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Development of digital books to improve Al-Qur'an reading fluency in high school students

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ABSTRACT

Technology is developing increasingly rapidly, both in terms of economics, tourism, social and even more so in the world of education. Technology can make it easier to do various things. Education in particular has made various efforts so that students can keep up with the times with developments in science, the provision of teaching materials, supportive learning media, and professional teaching staff. This research aims to identify the need for digital books, design digital books, and measure the level of validity, practicality, and effectiveness of digital books. The problem found during initial observations was that the books were used separately. Apart from that, the ability to read the Al-Qur'an in high school students is based on Islam, a memorization program with an easy method. Al-Qur'an learning has been carried out in previous schools but is still less effective for students' Al-Qur'an reading skills following the rules of good and correct recitation. This is because the time to study Tajwid material is limited. This research combines the Borg and Gall, Four-D, and ADDIE methods, which are focused on the development of digital books. The digital book developed was declared very valid by material and media experts. The level of practicality was measured from questionnaire responses by teachers and students, and from both assessments, it was stated to be very practical.

ABSTRAK

Teknologi yang semakin cepat mengalami perkembangan, baik dari segi ekonomi, pariwisata, sosial dan terlebih lagi dalam dunia pendidikan. Teknologi bisa membuat menjadi lebih mudah untuk melakukan berbagai hal. Pendidikan khususnya, telah melakukan berbagai upaya agar peserta didiknya bisa mengikuti zaman dengan perkembangan ilmu, penyediaan bahan ajar, media pembelajaran yang mendukung, serta tenaga pendidik yang profesional. Penelitian ini bertujuan untuk mengidentifikasi kebutuhan buku digital, mendesain buku digital, mengukur tingkat validitas, kepraktisan dan keefektifan buku digital. Permasalahan yang ditemukan pada saat observasi awal adalah buku yang digunakan terpisah. Selain itu, kemampuan membaca Al-Qur'an pada peserta didik sekolah menengah atas yang berbasis Islam, program hafalan dengan metode yang mudah. Pembelajaran Al-Qur'an telah dilakukan di sekolah sebelumnya tetapi masih kurang efektif terhadap keterampilan membaca Al-Qur'an peserta didik yang sesuai dengan kaidah tajwid yang baik dan benar. Hal tersebut disebabkan karena waktu untuk mendalami materi tajwid terbatas. Penelitian ini menggabungkan metode Borg and Gall, Four-D, dan ADDIE yang difokuskan kepada pengembangan buku digital. Buku digital yang dikembangkan dinyatakan sangat valid oleh ahli materi dan media. Tingkat kepraktisannya diukur dari angket respons oleh guru dan peserta didik dan dari kedua penilaian dinyatakan sangat praktis.

Kata Kunci: *Al-Qur'an; buku digital; tajwid*

INTRODUCTION

Education today is inseparable from technology. Technology is developing rapidly across the economy, tourism, society, and, not least, education. Technology can make it easier to carry out various activities. In education, various efforts have been made to help students keep up with the times through the development of knowledge, the provision of teaching materials, supportive learning media, and professional educators. Educators not only teach but also guide and direct students to remain on the right path, especially during the learning process.

In essence, learning is a process of interaction between students and educators, involving learning materials, delivery methods, learning strategies, and learning resources within a learning environment (Anisa et al., 2020). Today, technology is very helpful in updating regulations, educational methods, learning media, learning resources, and curricula. Media is highly needed in the learning process because it can help students understand. Creative and innovative learning media can motivate students in the learning process (Sinaga & Anas, 2023). Using learning media makes delivering material easier because the media can support its presentation.

Regarding the concept of media in learning, Gerlach and Ely stated that media are events or tools that create supportive learning conditions, allowing students to gain understanding of knowledge, attitudes, and skills. The presence of media in the learning process plays a very important role because it can represent or replace elements that cannot be effectively explained solely through verbal instruction (Fatma, 2021). However, in the modern era, many educators have not integrated learning media innovatively into the teaching process (Rosyiddin et al., 2023). This is due to limitations in mastering learning media and a lack of skills in designing and developing media appropriate for students' needs. These obstacles can arise from both internal factors, such as a lack of motivation or pedagogical knowledge, and external factors, such as limitations in facilities, infrastructure, and environmental support.

