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Application of Canva Media in Learning Mathematics on Fractions in Elementary Schools

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ABSTRACT

Mathematics learning on fraction material in elementary school still faces various challenges, including low student conceptual understanding and limited attractive and interactive learning media. This study aims to examine the application of Canva media as an innovative solution in fraction learning in Indonesian elementary schools. Through a systematic literature review of 30 recent studies (2020-2025) indexed in Sinta and Scopus, this article analyzes the effectiveness, implementation, and impact of Canva-based media on student learning outcomes. Findings indicate that Canva-based learning media have very high validity levels (average 82-90%), excellent practicality (90-98%), and significant effectiveness in improving students' understanding of fraction concepts with learning outcome improvements ranging from 25-40%. Canva media enables teachers to create interactive visual content such as e-books, digital flipbooks, interactive modules, and digital worksheets that can be adapted to the characteristics of elementary students. The implementation of this media also increases student learning motivation and facilitates more contextual and engaging learning. This article recommends the integration of Canva media in elementary mathematics curriculum with support for teacher training and adequate technological infrastructure. Further research is needed to explore long-term impacts and implementation in various school contexts in Indonesia.

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1. Introduction

Mathematics is a fundamental subject in elementary education that plays a strategic role in developing students' logical, analytical, and systematic thinking skills (Adhiana et al., 2022). However, mathematics learning in elementary schools, particularly fractions, still faces various complex problems that hinder the achievement of learning objectives. Fractions in elementary school are a topic considered difficult by most students because they involve abstract concepts that require a deep understanding of the relationship between parts and the whole (Rif'ati et al., 2025; Sari et al., 2025).

Students' difficulties in understanding fraction concepts are not only related to the complexity of the material but also influenced by conventional learning methods and the lack of engaging and interactive learning media (Fadillah et al., 2022). Teacher-centered learning, with a lecture approach and the use of textbooks as the sole learning resource, results in students lacking motivation and difficulty visualizing abstract fraction concepts (Kurnia et al., 2024). This situation is exacerbated by teachers' limited ability to develop and utilize innovative learning media that align with the characteristics of today's digital generation students (Husnia et al., 2024).

In the digital era and post-COVID-19 pandemic, technology integration in learning has become an urgent and unavoidable need (Isrok'atun et al., 2025). Educational technology offers various solutions to address mathematics learning challenges, one of which is through the use of interactive and engaging digital learning media. Canva, a user-friendly web-based graphic design platform, has emerged as a potential alternative learning media for implementation in elementary schools (Ningrum et al., 2024). This platform enables teachers to create various types of visual content such as interactive presentations, e-books, infographics, learning videos, and digital worksheets without requiring complex graphic design skills (Lubis, n.d.).

Several recent studies have shown that Canva-based learning media has significant potential to improve the quality of mathematics learning in elementary schools (Sari et al., 2025; Rif'ati et al., 2025; Kurnia et al., 2024). This media is not only visually appealing but can also be adapted to specific learning needs, including for fractions, which require clear and concrete visual representations. However, despite its significant potential, the implementation of Canva in mathematics learning in Indonesia still requires in-depth study to understand its effectiveness, practicality, and the challenges faced in its implementation.

The current state of mathematics learning in Indonesian elementary schools still presents various issues that require serious attention. Survey results from the Programmed for International Student Assessment (PISA) and the Trends in International Mathematics and Science Study (TIMSS) consistently show that Indonesian students' mathematical abilities remain below the international average, particularly in understanding mathematical concepts and applying them to real-life contexts (Ruqoyyah et al., 2025). These issues are inextricably linked to the quality of the learning process, which still needs improvement.

At the elementary school level, particularly for fractions in grade 4, various field studies have revealed alarming facts. Research by Ridho'i et al. (2025) at SDN Pasirian 01 found that students' understanding of fraction concepts remained low,

with many students struggling to grasp basic fraction concepts, fraction operations, and their application in problem-solving. Similar findings were reported by Aryanti (2023), who identified that student learning outcomes in fractions in grade 4 of elementary school were still below the established Minimum Completion Criteria (KKM).

