

# DIGITAL BOOKS IN THE LEARNING PROCESS: SYSTEMIC LITERATURE REVIEW

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## ABSTRACT

*Digital books are digital teaching materials that can be integrated with various multimedia, including images, videos, animations or manipulative media. For the next digital book development process, data and information on what types of digital books are and what media have been integrated are really needed. For this reason, a Systemic Literature Review (SLR) was carried out which examined what and how digital books were researched. This research used PRISMA (Preferred Reporting Items for Systemic and Meta-Analysis) guidelines, by searching for Scopus indexed articles in the 2020-2022 period involving a total of 204 articles. After the screening process, 15 articles were obtained which were then analyzed according to the Research Question (RQ) that had been formulated. From the results of the study based on two RQs, it was found that (1) the research design that researches digital books the most is design/development research; (2) The aspect that is least integrated into digital books is animation/manipulative media. These results have limitations in terms of the scope of data sources and the depth of study on the material discussed. So this research provides opportunities for future researchers both in development design and SLR.*

*Keywords: Systematic Literature Review; Digital Books; Research Design; digital media*

## 1. INTRODUCTION

The development of technology affects many aspects of life, one of which is education. One aspect of education that is growing rapidly along with the development of technology is textbooks. Digital books are a learning resource that utilizes information technology in its development. Digital books have many advantages compared to conventional books. One of the advantages of digital books is a good level of flexibility, where they can be used anywhere and at any time. Digital books have many versions, depending on the type of technology integrated with the digital book.

In the learning process, the use of digital books has a positive impact on student achievement. The use of digital books can improve innovative thinking skills, obtain practical information, student creativity and student learning motivation (Radovic, 2020; Budi Aman, 2021). The use of digital books has a different influence on the level of education of students and the duration of application of digital books. Wijaya (2022) concluded that the application of digital books had maximum impact at the pre-school level and with a duration of less than 4 weeks.

Digital books can be varied by integrating images, learning videos, animations, and other manipulative learning media such as Geogebra. Learning videos are not only related to explaining the material, but can also be integrated with videos of real phenomena related to the material being discussed. Apart from that, digital books can also be integrated with manipulative media such as geogebra. Geogebra is a

medium that is able to display exploration of mathematical concepts that can be manipulated by users. For Mathematics material known to have a high level of abstractness, Geogebra media is seen as capable of providing real simulations.

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Therefore, the aim of this research is to determine what types of digital books have been applied to mathematics learning. Through this systematic literature review, this study aims to identify various types of digital books that provide answers to the following questions.

RQ1 : What research methods were used?

RQ2 : What types of digital books have been researched in recent years?

## **2. RESEARCH METODOLOGY**

### **Search Strategy**

This research uses the Preferred Reporting Items for Systemic and Meta-Analysis guidelines (Moher, 2009). This guide includes SLR steps, such as explaining clear criteria, sources of information, search strategies for the selection process and analysis of search results. The search process was carried out with the help of the Publish or Perish application by searching for Scopus indexed articles from 2020-2022. Keywords used in the search process for this article include "Digital book" and "mathematics digital book". Search results, with the keyword "Digital Book" there are 200 articles, and for the keyword "Mathematics Digital Book" there are 4 articles. So the total initial articles obtained were 204 articles.

Selection criteria for the articles obtained are really needed to maintain the suitability of an article. The required inclusion criteria are as follows, (1) published in English; and (2) explain clearly the type of digital book being used/developed. Meanwhile, the required exclusion criteria are (1) the method used is not clearly explained; (2) is preliminary research from another research; (3) the digital book used/developed is not a digital book; (4) the articles obtained are incomplete; (5) not published in English.

A diagram of the article selection process is shown in the image below.