Education is a fundamental right for every citizen, as it can improve the life of the nation, as stated in the fourth paragraph of the Preamble of the 1945 Constitution of the Republic of Indonesia. Education is humanity's effort to cultivate personality in accordance with societal values or to help students develop and enhance knowledge, skills, values, attitudes, and behavioral patterns useful for life (Nasution, 2022). In general, education has existed since humans were created. This type of education is widespread in society. General education is initially based on human instinct. Education guided by instinct is followed by education derived from human thought and experience. Humans can develop educational methods as their intellect evolves. The more advanced the development of thought, the more varied how parents educate their children. Education encompasses all aspects of human development (Efendy, 2023). Education aims to elevate humans from a natural to a cultured life. Education is closely related to human cultivation. Cultivating humans itself is a process or effort to improve the life and living conditions of individuals or groups; in simple terms, it is the way of life developed by society (Nugraha, 2022). This potential encompasses the spiritual and religious dimensions, the capacity for self-control, personal integrity, intellectual acumen, noble character, and essential skills that benefit the individual, society, the nation, and the state.

In practice, education cannot be separated from the learning process. An ideal learning process is expected to encourage students to learn optimally through an inspiring, non-monotonous, and enjoyable environment. Learning should provide motivation and space for students to express creativity and solve problems independently according to their abilities. One strategy to achieve high-quality learning is to use learning media. Learning media play an important role in helping achieve learning objectives. Therefore, educators are not only required to have skills in delivering material, but must also possess the competence to select, manage, and integrate learning media appropriately and effectively.

The learning media used in the learning process can vary, depending on the level of need and the learning objectives to be achieved. This is because learning media play a crucial role in supporting the effectiveness of the learning process. One of its functions is to determine whether learning materials are delivered successfully in the classroom. Learning media not only function as intermediaries between educators and students but also play a strategic role in helping students acquire skills, form habits, develop talents, and instill desired values (Rosyiddin et al., 2023). As aids, media help smooth the path toward achieving learning objectives. This is based on the belief that media-supported learning activities enhance students' learning over an adequate period. This means that students' learning activities with media support will produce better learning processes and outcomes than those without media support (Rambe & Rahma, 2020).

The development of information and communication technology in the era of the 4.0 industrial revolution has brought significant changes in various aspects of life, including education. One tangible impact of this development is the emergence of digital learning media, which use digital technology to deliver learning materials (Ashary & Komara, 2022). Digital-based learning media increasingly adopt the principles of interactive, adaptive, and responsive learning design to meet user needs (Setiawan, 2022). Digital books are publications that contain text, images, or audio, presented in digital format and accessible on computers or other electronic devices. E-books, or digital books, are digital versions of printed books that have been digitized, allowing access on devices such as computers, tablets, or smartphones (Ikrimah et al., 2023). Digital books are generally available in file formats that can be downloaded online and read offline after the download process is complete (Nurhikmah et al., 2021).

With these characteristics, digital books have become practical, flexible learning media that align with contemporary demands, making them highly effective for supporting learning, particularly in text-based subjects such as Al-Qur'an and Tajwid. The use of digital books is especially necessary in subjects that combine theoretical and practical elements. The inclusion of features such as instructional videos within digital books allows students to gain a deeper understanding, particularly of practical materials. The integration of digital books and instructional videos not only reinforces students' understanding of practical concepts but also creates opportunities to implement more dynamic, interactive, and contextual learning approaches. In addition, digital books allow personalization, such as adjusting text size and adding notes, tailored to individual students' needs, enabling them to learn most effectively for themselves. From a cost perspective, digital books are often more economical than physical books and more environmentally friendly because they reduce paper use. Thus, the integration of digital books into learning not only enhances the effectiveness and efficiency of teaching and learning processes but also supports environmental sustainability. The development of this digital book employs a constructivist theoretical approach. The constructivist approach to learning provides students with the freedom to discover their own learning styles, based on models prepared by the teacher (Mustafa & Reosdiyanto, 2021). One subject that combines theoretical and practical aspects is Tajwid. Tajwid material is an essential foundation in learning to read the Al-Qur'an, containing the rules of recitation that must be mastered before one can read the Al-Qur'an fluently and correctly. Mastery of Tajwid knowledge is crucial for supporting the skill of reading the Al-Qur'an according to the applicable rules of recitation, as well as facilitating the process of memorizing the Al-Qur'an. The skill of reading the Al-Qur'an, or recitation, is a crucial initial stage in understanding the content of the Al-Qur'an more deeply. The importance of mastering Al-Qur'an reading is also emphasized by Ibnu Sina, who stated that the skill of reading the Al-Qur'an is a primary priority in Islamic religious education (Setiani et al., 2024).