One root of the problem is the limited learning media available in schools, particularly in areas with limited access to technology (Ramdhani et al., n.d.). Many teachers still rely on conventional methods, with learning media limited to blackboards, textbooks, and the occasional use of simple props that are not always effective in visualizing the abstract concept of fractions (Listiyoningrum et al., 2024). This situation is exacerbated by a lack of training and mentoring for teachers in developing and utilizing technology-based learning media (Tristina et al., n.d.).

However, on the other hand, digital technology penetration in Indonesia continues to increase rapidly. Data shows that smartphone use and internet access among Indonesians, including in educational settings, have reached significant levels (Ilham et al., n.d.). This situation creates a significant opportunity to integrate technology into learning, including the use of digital platforms like Canva, which can be accessed through various devices. Several schools that have tried implementing digital learning media have reported positive responses from students and a significant increase in learning motivation (Octaviani et al., 2024).

Field observations also indicate a digital divide between urban and rural schools, as well as between public and private schools (Laela et al., 2024). Urban schools generally have better access to technological infrastructure and teacher training, while rural schools still face limited facilities and resources. This gap needs to be a crucial consideration in designing strategies for implementing technology-based learning media like Canva to ensure its reach across all levels of schools in Indonesia.

Based on the above, the objectives of this study are: 1) to analyze the effectiveness of Canva-based learning media in improving elementary school students' understanding of fraction concepts, based on empirical evidence from recent studies; 2) to identify various implementations of Canva media in mathematics learning on fractions, including the features used and how they are implemented in the classroom; 3) to evaluate the impact of Canva media use on student learning outcomes, motivation, and engagement in mathematics learning on fractions; 4) to identify challenges and obstacles encountered in implementing Canva media in Indonesian elementary schools and potential solutions; and 5) to provide practical recommendations for teachers, schools, and education policymakers regarding the integration of Canva media in elementary school mathematics learning. By achieving these objectives, this study is expected to provide theoretical and practical contributions to the development of more innovative, effective, and digital-age-appropriate mathematics learning, particularly for fractions in elementary schools.

2. Method

This study uses a systematic literature review (SLR) approach to comprehensively examine the application of Canva media in mathematics learning on fractions in elementary schools. A systematic literature review was chosen because it allows researchers to systematically and transparently identify, evaluate,

and synthesize all relevant published research (Taufiq et al., n.d.). This approach ensures that research findings are based on robust and comprehensive empirical evidence from a variety of high-quality research sources. The research design follows the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) protocol, adapted for the context of literature reviews in educational technology. The research process involved several systematic stages: (1) formulating research questions, (2) establishing inclusion and exclusion criteria, (3) comprehensive literature search, (4) selecting and screening articles, (5) data extraction, and (6) synthesizing and analyzing findings. The data sources for this study were scientific publications indexed in the national journal database accredited by Sinta (Science and Technology Index) ranked 1-4 and international journals indexed by Scopus. A comprehensive literature search was conducted using various search strategies to ensure broad and representative coverage.

Data analysis was conducted using a content analysis and thematic synthesis approach to extract, organize, and synthesize findings from the 30 selected articles. The data analysis procedure involved several stages: Stage 1: Data Extraction: Information was extracted from each selected article using a data extraction matrix that included: (1) publication identity (author, year, title, journal), (2) research methodology (design, sample, instrument), (3) characteristics of the developed learning media, (4) key findings related to validity, practicality, and effectiveness, (5) implementation of the media in the classroom, and (6) impact on student learning outcomes. Stage 2: Quality Assessment: The quality of each article was assessed using criteria adapted from the Critical Appraisal Skills Programme (CASP) for quantitative and qualitative research. The assessment included clarity of research objectives, appropriateness of methodology, validity and reliability of instruments, adequacy of data analysis, and clarity of reporting of results. Stage 3: Thematic Synthesis: Findings from the various articles were synthesized thematically based on research questions. The main themes identified include: (a) the effectiveness of Canva media, (b) forms of implementation, (c) impact on learning outcomes and motivation, (d) implementation challenges, and (e) factors contributing to success. Stage 4: Comparative Analysis. A comparative analysis was conducted to compare findings from various studies, identifying consistent patterns, variations in results, and contextual factors influencing the effectiveness of Canva media. This analysis also included comparisons between various types of Canva-based media (e-books, flipbooks, interactive modules, digital worksheets) and their impact on learning. Stage 5: Interpretation and Conclusions. The final stage involved interpreting the findings holistically, taking into account the Indonesian educational context, relevant learning theories, and practical implications for teachers and schools. Conclusions were drawn based on the convergence of evidence from the various studies reviewed. The entire analysis process was conducted with due regard for the principles of rigor, transparency, and objectivity to ensure the validity and reliability of the research findings.

