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Development of Technological Learning Media to Increase Students' Civic Knowledge

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ABSTRACT

Objective: This study focused on developing Bekatal learning media (Digital Civics Education) to enhance students' civic knowledge. This was motivated by issues identified in students' understanding of civic knowledge. The study analyzed the feasibility and effectiveness of Bekatal learning media for enhancing students' civic knowledge. **Method:** The research employed the Four D (4D) model, involving samples from both experimental and control classes. **Results:** The findings indicate that the Bekatal learning media developed to enhance students' civic knowledge is feasible for use, with expert The findings show that the Bekatal learning media which was developed to increase students' civic knowledge is suitable for use, with the categories of very appropriate assessment from subject matter experts, very appropriate from media experts, very appropriate from language experts, and very appropriate from evaluation experts. Furthermore, from the results of the t-test, it can be concluded that there is an increase in students' civic knowledge before and after using Bekatal learning media. Based on these data, it can be concluded that the Bekatal learning media is feasible and effective in enhancing students' understanding of civic knowledge. **Novelty:** This research provides an innovative technological learning media that makes users feel the sensation of playing with learning materials by the learning objectives. So that users feel energized and like they are learning but feel like they are playing.

INTRODUCTION

The world is constantly changing and evolving. These changes require humans to adapt to innovations. These shifts are marked by the emergence of various eras currently present in the world, ranging from the era of digitalization, disruption, and globalization to other such periods. These changes are not limited to one or two countries; every country, including Indonesia, is experiencing these new eras. Indonesia has undergone significant changes in its way of life due to the advent of these eras. One era that has brought about substantial change in Indonesia is the digitalization era. The arrival of this era has transformed various sectors of life, from work activities and culture to education. Educational activities that involve aspects of the Industry 4.0 era entail classroom processes and activities that utilize developments in information and technology (Alakrash & Razak, 2020; Bilotta et al., 2021; Hımmetoglu et al., 2020; Moraes et al., 2023; Sein-Echaluce et al., 2024). Therefore, to maximize the use of technology in various aspects of life, the roles of all stakeholders, including educators and parents, are crucial. Parents at home play a significant role in shaping the character of students.

Education in Indonesia currently leverages advancements in digitalization, one form of which is learning media that utilizes digital media to support the learning process. Using these media represents one of the benefits of the digitalization era in Indonesia. Adaptations must accompany the rapid changes in era and technology.

in educational institutions (Al-Haddar et al., 2023; Crawford, 2023; Flores et al., 2022; Núñez-Canal et al., 2022; Ssemugenyi & Nuru, 2021). Educational institutions must be able to adapt to the changes of the times (Astuti, 2022). The learning process is inherently enjoyable for everyone, but using methods that align with the current changes and the development of informatio technology from the Industry 4.0 revolution allows educators to develop numerous learning media during the educational process (Aransyah et al., 2023)

Digital media usage among teenagers and children is relatively high. This situation presents opportunities and threats for future generations if there are misuses of the digital media they employ. Fundamentally, using digital media can enhance the attractiveness of the learning process for students because incorporating digital components into learning can diversify learning patterns and increase student engagement. According to Wisnu et al. (2021), learning through digital media can concretize abstract concepts, thereby enhancing students' understanding of the learning objectives they aim to achieve.

Nurrita (2018) suggests that learning media serve as tools to aid the learning process between educators and students, clarifying the message conveyed and helping achieve educational goals more effectively and efficiently. According to Aghni (2018), types of learning media that can be developed and applied in the learning process include 1) Visual Media, 2) Audio-Visual Media, and 3) Multimedia. Learning media facilitates communication and interaction between educators and students within the learning process; without such media, the learning process would be compromised. Learning media helps teachers and students better understand the material (Noviani et al., 2022). Learning media plays a crucial role in the teaching and learning process, similar to a bridge as a tool to achieve a goal (Daryanes et al., 2023; Degner et al., 2022; Dita et al., 2021; Hursen, 2021; Sholihin et al., 2020; Yu et al., 2022). The presence of media provides tangible benefits to the teaching and learning process. Media use is expected to impact positively, such as creating a more informative learning process, generating feedback in the teaching and learning process, and achieving optimal results (Febrita & Ulfah, 2019). The selection and determination of appropriate learning media make using media in the learning process increasingly important. Media use can be considered on par with how it is used in the learning process, as the method and media have a synergy in supporting the learning process conducted according to the learning needs carried out by the teacher in the classroom.

