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Development of Skinner-Based 'Civic Domain' E-Learning Platform to Enhance Civic Education Motivation at Undiksha Lab High School

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Abstract

The low motivation of students to learn in Civic Education shows the need for learning media innovations that are more interactive and in accordance with the characteristics of 21st century students. One relevant approach is the development of digital media based on Skinner's reinforcement theory, which emphasizes the gradual provision of stimulus, response, and positive reinforcement. This research aims to develop the Civic Domain e-learning platform as a valid, practical, and potentially effective Civic Education learning media to increase students' learning motivation. The method used is Research and Development (R&D) with the ADDIE model, but the research is focused on the needs analysis stage as well as the design and development of the initial product. Needs data were obtained through questionnaires, interviews, and observations involving teachers and students of Undiksha Lab High School. The results of the analysis show that PKn learning still tends to be monotonous, does not utilize interactive media, and has not been able to generate motivation to learn. Based on these findings, a prototype of the Civic Domain platform was designed and developed with automated quiz features, digital discussion forums, badge systems, and instant feedback. These initial products are then validated by material experts, media experts, and learning experts to ensure the feasibility of content, display, and pedagogical aspects. The conclusion of the study shows that the Civic Domain platform is worthy of further development as a learning medium for PKn. Implication, this platform has the potential to increase student engagement and motivation and can be an alternative to digital innovation in civic education.

Keywords: *Civic Domain, Civic Education, learning motivation*

1. INTRODUCTION

The rapid development of technology and information has brought significant transformations in various aspects of life, including education. Digitization of education is now an absolute necessity, especially in responding to the challenges of the times that demand learning to be more flexible, interactive, and accessible to students. However, the reality on the ground shows that not all students are able to take advantage of these developments to the fullest. Many students are still confused in finding learning sources that are relevant, valid, and appropriate to their needs. The information spread on the internet is vast (Zhao et al., 2022), But not everything is structured and reliable, so students are like "looking for diamonds in the garbage heap". This causes the learning process to be inefficient and has the potential to reduce students' interest and motivation to learn.

Conventional learning methods that still use paper-based systems are starting to lose their effectiveness, especially in Civics Education where student engagement rates remain very low. Many students feel bored and disinterested when they have to learn through print modules or conventional media. When learning methods are no longer in accordance with the characteristics of the digital generation, what happens is a decrease in student engagement,

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motivation, and even learning outcomes. This condition is reinforced by the findings of Pintrich and De Groot (1990) who emphasize that motivation and self-regulated learning play an important role in students' academic achievement. Therefore, it is very important to present technology-based learning innovations that are able to answer the real needs of students (Theobald, 2021).

According to Skinner (1968), through the concept of operant conditioning, learning will be more effective if positive reinforcement is used to improve learning response(Kurnia Sari & Hanifah Rahmani, 2024). In the context of digital education, this translates into the systematic implementation of instant feedback, progressive reward systems, and structured learning paths that can significantly affect student engagement and learning outcomes. The study operates within a comprehensive theoretical framework that systematically connects three fundamental components to direct the development of the platform. First, the principles of conditioning Skinner's operants serve as pedagogical foundations, specifically emphasizing positive reinforcement through instant feedback mechanisms, variable reinforcement schedules that maintain long-term engagement, and behavior formation through progressive learning modules. Second, digital reinforcement mechanisms are implemented through specific technology features, including automated quizzes with instant assessment results, a digital badge system that provides visual achievement recognition, a comprehensive progress tracking dashboard, and interactive feedback loops that respond to student actions. Third, the objectives of civic education include the development of mastery of civic knowledge through the delivery of structured content, the internalization of democratic values through interactive scenarios, and the development of active citizenship through practical application exercises. The synergistic integration of these three components creates a learning environment based on theory, where digital tools function as a vehicle for systematic behavior reinforcement while simultaneously achieving specific civic education learning outcomes.