Previous studies have examined the development of web-based Tajwid learning media to improve students' skills in reading the Al-Qur'an. The purpose of this study was to assess the validity, effectiveness, and practicality of developing web-based learning media on Tajwid for eighth-grade students at SMP IT Nurul Fadhillah, Bandar Setia (Sinaga & Anas, 2023). Another study focused on the development of

Android application-based Tajwid learning media. This study aimed to: 1) analyze the development needs of an Android application for Islamic Religious Education subjects, specifically Tajwid material; 2) design the Android application for Islamic Religious Education subjects, specifically Tajwid material; 3) analyze the development of the Android application for Islamic Religious Education subjects, specifically Tajwid material; 4) analyze the implementation of the Android application for Islamic Religious Education subjects, specifically Tajwid material; and 5) analyze the evaluation of the Android application for Islamic Religious Education subjects, specifically Tajwid material (Nadawiyyah, 2021). Finally, a study was conducted on animated videos on Tajwid to improve students' ability to read the Al-Qur'an. This study aimed to develop animation videos based on Tajwid knowledge that are valid, practical, and effective in enhancing elementary school students' Al-Qur'an reading skills (Nasrul, 2024). The difference between these three studies and the present research is that the researcher not only examines the effectiveness and practicality of digital book media but also assesses the practicality of the digital book when implemented in an integrated Islamic school in Makassar, namely SMAIT As-Sunnah.

SMAIT As-Sunnah, located in Makassar City, is an integrated Islamic school that designates Al-Qur'an and Tajwid as separate subjects in its curriculum. The existence of this school is particularly interesting to study, considering that not all integrated Islamic schools give special attention to teaching Al-Qur'an and Tajwid as independent subjects. Based on this phenomenon, the researcher intends to conduct an in-depth study of students' fluency in Al-Qur'an reading at this school and to evaluate the effectiveness of the learning process, particularly the use of digital learning media to support mastery of Tajwid.

LITERATURE REVIEW

Constructivist Learning Theory

Information from the environment is processed through the child's mental structure, thereby helping them understand and construct reality. This basic concept evolves over time, forming a broader perspective informed by their experiences (Suryana et al., 2022). Hariyanto and Mustafa, in their book *"Remedial Teaching in Physical Education"*, argue that effective learning is aligned with the characteristics of the students and utilizes the environment in the learning process to achieve optimal outcomes. Student diversity also encompasses differences across age groups, necessitating needs analyses to support the development of diverse learners. The learning process is more effective when students have direct interaction with the objects they study.

Learning Resources

Learning resources are essential components of the learning process, serving as references, materials, or tools that support the achievement of educational objectives. Specifically, the development of learning resources serves as a guideline for implementing learning and constitutes key elements that must be accessible to students (Anis, 2020; Khaira et al., 2023). Science and technology are two fundamental components that continue to evolve, directly or indirectly exerting significant impacts on various aspects of life, including education (Damayanti & Yuliani, 2023). Technological advancements have driven

innovations in the education system, including adaptive learning systems, mobile-based learning, learning analytics, the use of digital portfolios as assessment and reflection tools, and the development of collaborative and interactive learning environments and communities.

Digital Books

Digital books are electronic versions of conventional books that can be read on digital devices using dedicated software. Gradually, digital books have become an effective alternative learning aid, alongside the increasing use of digital devices, such as tablets, in teaching and learning. The use of digital books requires knowledge and skills to be used wisely, enabling learners to maximize their benefits (Zein et al., 2023). A digital book is a book presented in digital form that offers a more engaging display by presenting text, images, audio, animations, and videos (Chen, 2023). The use of technology in learning is expected to create a more engaging and meaningful learning environment, enabling students to gain a deeper, more memorable learning experience (Syafawani & Prasetyo, 2023).