Digital media can enhance students' civic knowledge because it can be accessed anywhere and anytime, thereby increasing students' learning independence. Ideally, the use of digital media in education should serve as a basis for increasing students' interest and engagement in their learning (Chiu, 2021; Heilporn et al., 2021; Murillo-Zamorano et al., 2021; Rahmatullah et al., 2022; Wekerle et al., 2022). However, many educational institutions have yet to fully optimize the role of digital media due to its difficulty of use for senior educators, lack of user-friendly design, and the need for more excellent knowledge and experience. These factors contribute to the limited implementation of digital media in educational settings.

According to Wijaya et al. (2021), the success of digital media usage, besides the technology and media itself, is also influenced by the proficiency of the human resources managing the media as operators. Hasiru et al. (2021) identify effective learning media indicators as 1) Creating motivational learning, 2) Enhancing learning outcomes, and 3) Enabling students to remember and apply acquired knowledge.

Research observations conducted through interviews with educators and students revealed difficulties in enhancing students' understanding of civic knowledge in the fourth grade. Furthermore, students are insufficiently involved in using technologically supported learning media, resulting in a less comprehensive absorption of the learning material.

Based on student pretest data in five elementary schools, consisting of 108 students with a minimum passing criterion of 70, an average civics knowledge score of 56 out of 100. The percentage of students who passed (34.2%) and those who did not (65.7%) show significant problems in understanding civic knowledge among students. This phenomenon occurs in the educational environment where students today are more actively and intensively engaged with gadgets than textbooks at home and in school. This presents a unique challenge in the educational field. Educators have the task of imparting understanding related to the teaching materials to achieve learning objectives. However, if students are more intensely engaged and interested in their gadgets than their textbooks, this poses a particular challenge for educators.

The needs analysis conducted by the researcher among educators revealed the following: 100.0% of teachers enjoyed teaching Civics, 100.0% used educational media to deliver lessons, 100.0% taught about civic knowledge, and all agreed on the development of an Android-based learning media application to enhance civic knowledge. Thus, it can be concluded that in Civics education, educators seldom utilize ICT-based learning media, while students require interactive and varied learning to enhance their civic knowledge. Therefore, developing Bekatal learning media (Digital Civic Education) is necessary and crucial for efficiently achieving learning objectives.

The analysis of students' needs yielded the following results: 96.0% of students enjoyed Civics education, 92.0% of teachers used learning media to deliver content, 60.0% of students were interested in the development of Android-based learning media, 80.0% of students engaged in learning about civic knowledge, and 75.0% agreed on the development of Android-based learning media to enhance civic knowledge. This data indicates that although media are used in civics education, the dominant media are conventional and not IT-based. This results in students' less effectively capturing the material due to the lack of adequate and varied media tailored to students' needs. This demonstrates the importance of using student-needed media, such as Bekatal learning media (Digital Civic Education), to facilitate students' understanding of civic knowledge.

Teaching materials play a crucial role in shaping the knowledge, skills, and attitudes required for students to achieve competency standards. As an integral part of the curriculum, teaching materials are central in preparing efforts to achieve the desired learning competencies. Civic knowledge falls within the cognitive domain as it involves understanding and knowledge about the government system, history, and concepts of citizenship, which are crucial for every citizen to understand (Imronah et al., 2022).