In this context, the Civic Domain platform was developed as an e-learning-based civic education learning solution that combines access to learning materials, assignments, discussions, and evaluations in one integrated system. The platform is not only designed to make it easier for students to access information but also to apply the principles of B.F. Skinner's behavioristics learning theory. The platform implements Skinner's theory by providing immediate feedback, dividing the material into small steps, and implementing a digital reward system that encourages students to keep learning(Kurnia Sari & Hanifah Rahmani, 2024).

In a study conducted by Agnestin, Abdulkarim, and Rahmat (2021) (Agnestin et al., 2022), it has been proven that the use of e-learning in Civics Education subjects can significantly increase students' knowledge of civics, which can be seen through an increase in learning outcomes that reaches more than 70%. In addition, the use of this digital platform has also proven to be effective in presenting a more fun and interactive learning process. The results of this study are in line with the theory of self-autonomy which shows that in intrinsic motivation, students will be able to improve themselves when they feel that the learning they follow has meaning and gives them control as well as the learning process itself (Bureau et al., 2022).

Based on the identified gaps and theoretical framework, this study answers three specific research questions that guide the development and analysis of the platform. First, this study explores how the development of a Skinner-based "Civic Domain" platform can effectively increase student motivation and engagement in Civic Education learning, by analysing specific design features and implementation strategies that contribute to a better learning experience. Second, this study analyses the role of Skinner's reinforcement theory in shaping the platform's digital learning mechanisms, by examining how the principle of positive reinforcement is translated into concrete technological features such as automatic feedback

systems, progressive reward structures, and behaviour formation modules. Third, the study explores the perceived advantages and limitations in the implementation of the "Civic Domain" platform for Civic Education from both theoretical and practical perspectives, investigating the potential benefits of a digital learning environment based on behaviorist theory along with the challenges and limitations that may arise during the development and implementation of the platform.

The development and analysis of the Civic Domain platform represent a systematic approach in creating theory-based digital learning solutions that address specific pedagogical challenges in civic education. The study aims to contribute to this field by showing how established learning theories can be effectively translated into practical digital tools that not only improve cognitive abilities, but also encourage students' motivation and engagement in learning through affective and psychomotor aspects (Hardiyanti et al., 2025). The integration of Skinner's behavioristic principles with modern e-learning technologies offers a promising path to creating a more effective and engaging civic education experience, which prepares students to become active citizens in the digital age policies.

2. METHOD

This research is designed using a Research and Development (R&D) approach with the ADDIE development model which consists of five stages, namely analysis, design, development, implementation, and evaluation. However, this research is focused on two main stages, namely the study of needs and the creation of the Civic Domain platform as an initial product. The first stage needs assessment. This activity aims to map real problems in learning Civic Education at SMA Lab Undiksha. Needs data were obtained through the distribution of questionnaires to students, interviews with teachers, and observation of the learning process in the classroom. Through this needs study, it is hoped that the main obstacles faced in conventional learning can be depicted, such as low student motivation, methods that tend to be monotonous, and limited interactive learning media. In addition, this stage is also used to identify relevant and needed features in the platform, such as automated quizzes, digital discussion forums, award badge systems, as well as instant feedback in accordance with the positive reinforcement principle in Skinner's theory.

The second stage is product design and development. At this stage, the initial design of the Civic Domain platform was created in the form of a storyboard, navigation flow, and user interface design. Citizenship Education materials are arranged in the form of gradual modules that refer to the principle of operant conditioning, namely learning that breaks down the material into small parts, provides simple exercises, provides instant feedback, and presents reinforcement in the form of digital rewards. Once the design is compiled, the platform is then developed into a prototype based on a Learning Management System (LMS) or interactive web application. This initial prototype was validated by media experts, material experts, and learning experts to assess the feasibility aspects of the display, the accuracy of the content, and the suitability with the objectives of civic learning.