Flipbook

Flipbooks are a form of digital learning media innovation that combines the concept of conventional books with interactive multimedia technology. Flipbooks are an advancement on e-books, serving as an alternative to facilitate the learning process. In addition, flipbooks are a form of virtual teaching material (Martatiyana, 2022). Flipbooks are a form of teaching material presentation that can be used by students with a display similar to opening and closing book pages, but in digital form (Apriliyani & Mulyatna, 2021). Flipbooks have an attractive display and can insert various videos and images (Amanullah, 2020). The inclusion of images, videos, and audio enhances the delivery of learning materials, making them more engaging (Roemintoyo & Budiarto, 2021). There are several advantages to flipbooks, namely an attractive display of elements such as text, images, audio, and learning videos, which can enhance students' creativity and visual literacy in learning (Hadiapurwa et al., 2021). However, there are also disadvantages to flipbooks, namely that they cannot be easily updated or shared and, so far, can only be accessed online (Maknum et al., 2023).

Fluency in Al-Qur'an Reading

In Islam, the most important act of worship is prayer. Prayer requires the skill of reading the Al-Qur'an properly, which is already considered an act of worship (Fatah & Hidayatullah, 2021). Today, technological advancements are developing rapidly; while they bring positive impacts, they can also cause increasing anxiety in society (Fitria & Marlina, 2022). Efforts to improve fluency in reading the Al-Qur'an have become highly urgent, considering that many children who are learning to read the Al-Qur'an have not yet achieved perfect fluency. Without fluency, a recitation may carry different meanings or interpretations, making fluency an essential part of Tajwid knowledge that must be mastered by Al-Qur'an readers or children learning to read the Al-Qur'an (Realita & Muzfira, 2021).

Mustaḥaq al-ḥarf refers to the attributes that are not permanently inherent in the letters but arise due to certain conditions, such as the *tarqīq* (thin) quality resulting from the property of *istifāl*, or *tafkḥīm* (thick), which originates from the property of *istiʻlā'* (Sinaga & Qorib, 2023). Additionally, a definition states that Tajwid is the science of understanding and correctly pronouncing the letters of the Al-Qur'an, ensuring that the meaning of the verses is not distorted.

