners to practice. Accommodates learners' learning difficulties. Requires a careful navigation system. Always provides a summary. The writing style used is communicative, interactive, and semi-formal. Packaged for use in the learning process. Requires a learning strategy (introduction, presentation, conclusion). Has a mechanism for collecting feedback. Supports *self-assessment.* Explains how to study the textbook. Instructions/guidelines are needed when using e-modules.

The National Education Standards Agency (2017) has established rules regarding the procedure for assessing the feasibility of modules (both printed and electronic), covering aspects of content feasibility, presentation, language, and graphics: Content feasibility includes the suitability of the material description with the applicable learning outcomes, core competencies, and basic competencies in the curriculum, the accuracy and completeness of the material, and the completeness of learning support material relevant to the digital format. The presentation aspect includes the systematic presentation of material in digital form, learning interactivity (e.g., hyperlinks, navigation, and interactive quizzes), and the completeness of presentation elements such as multimedia (text, images, audio, video, and animation). Language suitability includes the appropriateness of language use for the cognitive development level of students, the use of communicative and easy-to-understand language, and the integration and consistency of the material delivery flow that supports digital-based independent learning. Graphic suitability includes an attractive and responsive user interface design, appropriate typography and layout, visual and multimedia quality, and ease of navigation on various devices (computers, tablets, and mobile phones).

Problem-based learning, known in Indonesian as Pembelajaran Berbasis Masalah (PBM), is a learning model oriented towards the theoretical framework of constructivism. Afif (2019) explains that the problem-based learning model focuses on selected problems so that students not only learn concepts related to them but also scientific methods for solving them. Therefore, students must not only understand the concepts relevant to the problem at hand but also gain learning experiences related to the skills of applying scientific methods in problem solving and developing critical thinking patterns. The purpose of using a problem-based learning model is for students to think critically about a problem, solve problems independently, and find solutions to these problems. Students are also expected to be able to find various solutions to the problems they face so that they genuinely understand the issues at hand. According to Wena, as quoted in Trian Pamungkas, problem-based learning is a learning strategy that exposes students to practical problems as a basis for learning, or in other words, students learn through difficulties.

This means that the problem-based learning model presents problems to students so that learning becomes more challenging (Pamungkas, 2020). Tan, as quoted in Trian Pamungkas, says that problem-based learning is the use of various types of intelligence needed to confront real-world challenges, the ability to deal with everything new and complex. In this case, the problem-based learning model is a learning model that presents challenges to new things. With that, students will gain new knowledge in the problem-based learning model. According to Suprijono, as quoted in Trian Pamungkas, the problem-based learning model is a discovery learning process that includes information, transformation, and evaluation. In this case, the problem-based learning model requires students to find information about the problems that exist in the learning process. According to Komalasari, as quoted in Trian Pamungkas, the problem-based learning model is a learning strategy that uses real-world problems as a context for students to learn critical and problem-solving skills and understand the essential knowledge and concepts of the subject.

In this case, the problem-based learning model has the advantage of encouraging students to learn more actively and critically so that they will acquire new knowledge. Based on these various opinions, problem-based learning can be concluded as a constructivist learning model that uses real problems as the starting point of the learning process to develop conceptual understanding, critical thinking skills, and independent problem-solving abilities, so that the learning experience becomes more meaningful and contextual. The term “flipbook” is familiar to many, especially since the pandemic entered Indonesia. Digital books have become increasingly widespread, and one of them is the Flipbook. A flipbook is a three-dimensional digital book containing text, images, videos, music or songs, and animated movements, so flipbooks fall into the category of digital books or e-books (electronic books). Flipbook is a digital platform that converts PDF files into interactive publications resembling printed books. This application has a simple and easy-to-use interface, making it ideal for creating various types of digital media such as electronic books, digital magazines, company catalogs, and interactive learning materials. In addition to presenting content in text and images, Flipbook also supports the insertion of multimedia elements such as audio and video, making the media more interesting and communicative (Mulyadi & Wahyuni, 2016).