The object of this study is the Skinner-based Civic Domain platform developed as a digital learning medium. The subjects of this study include high school students at Undiksha Laboratory who participated in the needs assessment study, Civic Education teachers as sources of information and assessors of learning needs, as well as media experts, subject matter experts, and learning experts who acted as product validators. Data collection techniques were carried out in several ways. Questionnaires were used to obtain an overview of the needs of students and teachers regarding the digital learning platform. Interviews were used to explore more in-depth information about learning obstacles and expectations from the teachers' perspective. Observations were carried out to determine the actual conditions of the Civic Education learning process in the classroom. Meanwhile, validation sheets were used at the product

development stage to assess the quality of the platform design in terms of content, appearance, and pedagogical aspects.

Data analysis was carried out qualitatively and quantitatively. The data from the questionnaire was analyzed in a quantitative descriptive manner by calculating the percentage of tendencies in needs and obstacles experienced by students. Data from interviews and observations were analyzed qualitatively by reducing, grouping, and arranging the main themes that describe learning needs. Data from expert validation is analyzed by calculating an average score to determine the feasibility of the product, then combined with qualitative comments from validators to improve the platform's design. With this methodology, the research is expected to be able to produce an initial product of the Civic Domain platform that meets user needs, is validated by experts, and is ready for further testing in the next phase of research.

3. RESULT DAN DISCUSSION

3.1 The Nature of Civics Education Learning through the "Civic Domain" Platform at SMA Lab Undiksha

The needs study shows that students consider PKn learning to be less interesting and boring. Teachers recognize the need for media that can provide instant feedback, motivate students, and facilitate active learning. These results reinforce the urgency of technology-based innovation in civic learning. Civic Education (PKn) learning in schools still faces challenges, especially related to low motivation and student involvement in the learning process. Students tend to assess the monotonous learning of PKn, while teachers emphasize the importance of media that is able to provide instant feedback and facilitate active learning. Various studies show that e-learning-based digital learning media has the potential to be a solution to this problem. Nabila's research (2025) found that the implementation of interactive learning media in Civic Education significantly **increased students' motivation and enthusiasm for learning** (Irfiani et al., 2023). In addition to the motivation aspect, the effectiveness of e-learning in improving learning outcomes has also been proven in several studies. Agnestin et al. (2021) stated that the use of Schoology as an e-learning-based learning media in Civic Education was able to increase the achievement of civic knowledge, with learning completeness reaching **70.7%** (Tanshzil et al., 2022) These findings reinforce that digital platforms designed specifically for PKn have a positive contribution to improving student understanding.

Furthermore, the development of Civic Education in the digital era is not only oriented towards academic achievement, but also emphasizes strengthening the competence of citizenship in the 21st century. Halimi et al. (2022) emphasized that online learning can improve the quality of Civic Education if digital technology is effectively integrated into the curriculum and the materials presented can foster digital literacy, critical thinking, and 21st century skills (Halimi et al., 2022) Thus, digital platforms such as **Civic Domain** not only function as a learning medium, but also as a vehicle for the formation of competent digital citizens. The innovation aspect is also one of the important needs in PKn learning. Purnama et al. (2022) research that developed a digital media called "Bekatal" shows that game-based learning strategies can make students feel learning while playing, so that the understanding of the concept of citizenship increases significantly (Purnama et al., 2024). This shows that e-learning platforms should be packaged in an interactive, interesting, and meaningful form. On the other hand, providing quick feedback through interactive quizzes has also been shown to be effective in increasing learning motivation. Sewang & Mustapa (2022) proved that quiz-based learning strategies with instant feedback in PPKn subjects can drastically increase student motivation, from an average score **of 79.33 to 101.77** in just two learning cycles (Uyun, 2025). Based on the results of these studies, the development of the **Civic Domain** platform is relevant and

urgent. The platform is designed as a simple e-learning medium that is widely accessible, easy to use by teachers and students, and able to increase motivation, deepen understanding of concepts, develop 21st century competencies, and provide instant feedback. Thus, **Civic Domain** is present as an innovative solution that supports the creation of more interesting, interactive, and meaningful PKn learning for Undiksha Lab High School students.