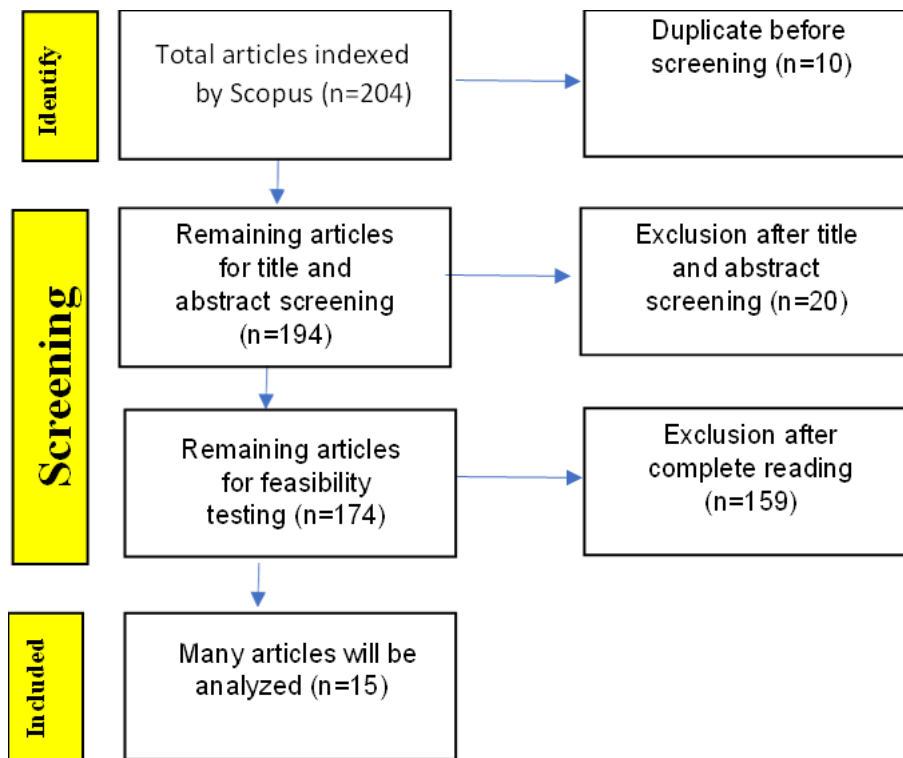


Figure 1. Search and selection process diagram

Illustration of figures and tables must be given identity numbers and information. The illustration must be referred to by the text section. Information is written at the bottom of the picture while information for the table is written at the top. Information is written using Arial 8pt [Center-justified] with sufficient space between the text and the illustration.

The number of articles identified as indexed by Scopus was (n=204). In the first stage, duplication was checked for the identified articles, which resulted in the exclusion of (n=10). So the number of articles remaining for title and abstract screening was (n=194). Exclusions after screening the title and abstract were (n=20) and 174 articles remained for eligibility testing by reading the entire contents of the article. The feasibility test exclusion reduced articles by 159. So the number of articles analyzed was 15.

### 3. RESULTS AND DISCUSSION

#### Results and Discussion RQ1: What research methods were used?

The problem formulation tested first is about the research design that is most widely used in the 2019-2022 time period, which is related to the use/development of digital books. Of the 15 articles that were the output of the screening process, the results of the analysis related to the research design used can be presented as follows.

Table 1. Recap of research design

No	Research design	Source
1	Qualitative	(kucirkova, 2021), (Ismail, 2021). (Yasa, 2021), (Bus, 2020), (Sawitri, 2021)
2	Experiment	(Siano, 2022), (Choi, 2020)
3	Design/development	(Budiman, 2021), (Riyanto, 2020), (Saripudin, 2022), (Faizah, 2022), (Setiyani, 2022), (Awaludin, 2020), (Fitriani, 2021)
4	Meta analysis	(Wijaya, 2022)

Visually, the results in the table above are presented in the diagram below.

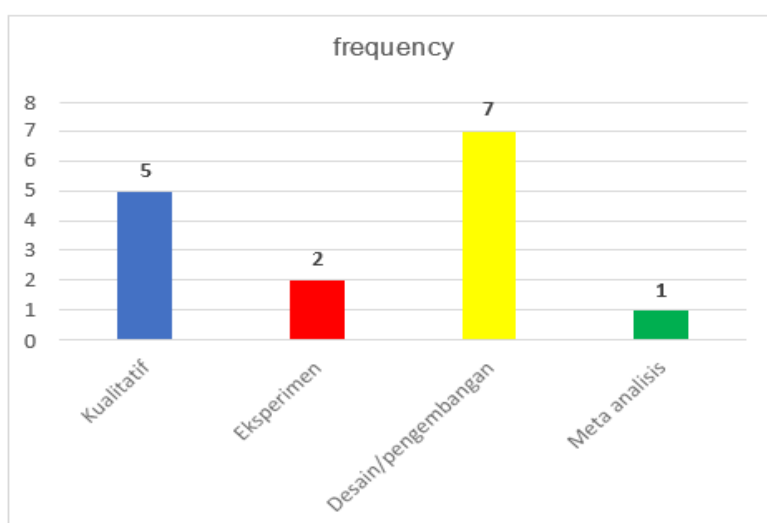


Figure 2. Research design distribution diagram

From the results in table 1 and figure 2 above, it can be seen that 33.33% is qualitative research, 13.33% is experimental research, 46.67% is design/development research and 6.67% is meta-analysis research. The type of research that is most often carried out in relation to digital books is design/development research. This means that there is quite a lot of design/development research related to digital books with their respective qualities.