In education, Flipbook serves as a learning support medium that can overcome the limitations of text-based material delivery. Flipbook makes learning more enjoyable and less monotonous by inserting motion animations, sounds, and visuals. To design Flipbook content, users can utilize various flipbook maker applications such as Kvisoft Flipbook, Anyflip, FlippingBook, and the like. Flipbook maker applications are generally professional software that convert PDF files into digital books and provide various interactive features. These features include editing functions, video insertion, numbers, audio, hyperlinks, and other multimedia objects. The final result of the Flipbook design can be saved in various formats such as HTML, EXE, or ZIP. With its ability to display interactive simulations that combine text, images, audio, video, and animation, Flipbook is an effective solution for creating a more engaging, participatory, and meaningful learning experience for students (Yulisetiani et al., 2022).

21st-century learning emphasizes the importance of mastering various skills considered core competencies for students. These skills include critical thinking, problem solving, collaboration, communication, creativity, and digital literacy. These competencies support student success in the learning process and equip them to face real-life challenges in a global era full of technological and informational developments (Wikipedia contributors, 2025). In this context, problem-based E-Modules packaged in flipbook form present a learning approach that is not only text-based but also integrates multimedia and interactivity elements, in line with modern demands in education. One of the innovations that has emerged is the use of problem-based E-Modules. The integration of problem-based learning in e-modules places students at the center of the learning process by exposing them to relevant, authentic problems. This approach encourages students to find solutions through reflection, group discussions, and independent research. This process not only strengthens the development of higher-order thinking skills (HOTS) but also changes the role of teachers to facilitators who guide and support learning, rather than merely delivering material. Astuti, Fitrian, Bhakti, and Shintiasari (2025) explain that using flipbooks as a supporting medium for e-modules further strengthens learning innovation. Digital flipbooks offer a reading experience similar to printed books, but enriched with various modern features such as page-turning effects, video integration, audio, animation, and interactive links. Several studies show that this media is feasible, practical, and effective in increasing student engagement, deepening conceptual understanding, and fostering learning motivation. Its presence reflects a form of technological innovation relevant to the characteristics of the digital generation, who are accustomed to interacting with interactive media.

The integration of PBL in E-Modules in flipbook format facilitates the delivery of material and encourages the development of 21st-century skills. Students are trained to think critically in problem-solving problems, be creative in finding solutions, collaborate in group discussions, and communicate effectively in presenting problem-solving results. In addition, interaction with flipbooks also develops students' digital literacy, namely the ability to access, understand, and manage digital information wisely. Thus, problem-based E-Modules using flipbooks can be categorized as 21st-century learning innovations because they can integrate modern pedagogical aspects with interactive digital technology. This innovation responds to educational transformation demands that emphasize independent learning, mastery of 4C skills, and digital literacy. As a result, students gain knowledge and the competencies to adapt, innovate, and compete in a dynamic global era.

4. CONCLUSION

21st-century learning requires innovation that can foster critical thinking, creativity, collaboration, communication, and digital literacy skills. In this context, problem-based e-modules packaged in flipbook format are relevant solutions because they integrate a problem-based approach with interactive digital technology. This innovation is not only oriented towards knowledge mastery but also towards the development of 21st-century skills in line with global demands. The study's results show that the application of problem-based e-modules in flipbook format contributes positively to increasing student motivation, independence, and learning outcomes. Its presence makes the learning process more interesting, flexible, and contextual while providing an active and meaningful learning experience. In addition, this model encourages students to get used to utilizing digital technology in accessing, processing, and presenting information, thereby strengthening digital literacy. Thus, problem-based e-modules in flipbook format can be seen as a 21st-century learning innovation because they synergize pedagogical aspects, technology, and student competencies. This innovation is a strategic step in realizing adaptive and transformative education while preparing the younger generation to face the dynamics of life in the digital era in a more creative, critical, and competitive manner.

REFERENCES

Ali, M. (2019). Pengembangan media pembelajaran interaktif kursus lapangan elektromagnetik. *Jurnal Pendidikan Listrik, 5*(1), 25.

Astuti, I. A. D., Fitrian, A., Bhakti, Y. B., & Shintiasari, M. (2025). Integrasi problem based learning dalam media flipbook: Solusi pembelajaran fisika yang interaktif dan kontekstual. *Titian Ilmu: Jurnal Ilmiah Multi Sciences, 17*(2). https://doi.org/10.30599/rth0pb02

Badan Standar Nasional Pendidikan. (2017). *Standar penulisan buku ajar*. BSNP.