METHODS

The type of research employed in this study is development research (Research and Development, or R&D). Research and development is a systematic, structured approach to designing, producing, and evaluating a product's effectiveness in real-world contexts (Ningsih et al., 2020). In the implementation of development research, a needs analysis serves as an essential initial step to assess the effectiveness and relevance of the product, thereby enabling broader application within the community. This study focuses on the process of designing, developing, and validating a product in the form of learning media (see Figure 1). In the educational context, the R&D approach aims to improve the quality of teaching and learning processes and outcomes by developing instructional materials, methods, media, or learning strategies that are more effective, efficient, and contextually relevant.
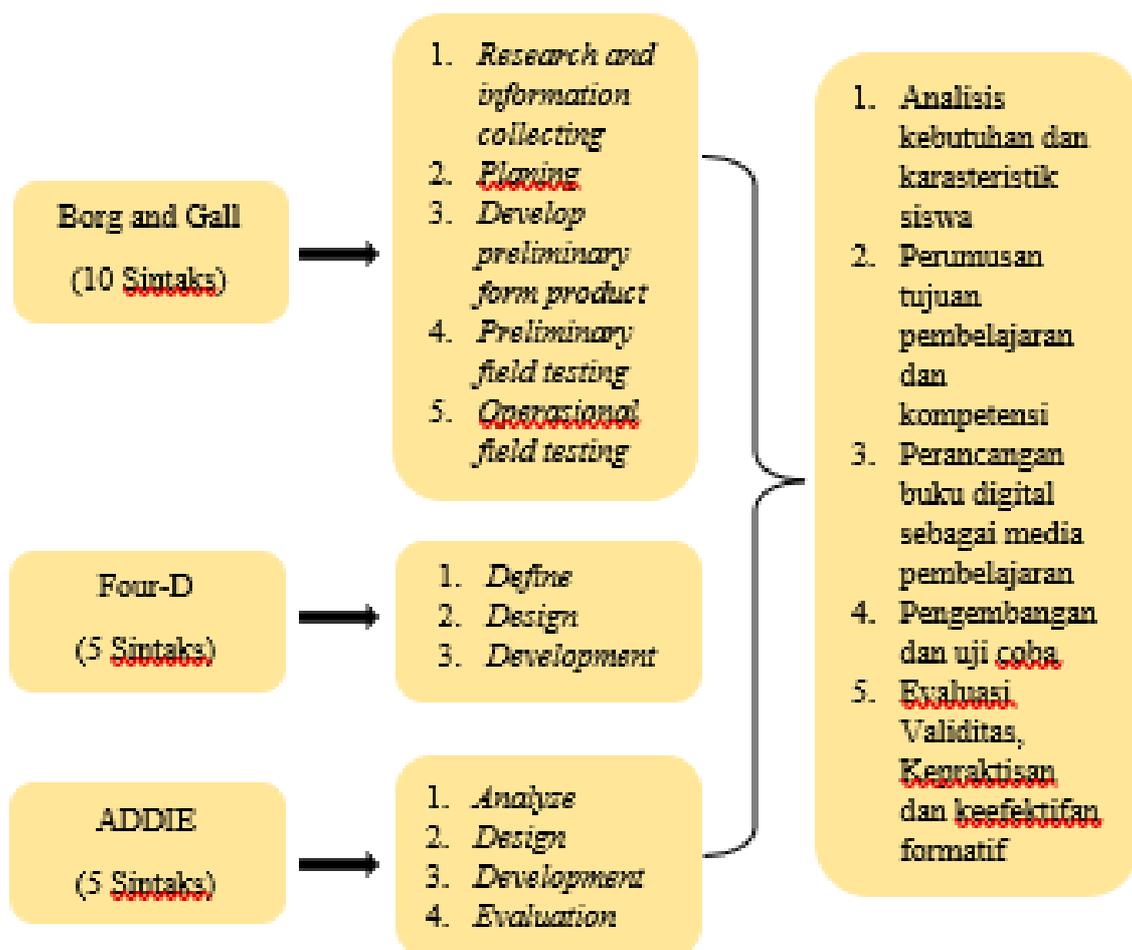
Figure 1. Synthesis of the Digital Book Development Model
Source: Author Documentation 2025

The product developed in this study is a digital book serving as learning media to improve students' fluency in reading the Al-Qur'an at the senior high school level in Makassar. The product development was carried out through a synthesis process that included descriptive steps, critical analysis, and comparative analysis, and culminated in the preparation of the final synthesis. In the development process, this study adopted and integrated three models: the Borg and Gall model, the Four-D Model, and the ADDIE Model. The selection of these three models was made to obtain a more comprehensive and systematic development framework. These models served as references in designing the development flow, which encompassed needs identification, design planning, expert validation, revisions, and limited trials of the developed product.

RESULTS AND DISCUSSION

Level of Need for Digital Books in Al-Qur'an and Tajwid Subjects

The level of need among students was assessed by identifying student characteristics through a needs analysis. The questionnaire results showed that 100% of students reported that teachers used printed books as learning materials in Al-Qur'an and Tajwid lessons. Meanwhile, 81.8% of students reported not being interested in using printed books for learning. About 13.6% reported being sometimes interested in using printed books, citing reasons such as taking notes, marking sections with highlighters, or attaching stickers to the printed book to facilitate learning. Only 4.5% of students expressed interest in printed books because they were easier to mark important sections. This habit positively impacts students' memory retention when studying specific topics (Nuradni *et al.*, 2023). Taking notes and marking important sections accelerates students' ability to locate necessary information, which is why many students still prefer learning using printed books.

Students continued to show enthusiasm when printed books were replaced or supplemented with digital books as learning resources. Approximately 90.9% of students expressed interest in using digital books that include materials, images, audio, and video for Al-Qur'an and Tajwid lessons. Digital books provide a technological experience and are considered more engaging due to the inclusion of images, audio, and video, which cannot be presented in printed books (Budiaman *et al.*, 2021; Prahanai *et al.*, 2022).

Meanwhile, 9.1% of students reported disinterest, citing that reading on screens for extended periods can cause eye fatigue. Overall, 90.9% of students agreed that digital books should be used in Al-Qur'an and Tajwid learning, while 9.1% disagreed for the same reason. The use of digital books requires knowledge and skills to ensure that students can use them wisely and maximize their benefits (Zein et al., 2023).