### Results and Discussion RQ1: What research methods were used?

The second problem formulation is about the aspects integrated in digital books. Aspects that can be integrated are text, images/tables/photos/diagrams, videos, and animation/manipulative media. In a digital book, one or even all four of these aspects can be integrated.

Table 2. Recap of aspects integrated into digital books

No	Aspects in the book	Description	Source
1	Text	Digital books that only contain text material	(kucirkova, 2021), (Ismail, 2021), (Yasa, 2021), (Bus, 2020), (Sawitri, 2021), (Siano, 2022), (Choi, 2020), (Budiman, 2021), (Riyanto, 2020), (Saripudin, 2022), (Faizah, 2022), (Setiyani, 2022), (Awaludin, 2020), (Fitriani, 2021), (Wijaya, 2022)
2	Figures/tables/photos/diagrams	Digital books equipped with pictures/tables/photos/diagrams of phenomena related to the concept being discussed	(Choi, 2020), (Budiman, 2021), (Saripudin, 2022), (Ismail, 2021), (Faizah, 2022),
3	Video	Digital books equipped with videos, both learning videos that contain explanations of concepts or videos of phenomena that occur	(Budiman, 2021), (Awaludin, 2020), (Fitriani, 2021), (Siano, 2022),
4	Animation/manipulative media	Digital books equipped with media in the form of animation and manipulative media	(Riyanto, 2020), (Wijaya, 2022), (Awaludin, 2020),

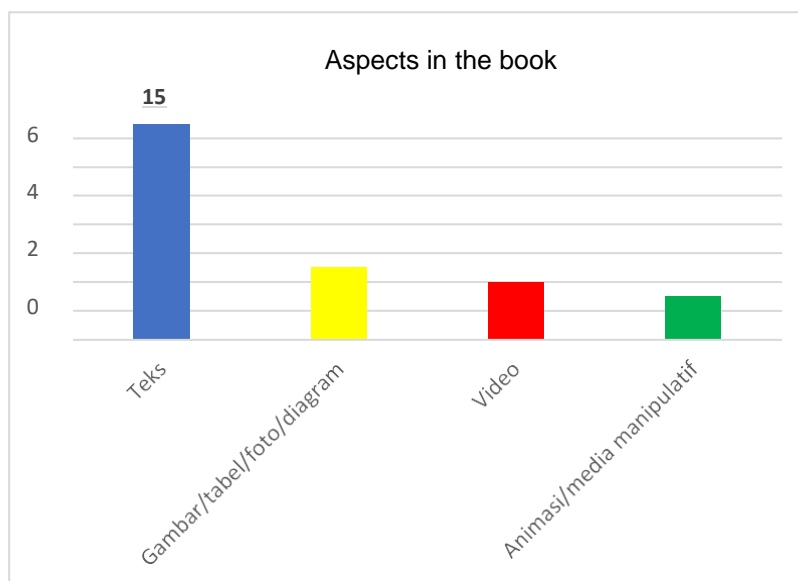


Figure 3. Aspects of the book being researched

From table 2 and figure 3 above it can be concluded that the aspect most researched is text. Text is the dominant aspect for a digital book, so all articles used in this SLR are categorized as containing text aspects. Meanwhile, the aspect that is least integrated in digital books is animation/manipulative media.

Digital books are a learning resource that utilizes information technology in its development. Digital books have many advantages compared to conventional books. One of the advantages of digital books is a good level of flexibility, where they can be used anywhere and at any time. Apart from that, the use of digital books can increase innovative thinking, obtain practical information, students' creativity and motivation to learn (Radovic, 2020; Budiaman, 2021). One manipulative media that can be integrated into digital books is Geogebra or AR.