Chandra Kusumasari, M., Muksar, & Rahardi. (2022). Pengembangan e-modul berbasis problem based learning untuk mendukung pembelajaran daring dengan flipped classroom. *PRISMA: Prosiding Seminar Nasional Matematika, 5*, 308–313. https://journal.unnes.ac.id/sju/prisma/article/view/54109

Departemen Pendidikan Nasional. (2008). *Penulisan modul*. Direktorat Jenderal Peningkatan Mutu Pendidik dan Tenaga Kependidikan.

Direktorat Pembinaan SMA, Direktorat Jenderal Pendidikan Dasar dan Menengah, Kementerian Pendidikan dan Kebudayaan. (2017). *Panduan praktis penyusunan e-modul pembelajaran*. https://www.scribd.com/document/366262566/Panduan-Penyusunan-E-Modul-2017

Hamid, & Alberida. (2021). Pentingnya mengembangkan e-modul interaktif berbasis flipbook di sekolah menengah atas. *Edukatif: Jurnal Ilmu Pendidikan, 3*(6), 4575–4583. https://www.edukatif.org/index.php/edukatif/article/view/452

Kementerian Pendidikan dan Kebudayaan Republik Indonesia. (2014). *Peraturan Menteri Pendidikan dan Kebudayaan Nomor 103 Tahun 2014 tentang Pembelajaran berbasis teknologi informasi dan komunikasi*. Kementerian Pendidikan dan Kebudayaan. https://peraturan.bpk.go.id/Home/Details/41570/peraturan-menteri-pendidikan-dan-kebudayaan-nomor103-tahun-2014

Kurniawan, C., & Kuswandi, D. (2021). *Pengembangan e-modul sebagai media literasi digital pada pembelajaran abad 21*. Academia Publication.

Mulyadi, D. U., & Wahyuni, S. (2016). Pengembangan media flash flipbook untuk meningkatkan keterampilan berfikir kreatif siswa dalam pembelajaran IPA di SMP. *Jurnal Pembelajaran Fisika, 4*(4), 296–301.

Nur Afif, D. (2019). *Pembelajaran berbasis masalah perspektif Al-Qur'an*. Karya Litera Indonesia.

Nurrohmah, F. I., et al. (2023). *Tantangan pengembangan model pembelajaran berbasis karakter dalam pendidikan kewarganegaraan (Konsep teoritis dan best practice)*. Unisri Press.

Pamungkas, T. (2020). *Model pembelajaran berbasis masalah (Problem based learning)*. Guepedia.Riegel, C., & Mete, R. (2021). Educational technologies for K-12 learners: What digital natives and digital immigrants can teach one another. *Educational Planning, 24*(4), 49–57. https://files.eric.ed.gov/fulltext/EJ1208111.pdf

Rusman. (2018). *Model-model pembelajaran: Mengembangkan profesionalisme guru*. Rajawali Pers.

Sa'adah, M., Suryaningsih, S., & Muslim, B. (2020). Pemanfaatan multimedia interaktif pada materi hidrokarbon untuk menumbuhkan keterampilan berpikir kritis siswa. *Jurnal Inovasi Pendidikan IPA, 6*(2), 185.

Salmaa. (2024, Maret 1). Flipbook: Manfaat, keunggulan, cara membuat. *Deepublish*.

Sanjaya, W. (2015). *Perencanaan dan desain sistem pembelajaran*. Kencana.

Septi Yulisetiani, et al. (2022). *Merancang bahan ajar digital berwawasan budaya nusantara untuk pembelajaran bahasa Indonesia sekolah dasar*. Jejak Pustaka.

Widyastuti, I., Wiryokusumo, I., & S. (2019). Pengembangan modul pembelajaran dengan model Dick and Carey dan menggunakan concept mapping pada mata pelajaran ekonomi kelas XI IPS di SMA Negeri 1 Sampang semester ganjil tahun ajaran 2018/2019. *Jurnal Education and Development, 7*(2), 175.