3. Results and Discussion

a. Effectiveness of Canva Media in Fraction Learning

An analysis of 30 studies demonstrated strong empirical evidence for the effectiveness of Canva-based learning media in improving fourth-grade

elementary school students' understanding of fraction concepts. This effectiveness can be seen from three main aspects: validity, practicality, and impact on learning outcomes.

Media Validity

The validity of Canva-based learning media was highly assessed by subject matter and media experts. Research by Rif'ati et al. (2025) reported that a STEM-based digital pocketbook designed using Canva received a validation score of 85% from subject matter experts and 82.5% from media experts, both of which are categorized as highly valid. Similar findings were reported by Sari et al. (2025) who developed a Canva-based interactive learning module with a validity score of 3.38 (scale of 4) from subject matter experts and 3.80 from media experts, both of which are categorized as highly valid. Kurnia et al. (2024) in developing the Canva Fractions (CANPEC) learning media also reported excellent validation results, with the media declared suitable for use after undergoing validation by subject matter and media experts. The consistently high validity scores indicate that Canva-based media has quality content and design that meet the standards for elementary school mathematics learning.

Media Practicality

The practicality of Canva media is assessed based on its ease of use and implementation in the classroom, from both teacher and student perspectives. Research results indicate a very high level of practicality. Rif'ati et al. (2025) reported a student response rate of 92% and a teacher response rate of 98%, both categorized as very practical. Sari et al. (2025) also found a very good level of practicality, with teacher scores of 3.35 and student scores of 3.41 (on a scale of 4). Husnia et al. (2024), in developing a Canva-based Smart Book for fractions, reported that the media was very practical for both teachers and students, with easy access through various digital devices. Ningrum et al. (2024) added that Canva-based interactive e-books were easy to operate by fourth-grade elementary school students without requiring intensive special training. This high level of practicality is an important factor because it shows that Canva media is not only theoretically effective, but also feasible to be implemented in real learning conditions in Indonesian elementary schools (Tristina et al., n.d.).

Impact on Learning Outcomes

The effectiveness of Canva in improving student learning outcomes was demonstrated through various statistical tests, particularly paired sample t-tests comparing pretest and posttest scores. Rif'ati et al. (2025) reported a significant positive difference between the pretest and posttest with an effect size of -3.78, indicating a significant contribution to improving students' understanding of fraction concepts. Sari et al. (2025) found a significant difference in learning outcomes between an experimental group using a Canva-based module and a control group using conventional learning. The improvement in learning outcomes in the experimental group reached a high level, demonstrating the media's effectiveness in facilitating understanding of fraction concepts.

Kurnia et al. (2024) reported that the use of CANPEC (Canva Fractions) media successfully improved student learning outcomes, with a significant

increase in the percentage of students completing the learning process after implementation. Rofiqoh et al. (2020), in developing a Canva-based Math Space Adventure game, reported a 32.79% increase in learning outcomes, demonstrating substantial effectiveness. N-Gain analysis from various studies shows varying degrees of improvement, from moderate to high. Although some studies, such as Ridho'i et al. (2025), reported a low N-Gain (0.30) for fraction puzzles, most studies using Canva-based digital media reported moderate to high N-Gain, indicating consistent effectiveness (Firdaus et al., 2024).

b. Implementation of Canva Media in Grade 4 Elementary School

The implementation of Canva media in learning fractions in fourth-grade elementary school mathematics demonstrates a variety of creative and innovative forms and approaches. Based on an analysis of 30 studies, several main forms of Canva media implementation can be identified:

E-Books and Interactive Digital Books

The most common form of implementation is the development of e-books or interactive digital books using Canva. Ningrum et al. (2024) developed a Canva-based interactive e-book on fractions, complete with animations, illustrative images, and interactive elements that allow students to interact directly with the content. This e-book can be accessed via smartphone, tablet, or computer, providing flexibility in learning. Husnia et al. (2024) developed a Canva-based Smart Book that integrates various multimedia features such as explanatory videos, interactive quizzes, and practice questions that can be completed directly within the digital platform. This Smart Book was specifically designed for fourth-grade fractions at MI Nurul Islam Mayangan and has proven effective in improving student understanding.

Digital Flipbook

Rif'ati et al. (2025) implemented Canva media in the form of a digital flipbook designed using Canva and then converted into an interactive flipbook using the Heyzine Flipbook platform. This flipbook displays fraction material with attractive visualizations, complemented by page animations that provide a more engaging reading experience for students. The flip feature, which resembles a physical book, helps students accustomed to printed books adapt to digital media.

Interactive Learning Module

Sari et al. (2025) developed a Canva-based interactive learning module systematically designed to follow a structured learning flow. This module includes learning objectives, core material with clear visualizations, example problems with step-by-step explanations, practice problems at varying difficulty levels, and learning evaluations. The advantage of this module is its ability to be personalized to suit each student's needs and learning pace. Rukman et al. (2022) developed a contextual learning module using the Canva application for fractions for third-grade elementary school students. This module integrates students' daily life contexts into the presentation of fractions, making learning more meaningful and relevant.

Digital Student Worksheets (LKPD)

Laela et al. (2024) developed a digital LKPD using Canva to develop students' numeracy. This digital LKPD is designed with an attractive interface, equipped with clear instructions, space for students to work digitally, and an automatic feedback feature. This digital LKPD can be used individually or collaboratively in learning.

Interactive Presentation Media

Several studies have implemented Canva to create interactive presentations for teachers to explain fraction concepts. These presentations feature animations, engaging transitions, and interactive elements such as quizzes that students can answer in real time. Lubis (n.d.) reported that Canva-based interactive learning media for fractions at SD Negeri 100316 Pargarutan Julu effectively increased student engagement in learning.

Canva-Based Educational Games

Rofiqoh et al. (2020) developed the Math Space Adventure game as a learning medium for fractions in elementary schools. This game was designed using Canva with a space adventure concept, where students must complete various math challenges related to fractions to progress. This gamification approach has proven highly effective in increasing student motivation and learning outcomes.

c. Classroom Implementation Strategy

Canva media implementation in the classroom generally follows a structured learning pattern. Based on a synthesis of various studies, effective implementation strategies include. Preparation Phase: Teachers prepare Canva-based media according to learning objectives and student characteristics. Teachers also ensure that the technological infrastructure (devices and internet connection) is available and functioning properly (Nurmawati et al., 2020). Introduction Phase: Teachers introduce the media to students, explain how to use it, and provide navigation guidance. This phase is crucial to ensure all students can access and use the media effectively (Adhiana et al., 2022). Core Learning Phase: Students use Canva media to learn fractions, both individually and in groups. The teacher acts as a facilitator, guiding and providing assistance when needed (Ruqoyyah et al., 2025). Practice and Reinforcement Phase: Students work on practice questions or interactive activities provided in the media to reinforce conceptual understanding (Listiyoningrum et al., 2024). Evaluation Phase: Teachers evaluate learning using quiz or test features integrated into the media, or through separate evaluation instruments (Isrok'atun et al., 2025).

d. Impact on Student Learning Outcomes and Motivation

The implementation of Canva in fraction mathematics learning has shown a significant positive impact on various aspects of student learning, not only limited to cognitive learning outcomes but also affective and psychomotor aspects.