3.2 Development of 'Civic Domain' E-Learning Platform Based on Skinner's Theory on Civic Education Subjects at SMA Lab Undiksha

The development of the *Civic Domain* platform was carried out based on the findings of a needs study that showed low motivation for students to participate in Civic Education learning at SMA Lab Undiksha. The development process follows Skinner's **operant conditioning principle**, which emphasizes the formation of learning behaviors through stimulus, response, and positive reinforcement. With this approach, the platform is designed so that every student's learning activity gets instant feedback, either in the form of quiz scores, automated comments, or a digital reward system.

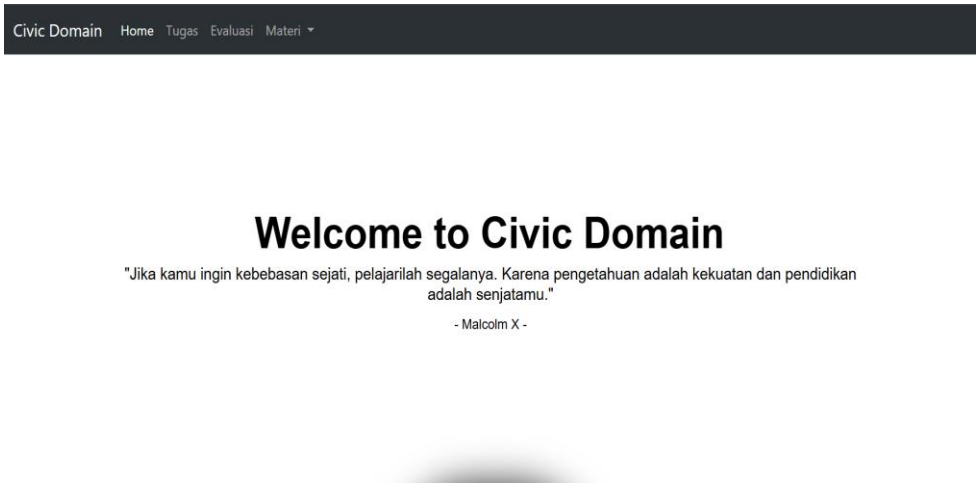
The design stage begins with the preparation of **the storyboard** and the platform's navigation flow. The storyboard contains a design of the PKn learning module which is divided into small *units*, according to Skinner's learning principle which emphasizes breaking the material into simple parts so that students can learn gradually. The navigation flow is designed to be simple and intuitive, making it easy for students to access materials, work on exercises, and participate in discussion forums.

Furthermore, the platform was developed in the form of **a Learning Management System (LMS)-based prototype** that was integrated with digital reinforcement features. The main features of the platform include:

1. **Phased Learning Modules** → each PKn topic are presented in small units equipped with summaries, explainer videos, and exercises.
2. **Automatic Quiz with Instant Feedback** → students immediately get a score and true/false explanation after answering, according to the principle of immediate reinforcement.
3. **The Badge and Reward Points System** → students earn badges or points after completing a module, actively participating in forums, or achieving certain grades.
4. **The Digital Discussion Forum** → an interactive space for students to discuss, exchange opinions, and collaborate on civic issues.
5. **Progress Tracking** → a feature that allows students to monitor their learning progress independently.

The Civic Domain prototype was then validated by media experts, material experts, and learning experts. The validation results show that the platform meets the eligibility criteria for content, display, and pedagogical aspects. Some of the recommended improvements are simplifying the interface to make it more user-friendly, as well as adjusting the language of quiz questions to match the level of understanding of high school students.

With this design and development, *the Civic Domain platform* is expected not only to become a digital media that facilitates the delivery of PKn materials, but also to be a means of forming learning motivation through a sustainable positive reinforcement mechanism.