Based on the needs analysis conducted, it can be concluded that students consider it important to develop a digital book to support the learning process, particularly for Al-Qur'an and Tajwid lessons in the classroom. This is because it can enrich the learning experience and support the achievement of learning objectives. The digital book was developed in accordance with the learning objectives outlined in the teaching module. The entire design was discussed, including the decision to develop the digital book in web format, accessible via mobile phones and Android devices, as well as computers and laptops. The use of technology in learning is expected to foster a more vibrant and meaningful learning environment, enabling students to gain a deeper, more memorable learning experience (Hsbollah & Hassan, 2022).

Design of Digital Book for Al-Qur'an and Tajwid Subjects

Digital book design as an interactive learning medium to support the learning process in Al-Qur'an and Tajwid subjects at the Makassar City High School level. The development of digital books was guided by principles of technology-based learning design and the integration of Islamic values. The material presented in this book includes the nature and *makhrijul* of the *Hijaiyyah* letter. This book presents selected verses as practice material for reading the Al-Qur'an in accordance with the *makhrijul* of the *Hijaiyyah* letter.

The purpose of the digital book design is to provide a learning medium that is easily accessible to students anytime and anywhere, to help teachers deliver material in a more interesting and interactive way, to facilitate independent learning for students with the support of audio, video, and interactive exercises, and to improve students' understanding and skills in reading the Qur'an according to its *mahroj*. The use of technology in learning is expected to create a more lively and meaningful learning environment, enabling students to gain a deep and memorable learning experience (Syafawani & Prasetyo, 2023).

Efforts to improve fluency in reading the Al-Qur'an are urgent, as many children learning to read it do not yet have perfect fluency. Without fluency, a reading may have a different meaning or interpretation, so fluency is part of the science of tajwid that must be mastered by readers of the Al-Qur'an or children who are learning to read the Al-Qur'an (Realita & Muzfira, 2021). Fluency is part of the science of tajwid that must be mastered by readers of the Qur'an or children who are learning to read the Al-Qur'an (Realita & Muzfira, 2021).

Validity Level of the Digital Book for Qur'an and Tajwid Lessons

The validity level of the digital book for Qur'an and Tajwid lessons was determined through a validation process conducted by experts in their respective fields, namely content experts and media experts. Based on the assessment results from media and design validators, the media aspect received a 80% score, indicating a valid category. The design aspect received a score of 91.4%, indicating a very valid category. The usability aspect obtained 91.1%, categorized as very valid. The user aspect scored 90%, categorized as valid. Meanwhile, the utilization aspect received a score of 92%, also categorized as valid. Meanwhile, the assessment by content experts indicated that the learning aspect received a percentage of 96%, indicating a very valid category.

In terms of content, it achieved a 96% validity, indicating a highly valid category. In terms of completeness, accuracy, and meaningfulness, it achieved 97.3%, indicating a highly valid category. Media development must pay attention to the suitability of the material presented with basic competencies, learning indicators and objectives, the correctness of concepts and theories, and the use of grammar in accordance with the characteristics of the students in order to create media that is appropriate and can be used in accordance with the learning objectives to be achieved (Meliyani & Tirtayani, 2022).

Practicality Level of the Digital Book for Qur'an and Tajwid Subjects

The practicality of the digital book for Qur'an and Tajwid subjects was evaluated with subject teachers and tenth-grade students at Senior High Schools in Makassar City. The practicality test aimed to determine the extent to which the digital book could be used easily and effectively, and to support teaching and learning activities both directly in the classroom and independently by students. The practicality assessment was conducted using a teacher response questionnaire, which showed an average percentage of 93.3%. This result indicates that the practicality level falls into the "very practical" category, meaning that the use of the digital book supports the learning process. Meanwhile, the student response questionnaire showed an average percentage of 93.3%. This result also indicates that the practicality level is in the "very practical" category, meaning that the use of the digital book can support the learning process. The questionnaire included several indicators: ease of use, clarity of display, accessibility of features, reading comfort, and support for the Tajwid learning process. In the student response questionnaire, aspects such as the appearance of the digital book, its material, and the student's interest and use of the digital book were included. With such a high level of practicality, this digital book is considered ready to be implemented widely as an alternative learning media for Qur'an and Tajwid subjects. The availability of the digital book in the learning context has the potential to increase students' interest and enthusiasm in understanding certain topics or materials (Lee et al., 2023).