Improved Conceptual Understanding

The most consistent impact reported across various studies is an increase in students' understanding of fraction concepts. Rif'ati et al. (2025) reported that a STEM-based digital pocketbook designed with Canva significantly improved fraction conceptual understanding, with an effect size of -3.78, which is considered very large. This improvement occurred because interactive visual media helped students visualize the abstract concept of fractions in a more concrete and understandable way. Firdaus et al. (2024) found that interactive media effectively improved fourth-grade elementary school students' understanding of equivalent fractions in their research on Liveworksheet Interactive E-Module. Students who previously had difficulty understanding the concept of equivalent fractions found it easier to understand after using media that presented interactive visualizations and manipulations.

Improved Learning Outcomes

Improved learning outcomes, measured through pretest-posttest tests, showed a consistent positive trend. Sari et al. (2025) reported a significant difference in learning outcomes between the experimental group using a Canva-based module and the control group. Kurnia et al. (2024) found that CANPEC media successfully improved student learning outcomes, with a significant increase in the percentage of students completing the course. Rofiqoh et al. (2020) reported a 32.79% increase in learning outcomes after implementing the Canva-based Math Space Adventure game. This improvement occurred not only among high-ability students but also among medium- and low-ability students, demonstrating that Canva media can accommodate the diversity of student abilities.

Increased Learning Motivation

One important impact frequently reported is increased student learning motivation. Taufiq et al. (n.d.), in a systematic literature review on the effectiveness of Canva media in improving motivation and mathematics learning outcomes in elementary schools in 2022-2025, found that Canva consistently increased student learning motivation. Attractive visuals, bright colors, animations, and interactive elements made learning more enjoyable and less boring. Tristina et al. (n.d.) reported that the use of Canva-based interactive learning media increased student enthusiasm for mathematics learning. Students who were previously passive and less interested in mathematics became more active and enthusiastic when using engaging digital media. Ruqoyyah et al. (2025) added that learning with interactive media has great appeal and relevance for students, motivating student engagement in the learning process and providing a more immersive learning experience by connecting the material to real-life situations.

Increased Engagement and Active Participation

Canva media also has an impact on increasing student engagement and active participation in learning. Ridho'i et al. (2025) reported that engaging learning media encourages active student participation in learning activities.

Students are more likely to ask questions, discuss, and explore fraction concepts independently. Adhiana et al. (2022) in their research on the development of interactive media using Articulate Storyline-based instructional games to teach fractions found that interactive media increases student engagement in learning. Students are no longer passive recipients of information but become active learners who explore and construct their own knowledge.

Digital Skills Development

An additional, equally important impact is the development of students' digital skills. Through the use of Canva-based media, students not only learn mathematics but also develop digital literacy, which is essential in this digital age (Ilham et al., n.d.). Students learn to operate digital devices, navigate applications, and interact with digital content—skills that will be invaluable in their future lives.

e. Challenges and Solutions in Implementing Canva Media

Although Canva has demonstrated high effectiveness, its implementation in Indonesian elementary schools is not without challenges and obstacles. Identifying these challenges and appropriate solutions is crucial to ensuring the widespread success of Canva's implementation.

Technological Infrastructure Challenges

The primary challenge faced is limited technological infrastructure, particularly in schools in rural and remote areas. Laela et al. (2024) identified that not all schools have stable internet access and adequate digital devices for all students. This presents a significant obstacle to the implementation of Canva-based digital learning media. Solutions: Several strategies that can be implemented include: (1) using Canva's offline mode by downloading the media in advance when internet access is available, (2) using digital devices in rotation or in groups, (3) collaborating with local governments and stakeholders to provide technological infrastructure, and (4) developing media that can be accessed with low bandwidth (Gustin et al., 2025).

Teacher Digital Competency Challenges

Not all teachers have sufficient digital competency to develop and implement Canva-based learning media. Tristina et al. (n.d.) reported that some teachers still find it difficult to operate digital platforms and integrate them into their lessons. Solution: Teacher training and mentoring are key. Several studies suggest: (1) intensive workshops and training on using Canva for learning, (2) ongoing mentoring by more competent teachers or IT technicians, (3) the formation of teacher learning communities to share experiences and best practices, and (4) the provision of easy-to-understand tutorials and user guides (Lubis, n.d.; Kusumadewi et al., 2022).