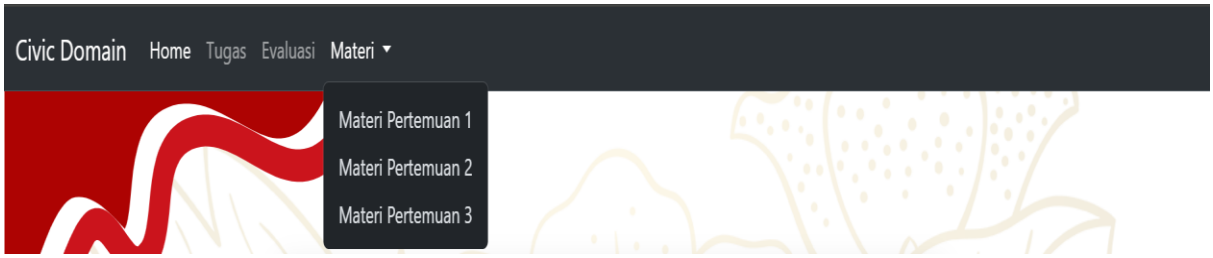
Picture 1. Home page

The first image shows the homepage of the Civic Domain e-learning platform. This page has a strategic role as the main gateway that users access for the first time. The page view comes with a large Welcome to Civic Domain title that confirms the identity of the platform. In addition, there is an inspirational quote from Malcolm X, "If you want true freedom, learn everything. For knowledge is power and education is your weapon." The presence of this quote not only serves as a visual sweetener, but also motivates students to study more actively and understand the importance of education. In terms of function, this homepage is intended to provide a welcome, create a conducive initial atmosphere, as well as introduce the basic concept of the Civic Domain as a learning medium for Civic Education (PKN) at SMA LAB Undiksha. In terms of design, the use of a wide enough white space helps keep students' attention focused on the main message they want to convey, namely welcome, motivation, and introduction to the platform.

Picture 2. Page Penugasan

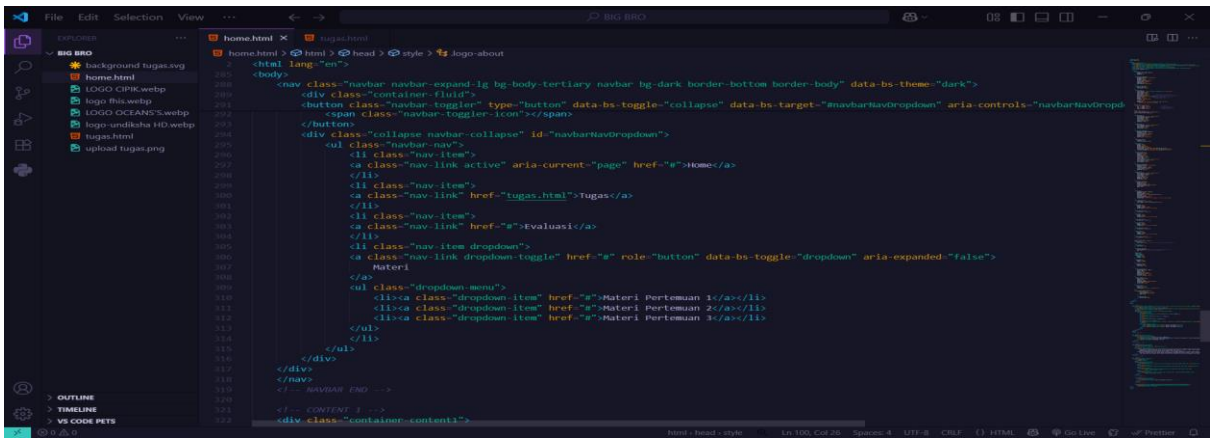
The second image shows the **assignment page**, which is one of the core of the e-learning implementation. This page is titled *Task Work* with instructions that read, "Please do the tasks below as instructed." The instructions are clearly placed at the top of the page to ensure that students understand the main purpose of this section. Below it, you'll see a list of tasks in the

form of *Meeting Assignment 1, Meeting Task 2, and Meeting Task 3*, each with a special icon that resembles a folder with a plus sign (+). This icon serves as a visual representation that each section contains instructions and space for task collection. The background of the page displays an illustration of a red Garuda bird which symbolizes the spirit of nationality, national identity, and relevance to PKN subjects. Pedagogically, this page is an important means in the application of the principles of active learning, because students not only receive information, but are also asked to produce works or answers as a form of their involvement in the learning process.