The concept of optimizing civic education to enhance students' civic knowledge through media involves creating, innovating, and collaborating between explanations of civic education and civic knowledge with existing media (Hariyanti & Filma, 2020). Through Civic Education, students are encouraged to understand global issues' complexities and take appropriate actions in response to these global challenges. Since global challenges cannot be deferred to others, each individual is expected to bear personal responsibility for maintaining global welfare while respecting the rights and obligations of others. Conceptually and theoretically, civic education equips students with the ability to think creatively, not just memorize lesson material.

Often, the intended learning objectives of education are not realized due to various factors, including educators' lack of innovation in using learning methods, conventional teaching methods, the lack of variety in learning media used, and not employing the latest learning techniques, media, or other teaching tools. This can lead to a decline in students' civic knowledge, impacting the achievement of the learning objectives themselves (Kadariah et al., 2020).

Based on the problems described, researchers see an opportunity to take advantage of students' tendencies towards Android gadgets and technology for use in learning. Therefore, researchers are interested in conducting research with the title "Development of technological learning media to increase students' civic knowledge". with the problem formulation: How is the development of appropriate Bekatal learning media to increase students' civic knowledge? and How effective is the Bekatal learning media for increasing civic knowledge in its implementation in elementary schools?

RESEARCH METHOD

The type of research employed in this study is Research and Development (R&D), which is utilized to produce a product. The research model used is the 4-D model. According to Thiagarajan (1974), the 4D (Four D) model is a systematic approach where this guidebook is structured based on previous models and actual field experiences in designing, developing, evaluating, and disseminating teacher training materials in special education. This model is frequently used in designing and developing new curricula, educational media, or teaching materials. The 4D stands for the four main stages in this model: Define, Design, Develop, and Disseminate. The flow of research activities is shown in Figure 1.

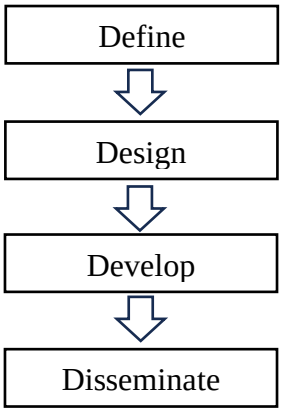

Figure 1. Reserch design.

This study employed an experimental class at elementary school A and a control class at elementary school D. Purposive sampling was used for sample selection because both schools share characteristics, as determined by the researcher. The instruments used in this study include non-test instruments (surveys) and test instruments (test items).

The data analysis techniques used by the researcher include the prerequisite instrument test, feasibility test, practicality test, and effectiveness test. These tests were conducted using the SPSS 26 software.

RESULTS AND DISCUSSION

Results

The presentation of research results regarding validity, practicality, and effectiveness was carried out through consultations with four experts: content, media, language, and evaluation experts. Product Feasibility Assessment Criteria include 0.0% - 25.0% very unfeasible criteria; 26.0% - 50.0% criteria are not feasible; 51.0% - 75.0% feasible criteria; and 76.0% - 100.0% very feasible criteria(Sugiyono, 2010). The calculation results can be seen in the Table 1.

Table 1. Content expert validation results.

No.	Aspect	Frequency				Number of Items	Total Score	Max Score	Percentage (%)	Criteria
		1	2	3	4					
1	Construction	0	0	3	6	9	33	36	91.6	Highly Feasible
2	Civic Knowledge	0	0	3	1	4	13	16	81.2	Feasible
3	Language	0	0	0	4	4	16	16	100.0	Highly Feasible
Total						**17**	**62**	**68**	**91.1**	**Highly Feasible**

Table 2. Language expert validation results.

No.	Aspect	Frequency				Number of Items	Total Score	Max Score	Percentage (%)	Criteria
		1	2	3	4					
1	Clarity	0	0	2	1	3	10	12	83.3	Highly Feasible
2	Communicative	0	0	0	1	1	4	4	100.0	Feasible
3	Interactive	0	0	3	0	3	9	12	75.0	Highly Feasible
4	Compatibility with Students' Development	0	0	3	0	3	9	12	75.0	Highly Feasible
5	Logical Sequence and Integration	0	0	3	0	3	9	12	75.0	Highly Feasible
6	Use of Symbols or Icons	0	0	1	1	2	7	8	87.5	Highly Feasible
Total						**15**	**48**	**60**	**80.0**	**Highly Feasible**

Table 3. Media expert validation results.