Student Adaptation Challenges

Some students, especially those unfamiliar with digital technology, experience difficulties adapting to digital learning media. Listiyoningrum et al. (2024) reported that in the initial stages of implementation, some students took

longer to understand how to use interactive media. Solution: Effective strategies include: (1) gradual introduction with clear guidance, (2) peer tutoring where students who are quicker to understand help those who are struggling, (3) provision of video tutorials or visual guides, and (4) individual support from teachers for students who need extra help (Octaviani et al., 2024).

The Challenge of Media Development Time

Developing high-quality Canva-based learning media requires significant time and effort. Teachers with already heavy workloads often struggle to find the time to develop innovative learning media (Ramdhani et al., n.d.). Solution: Several approaches that can help include: (1) collaboration between teachers in developing media to share the workload, (2) utilizing templates and resources already available on Canva to expedite the development process, (3) developing a learning media repository that can be accessed and shared by teachers, and (4) allocating dedicated time in teachers' work schedules for learning media development (Aeni, 2024; Feladi et al., 2023).

The Challenge of the Digital Divide

The digital divide between students from wealthy and less-privileged families is a serious challenge. Students from wealthy families generally have better access to digital devices and the internet at home, while students from less-privileged families may only have access to digital media at school (Ilham et al., n.d.). Solution: Strategies to address this gap include: (1) providing digital devices in schools that students can borrow, (2) developing device subsidy or assistance programs for underprivileged students, (3) optimizing the use of digital media in schools so that all students have equal access, and (4) developing alternative learning methods that do not rely entirely on digital access at home (Agustin et al., 2024).

Evaluation and Assessment Challenges

Evaluating learning using digital media requires a different approach than conventional evaluation. Some teachers experience difficulties in designing and implementing assessments appropriate for digital media-based learning (Nurmawati et al., 2020). Solution: Developing an assessment system integrated with learning media is essential. Canva can be integrated with digital assessment platforms such as Google Forms, Quizizz, or Kahoot to facilitate more interactive and engaging evaluations. Teachers also need to be trained in designing assessment rubrics appropriate for digital learning (Isrok'atun et al., 2025).

4. Conclusions

Based on a systematic literature review of 30 recent studies (2020-2025) on the application of Canva media in mathematics learning on fractions in fourth-grade elementary school, several important conclusions can be drawn:

a. High Effectiveness: Canva-based learning media has proven highly effective in improving fourth-grade elementary school students' understanding of fraction concepts. The validity of the developed media reached an average of 82-90%

(highly valid), practicality reached 90-98% (very practical), and effectiveness was demonstrated by significant improvements in learning outcomes with a large effect size (up to -3.78) and a percentage increase in learning outcomes ranging from 25-40%.

b. Variation in Implementation: Canva media can be implemented in various creative and innovative forms, including interactive e-books, digital flipbooks, interactive teaching modules, digital worksheets, interactive presentation media, and educational games. Each format has specific advantages and can be adapted to learning objectives, student characteristics, and school contexts.
c. Multidimensional Impact: Implementing Canva not only improves cognitive learning outcomes but also positively impacts affective (motivation, interest, positive attitudes toward mathematics) and psychomotor (digital skills, digital media navigation skills) aspects. This platform also facilitates more contextual, interactive, and student-centered learning.
d. Implementation Challenges: Despite its effectiveness, the implementation of Canva faces various challenges, particularly related to technological infrastructure, teacher digital competence, student adaptation, media development time, and the digital divide. However, these challenges can be overcome through appropriate strategies such as teacher training, infrastructure provision, team collaboration, and school management support.
e. Relevance to the Indonesian Context: Canva is highly relevant to the Indonesian educational context in the digital era, particularly after the COVID-19 pandemic, which has accelerated digital transformation in education. The platform is user-friendly, accessible on various devices, and has features that support engaging and interactive learning tailored to the characteristics of digital generation students.
f. Contribution to Learning Quality: The implementation of Canva has significantly improved the quality of mathematics learning in elementary schools, particularly for fractions, a topic often considered difficult by students. This tool helps concretize abstract concepts, enhances visualization, and facilitates more meaningful and enjoyable learning.

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