Picture 3. Fitur E-learning

The third image shows **the navigation menu (navbar)** which is the center of user orientation in accessing various features available on the platform. The navigation menu consists of several main links, namely *Home*, *Tasks*, *Evaluation*, and Material dropdowns. In the dropdown section, there are options *for Meeting Material 1, Meeting Material 2,* and *Meeting Material 3* which contain teaching materials according to the meeting. This navigation feature is very important in an e-learning platform because it provides a clear structure and makes it easy for users to move between pages without confusion. With simple, organized, and responsive navigation, students can focus more on the learning process rather than looking for the features they need. From an instructional design perspective, these menus support the principles of regularity and consistency, which are critical to creating an effective digital learning experience.

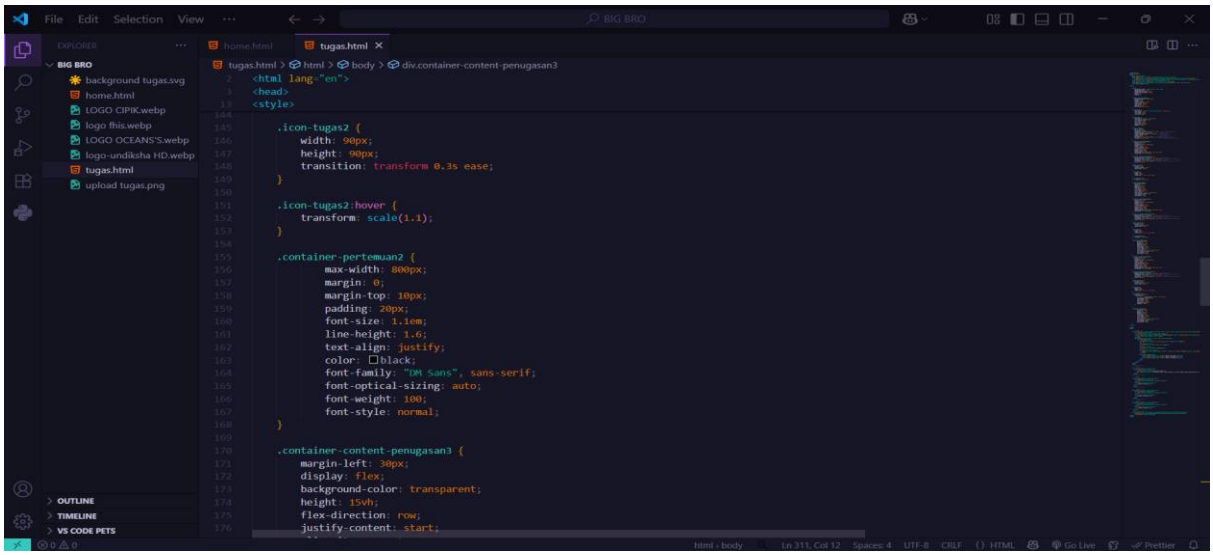


Picture 4. Codes Program

The fourth and fifth images show **the programming code** used in building *the Civic Domain* platform. The languages used are **HTML (Hypertext Markup Language)** to form

the content structure, as well as **CSS (Cascading Style Sheets)** to organize the visual appearance of the page. The HTML code in the fourth image shows the navigation structure using the elements combined with classes from the **Bootstrap framework** such as navbar-expand-lg, bg-body-tertiary, and dropdown-menu. This aims to make the page design responsive and can be customized on various devices, both computers and mobile phones. Meanwhile, the CSS code in the fifth image is used to beautify the appearance of the page, for example by adjusting the size of the task icon, giving a transition effect when the icon is touched by the cursor (*hover*), arranging the container using *flexboxes*, and typographic settings with *the DM Sans* font. With this combination of HTML and CSS, *the Civic Domain* e-learning platform not only works technically, but also has an attractive, consistent, and convenient appearance for students.