No.	Aspect	Frequency				Number of Items	Total Score	Max Score	Percentage (%)	Criteria
		1	2	3	4					
1	Relevance	0	0	1	1	2	7	8	87.5	Highly Feasible
2	Completeness and Systematic Development	0	1	3	0	4	11	16	68.7	Feasible
3	Compatibility of Learning Media with Material	0	0	3	3	6	21	24	87.5	Highly Feasible
Total						**12**	**39**	**48**	**81.25**	**Highly Feasible**

Table 4. Evaluation expert validation results.

No.	Aspect	Frequency				Number of Items	Total Score	Max Score	Percentage (%)	Criteria
		1	2	3	4					
1	Cover Design	0	0	2	4	6	22	24	91.6	Highly Feasible
2	Content Design	0	0	3	1	4	10	16	62.5	Feasible
Total						**10**	**32**	**40**	**80.0**	**Highly Feasible**

After conducting the validity tests, the researcher proceeded with practicality tests. These tests aimed to determine whether the Bekatal learning media is practical for educators and students. To measure this practicality, tests were conducted on students through a small group trial with ten respondents, a large group trial with 23 respondents, and a practicality trial involving two educators. The results of the practicality tests are as in Table 5.

Table 5. Practicality test results.

No.	Aspect	Percentage (%)	Category
1	Small group trial result	86.2	Very Good
2	Large group trial result	87.8	Very Good
3	Educator practicality test results	99.5	Very Good
Holistic Aiken Index		**91.1**	**Very Good**

Discussion

The Bekatal learning media was developed by outlining learning objectives, the sequence of learning goals, and achievement indicators based on the specified learning outcomes. This media was created using the Articulate Storyline 3 application. Articulate Storyline is a software application that functions as a support tool in learning (Hafiedz & Nurhamidah, 2023). The development process requires validity testing to ensure the product can be appropriately used in the learning context. The learning media undergoes testing by experts in the subject matter, language, media, and evaluation to determine its level of validity. Here are the results of the Bekatal product developed by the researcher.

Table 6. Bekatal learning media storyboard.

No.	Subsection	Display	Description
1	Cover		The login page is where the user enters their personal information, such as name and school origin, to proceed to the next stage.

No.	Subsection	Display	Description
2	Education Level		This screen prompts users to select their education level to tailor the learning material.
3	Grade Level		The user can choose their grade level to customize the learning material.
4	Main Page / Main Menu		This page contains options for learning materials, practice/evaluation, and additional information that the user can access.
5	Main Menu "Learning Material"		This page contains learning materials aligned with the learning outcomes.
6	Learning Information Display		The learning information page contains the learning outcomes and the sequence of the user's learning objectives.

No.	Subsection	Display	Description
7	"Teaching Material" Page		This page contains teaching materials, videos, texts, and feedback columns for specific content.
8	"Practice / Learning Evaluation" Page		The user is asked to select the level for the practice exercises.
9	"Practice / Learning Evaluation" Page		This page contains evaluations of the student's knowledge based on the teaching materials.
10	"Information" Page		This page contains information about the application, including its creators, developers, supervisors, and reviewers.

The testing results from the experts yielded the following data: subject matter experts rated it at 81.25%, media experts at 80.0%, language experts at 80.0%, and evaluation experts at 91.1%. Thus, it can be concluded that the Bekatal learning media product is considered highly feasible. Validation is conducted to obtain suggestions and feedback for improving the developed product. The suggestions and feedback provided by the experts serve as a reference for the researcher to make necessary improvements.