Effectiveness Level of the Digital Book for the Qur'an and Tajwid Subject

Effectiveness was measured using pretest and posttest instruments that assessed students' cognitive abilities in the Qur'an and Tajwid subjects. Before using the digital book, students were given a pretest consisting of 20 multiple-choice questions to assess their initial mastery of Tajwid material, with an average score of 67.6%. After the learning process was conducted over several meetings using the digital book as the main learning media, students were given a posttest with equivalent questions, resulting in an average score of 85.4%. The test included questions on the Qur'an and Tajwid. Based on the students' learning outcomes, the results showed an improvement in learning achievement after using the digital book in the Qur'an and Tajwid subjects. With appropriate learning media, students become more interested and enthusiastic about participating in lessons, making the learning process more effective and enjoyable, such as through digital book media (Zuhri *et al.*, 2023). The development of learning resources serves as a reference for learning implementation and constitutes a fundamental element that must be accessible to students (Anis, 2020; Khaira *et al.*, 2023). The research results are presented in **Table 1** as follows.

Table 1. Research Results

No	Statement	Percentage	Criteria
1	Media and design validation	88,3%	Valid
2	Material validation	97,3%	Very valid
3	Subject teacher response	93,3%	Very practical
4	Student response	93,3%	Very practical

Source: Research 2025

The analysis results in **Table 1** can be explained as follows: the four aspects (media, design, users, and utilization) in the assessment achieved a total of 88.3%, indicating they fall into the very valid category. This result shows that the digital book developed by the researcher is feasible to be tested. Meanwhile, the assessment of the aspects of learning, content, usage, completeness, accuracy, and meaningfulness obtained a 97.3% score, indicating a very valid category. This result demonstrates that the researcher's digital book is appropriate for testing. Furthermore, the results of the teacher response questionnaire showed an average percentage of 93.3%. This result indicates that the level of practicality is very practical, indicating that the use of the digital book supports the learning process. In addition, the student response questionnaire results showed an average of 93.3%. This result also indicates that the level of practicality falls into the very practical category, meaning that the use of the digital book can support the learning process.

CONCLUSION

Based on the results of the research and discussion on the development of a digital book for the Al-Qur'an and Tajwid subject to improve the fluency of Al-Qur'an recitation at the senior high school level in Makassar City, the following conclusions can be drawn: (1) the results of the needs analysis obtained through interviews and questionnaires administered to teachers and Grade X students of SMAIT As-Sunnah Makassar indicate that students require a digital book, in which the digital book to be developed is equipped with photos/images, audio, and learning videos that are attractively packaged so that they can support an engaging learning process; (2) the digital book was designed in accordance with the flow of learning objectives by designing digital teaching materials while paying attention to various elements, such as interactivity, media integration (text, images, audio, and video), and ease of navigation. The initial stage of developing the digital book product began with creating a prototype and a storyboard, followed by designing the teaching materials in Canva. After the Canva design was completed, it was published in another application, namely Heyzine Flipbooks, to complement the digital book's features, such as audio and learning videos. This digital book can be accessed online using smartphones, tablets, laptops, or computers; (3) the digital book has undergone a validity stage consisting of two aspects, namely media validity and material validity. The media validity and the material validity both received a very valid category.

The practicality of the digital book was assessed through teacher and student response questionnaires. The results showed that the teacher response questionnaire toward the Al-Qur'an and Tajwid digital book was categorized as very practical, while the student response questionnaire toward the Al-Qur'an and Tajwid digital book was also categorized as very practical. The effectiveness of the digital book was evaluated by administering pretests and posttests to students to determine whether learning outcomes improved after using the digital book. The pretest and posttest results indicated an improvement in learning outcomes, which fell into the very effective category. In addition, it is expected that this digital book can be used optimally, not only as the main learning resource but also as a supporting tool to help students understand the material more enjoyably.

AUTHOR'S NOTE

The authors declare that there is no conflict of interest related to the publication of this article. The authors affirm that the article's data and content are free of plagiarism.

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