Much research has been conducted on AR with positive results. The use of AR media provides experiences for students who are able to visualize the abstract aspects of a concept (Faridi, 2020). Furthermore, learning with AR can also make a positive contribution to students' modeling abilities (Cahyono, 2020). Specifically on the topic of geometry, learning with AR makes a contribution and novelty to geometry learning (Hanid, 2022).

### Summary of results

From the results of the analysis of the two problem formulations, it can be summarized as presented in the table below.

Table 3. Summary of research design and types of books studied

No	Research design	Aspects of the book	Source
1	Qualitative	Text	(kucirkova, 2021), (Ismail, 2021). (Yasa, 2021), (Bus, 2020), (Sawitri, 2021)
		Figures/tables/photos/diagrams	(Ismail, 2021)
		Video	
		Animation/manipulative media	
2	Experiment	Text	(Siano, 2022), (Choi, 2020)
		Figures/tables/photos/diagrams	(Choi, 2020)
		Video	(Siano, 2022)
		Animation/manipulative media	
3	Design/development	Text	(Budiman, 2021), (Riyanto, 2020), (Saripudin, 2022), (Faizah, 2022), (Setiyani, 2022), (Awaludin, 2020), (Fitriani, 2021)
		Figures/tables/photos/diagrams	(Budiman, 2021), (Saripudin, 2022), (Faizah, 2022)
		Video	(Budiman, 2021), (Awaludin, 2020), (Fitriani, 2021)
		Animation/manipulative media	(Riyanto, 2020), (Awaludin, 2020)
4	Meta Analysis	Text	(Wijaya, 2022)
		Figures/tables/photos/diagrams	
		Video	
		Animation/manipulative media	(Wijaya, 2022)

Visually, the results in table 3 above can be presented as figure 4 below.

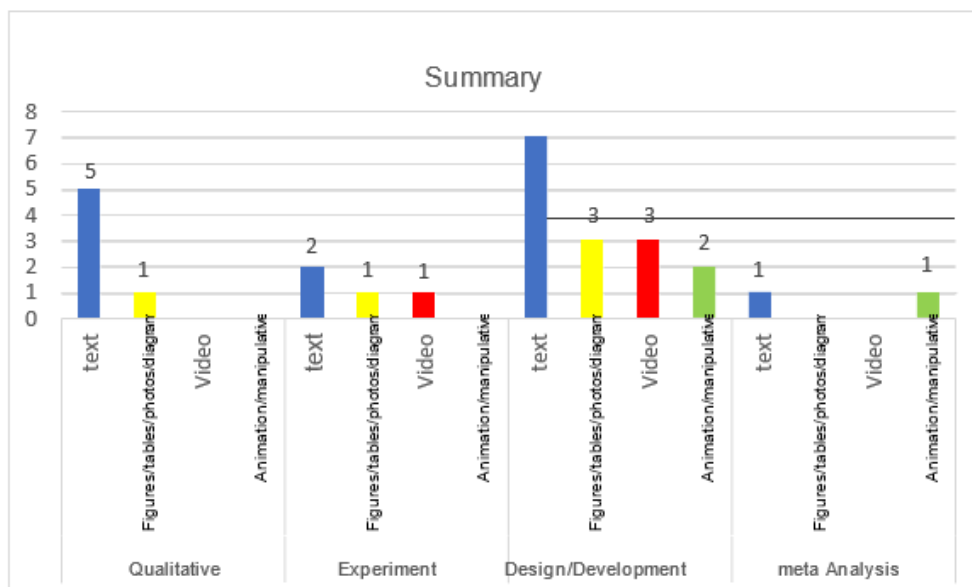


Figure 4. Diagram summarizing the research design and types of books studied

From the summary results in table 3 and figure 4, it can be concluded that each research design is still dominated by text. Perhaps it is natural that text is the dominant aspect of the digital book being studied, because text is the main element in a book. However, if you look more closely, animation elements are still minimally used in digital books for each research design.

#### 4. CONCLUSION

This SLR research reveals what and how digital books are researched. From the results of the analysis of 15 articles that have gone through the screening process, it was found that the research design that researches digital books the most is design/development research. The aspects integrated in digital books are still dominated by text, and quite a few integrate animation or manipulative media in the books studied. These results are certainly an asset in research, especially those that focus on researching digital books.

The results of this research can become basic information for further research. Further research that can be developed includes: (1) developing digital books by integrating aspects that are still minimally researched; (2) SLR by examining in more depth the principles, facts, concepts and procedures in each article.

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