The validity of the product was then tested with a small group consisting of 10 respondents and two educators. Both groups generated data, with students scoring 86.1% and educators 99.5%. Therefore, the Bekatal learning media falls into the 'outstanding' category. Consequently, as a follow-up action, the researcher conducted tests with a larger group to determine whether the Bekatal learning media effectively enhances students' understanding of civic knowledge. The purpose of assessing the effectiveness of the Bekatal learning media was to determine how much it enhances students' understanding of civic knowledge. The research utilized a control group and an

experimental group, with the control group scoring an average of 55 in the pretest and 63 in the posttest and the experimental group scoring 54 in the pretest and 77 in the posttest. This data indicates a significant difference in treatment between the control and experimental groups.

This research uses the Independent Sample T-test to compare two different samples. The calculations for this test use the formula from Sugiyono (2010). Analysis carried out using SPSS 26 shows that the independent t-test produces a significance value of 0.006, more diminutive than 0.05. Therefore, it can be concluded that the null hypothesis (H0) is rejected, and the alternative hypothesis (Ha) is accepted; this shows that the Bekatal learning media is effective in increasing students' understanding of civic knowledge. After performing the independent sample t-test, the researcher conducted the N-Gain Score test to measure the effectiveness of the educational treatment in the experimental and control classes (Magdalena & Angela, 2019). The analysis revealed that the overall N-Gain Score for the students was 0.4, interpreted as moderate. Therefore, based on the N-Gain Score, there was a noticeable improvement in the pretest and posttest scores after implementing the Bekatal learning media.

Based on validity, practicality, and effectiveness tests, the development of the Bekatal learning media to enhance students' civic knowledge concludes that the Bekatal learning media can enhance students' civic knowledge and can be used in further learning contexts. When learning sessions were conducted using the Bekatal learning media, students were observed to understand the teaching material more easily and tended to be more active compared to conventional learning settings. This resulted in improved comprehension of civic knowledge.

This study focuses on indicators of civic knowledge, including noble humanitarian virtues, strong nationalism, professional conduct inspired by a sense of national defense, and awareness of rights and duties as citizens. The analysis results from this study indicate a difference in students' understanding of civic knowledge, as evidenced by the percentage gains for each civic knowledge indicator from the pretest to the posttest. These data show improvements in scores for each indicator after treatment with the Bekatal learning media. Based on the analysis obtained during the research, the low understanding of civics knowledge among students is caused by educators' lack of variety in teaching methods and the limited use of technology in teaching, still relying on conventional methods, thereby reducing students' enthusiasm and causing passive learning participation.

According to Tiwow et al. (2022), the choice of learning media influences students' interest in learning, influencing their understanding of civic knowledge. Choosing technology-based learning media has been proven to increase students' interest and understanding of civic knowledge. The impact experienced by users after using Bekatal learning media is increasing students' understanding of civic knowledge, which can influence users' thinking and action patterns. Technological learning media can increase students' civic knowledge. Based on tests conducted by researchers, it can be concluded that the Bekatal learning media was declared feasible and effective in increasing students' understanding of citizenship.

CONCLUSION

Fundamental Finding: The results from this development research indicate that (1) the Bekatal learning media product (Digital Civics Education) developed using the Four D (4D) model has been validated by experts in content, language, media, and evaluation.

Furthermore, this learning media product is declared practical, effective, and feasible for use in educational settings by both students and educators. **Implication:** Educators are encouraged to use this Bekatal learning media as it has proven to enhance students' civic knowledge. This is attributed to the learning media design, which engages users as if playing a digital game, thereby activating participatory learning that impacts the improvement of civic knowledge. **Limitation:** This learning media has yet to be able to connect and integrate into a single server, resulting in learning outcomes that are not automatically available in one platform but require educators to collect students' learning results manually. **Future Research:** Future researchers are encouraged to refine the development of the Bekatal learning media to include an integrated platform with accounts for students and educators, allowing for automatic recording of learning outcomes into educators' data.

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