Picture 5. Codes Program



3.3 Advantages and disadvantages "Civic Domain" platform for Civic Education learning

Although the Civic Domain platform has great potential to support Civic Education (PKn) learning, there are still a number of shortcomings that must be anticipated so as not to hinder the effectiveness of its implementation. The first drawback has to do with accessibility and the digital divide. Not all schools and students have adequate technology infrastructure and internet networks to access e-learning optimally. According to Fatimah (2025), one of the main challenges of e-learning practices in Indonesia is limited internet access, especially for students who come from the outermost and less developed areas (Fatimah, 2025). This confirms that although the Civic Domain is designed to be simple, unequal access can create inequities in acquiring digital learning experiences. This means that there is a risk that the platform will only be effective in areas with adequate technology facilities, while students in areas with limited access are marginalized. The second weakness is related to the readiness of teachers in operating digital platforms. The implementation of educational technology is not only determined by the quality of the system, but also the competence of educators in utilizing it. Research by Wartindya Pradana Saputra et al. (2025) shows that significant obstacles in the implementation of digital classrooms arise from the readiness of infrastructure and digital literacy of teachers (Saputra et al., 2025). Teachers who are less skilled in integrating

technology tend to only use platforms as a medium for delivering material conventionally, not as an interactive means. If this happens to Civic Domain, then the potential of the platform to increase student motivation will not be optimally achieved.

In addition, the variety of students' learning styles is also an important aspect that must be considered. E-learning platforms often focus on text-based materials, videos, or self-paced quizzes. However, students have diverse learning styles, including those who prefer group discussions or face-to-face interactions. According to the latest research in *Frontiers in Education* (2025), without an adaptive approach that is able to adapt to the needs and learning styles of students, e-learning can become less effective and actually reduce student engagement (Purbasari et al., 2025). In other words, if Civic Domain emphasizes only static digital content, then students with social interaction or collaborative learning needs may feel unfacilitated. The next drawback lies in the aspect of student self-control. Digital learning demands higher discipline because students learn in an environment with minimal direct control from teachers. This situation opens up opportunities for external distractions, such as distractions from social media or the home environment. Research in *Frontiers in Education* (2025) also highlights that the success of e-learning is heavily influenced by students' time management skills and intrinsic motivation (Purbasari et al., 2025). If Civic Domain is not equipped with features that support self-regulation strategies, such as learning reminders, reward systems, or gamification, then its effectiveness in increasing student motivation can be reduced.

The last aspect that is no less important is data privacy and security. The use of digital platforms in education always carries risks to the protection of students' personal data. Research in the field of digital education confirms that many online learning platforms are still not transparent in the practice of data collection, storage, and utilization, raising concerns about misuse of information (Purbasari et al., 2025). If Civic Domain doesn't come with a strong privacy policy, it can reduce the trust of teachers, students, and parents in the platform. Based on this description, it is clear that the development of the Civic Domain is not only a matter of technical design, but also requires infrastructure support, teacher capacity building, adaptation to the variety of student learning styles, strategies to improve self-discipline, and data protection policies. Without anticipating these weaknesses, Civic Domain has the potential to face similar implementation constraints to other e-learning platforms that previously failed to achieve optimal learning goals.

4. CONCLUSION

The development of the **Civic Domain** platform based on Skinner's theory in the subject of Civic Education at SMA Lab Undiksha is an innovation born from the real need for learning media that is more interactive, fun, and relevant to the characteristics of the digital generation. The results of the needs study show that PKn learning still tends to be monotonous and less motivating for students, so an alternative is needed in the form of digital media that is able to provide instant feedback, awards, and active learning experiences. Through Skinner's positive reinforcement principle, Civic Domain is designed with automated quizzes, discussion forums, badge systems, and progress tracking that encourages continuous student engagement. Validation from material, media, and learning experts proves that the platform is worth using and has the potential to increase students' motivation, conceptual understanding, and civic competence in 21st century. However, this platform still has challenges, including limited internet access, variations in teachers' digital literacy, differences in student learning styles, and data privacy issues that need to be anticipated in further development. Thus, it can be concluded that Civic Domain is a valid, practical, and potentially effective digital learning medium to improve the quality of civic learning, as well as being the first step towards digital transformation in civic education in secondary schools.

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