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Application of the wordwall application in social studies learning to develop independent character in elementary school students

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ABSTRACT

Student independence in elementary schools is still considered low because many students rely on teachers to learn and more brilliant friends to work on questions. The culture of cheating when working on exam questions reflects that students lack confidence in their abilities. This study aims to provide an overview of using the Wordwall application as a learning medium for Natural and Social Sciences in developing the independent character of elementary school students. The researcher used a descriptive qualitative research method with data from interviews, observations, and documentation. The results of this study indicate that using the Wordwall application can increase student engagement with interactive features that can increase learning motivation and provide a more enjoyable experience than conventional methods. In addition, Wordwall contributes to forming an independent character by encouraging students to learn autonomously through instant feedback, allowing them to explore answers and understand concepts without relying on teachers or friends. This application also fosters learning discipline by helping students manage time, follow instructions consistently, and improve critical thinking and problem-solving skills through trial and error mechanisms. However, for its use to be more effective, Wordwall must be combined with other learning strategies, such as class discussions and problem-based projects, and integrated with a broader pedagogical approach to ensure that independent and disciplined characters can be internalized in students' academic and social lives.

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INTRODUCTION

Students' learning independence is often limited, reflected in their dependence on teachers at school. This indicates a lack of initiative to learn independently and ineffective use of available learning resources (Gunawardena et al., 2024; Kaufman et al., 2024; Kostoulas, 2024). Lack of independence among adolescents is often associated with suboptimal learning habits, such as studying only when exams are approaching, skipping class, cheating, and looking for leaked exam answers (Eisenberg et al., 2008; Putarek et al., 2020). Independent students maximize their efforts to complete assignments and homework based on their abilities. However, if they encounter obstacles, they will seek solutions through discussions with friends, teachers, or other competent sources (Briesch & Chafouleas, 2009; Briesch et al., 2019; Smith et al., 2022; Rimm-Kaufman, 2015; Dwyer, 2015). Learning independence is an important capacity that students must develop to organize, motivate themselves, and manage the learning process without significant dependence on assistance from teachers or adults. It is an important foundation for academic development at the elementary school level and reflects character education, which is at the heart of modern education curricula. The goals of education are now focused not only on cognitive intelligence but also on the development of character and moral values that are essential in today's world (Darling-Hammond et al., 2019; Charokar & Dulloo, 2022; Jeynes, 2019; Roqai et al., 2024).

Recent studies emphasize the importance of character education in early childhood, especially in elementary school, where personal character begins to form. The Natural and Social Sciences (IPAS) curriculum, involving lessons on living and non-living objects and human interactions with the environment, plays an important role in character development by improving skills such as problem-solving, leading to increased student independence (Kintu et al., 2017; Marini et al., 2021; Azzahra et al., 2023). However, students still tend to rely on help from friends and teachers, indicating the need for more innovative teaching methods, including the use of digital technology to support independent character development (Sailer et al., 2021; Zheng et al., 2024). Other studies highlight the effectiveness of digital learning media. Apriliani and colleagues (2021) found that Powtoon, as a digital tool, advances students' responsible character by making the learning process more interactive. Meanwhile, mobile web platforms contribute to increased engagement and positive character traits such as a love of learning, perseverance, and thoroughness (Ortiz et al., 2020; Marini et al., 2021). Furthermore, applications such as Wordwall have been shown to increase enjoyment in learning and support the formation of disciplined character among students (Utami et al., 2022; Sinaga & Soesanto, 2022). Olisna and colleagues (2022) also reported that the interactive game Wordwall improves learning quality, effectively delivering material, and overcomes boredom. In conclusion, various digital learning platforms play an important role in strengthening students' character and improving the quality of learning.

This study aims to provide a comprehensive analysis of the contribution of Wordwall applications in science education to academic success and the development of key life skills such as independence, problem-solving, and self-management. The main objective is to assess how interactive and digital tools can enhance educational practices and help students develop character traits important for future success. The benefits of this study are expected to provide valuable insights into the potential of digital tools such as Wordwall to make education more relevant and effective. This study also aims to encourage educators to innovate and adapt new technologies that suit the needs of diversified students. In addition, implementing Wordwall is considered a strategy to overcome challenges in developing independent learning behaviors, which in turn prepares students to navigate their educational and life paths more effectively. The results of this study inspire further studies on integrating technology in education that supports holistic student development.

This study aims to test the effectiveness of the Wordwall application in the context of science education. This study's primary hypothesis is that using Wordwall significantly improves students' academic success. In addition, this study will also test several secondary hypotheses, including whether Wordwall can improve students' learning independence and problem-solving skills and be

effective in improving students' self-management. Furthermore, this study hypothesizes that using Wordwall contributes to the innovation and adaptation of technology among educators and supports the development of effective self-learning behaviors among students. Appropriate methods will be used to test these hypotheses to verify the positive effects of Wordwall on relevant educational variables, ensure reliable results, and impact educational practices.

RESEARCH METHOD

This study adopts a qualitative approach with a case study type. This approach was chosen because the object and focus of the study aim to describe how the use of the Wordwall application can improve students' independent character. By using qualitative methods, this study aims to produce in-depth findings regarding the phenomenon, which is impossible to achieve through quantitative methods or statistical measurements (Thomas & Harden, 2008; Rijali, 2018; Priya, 2021). This research was conducted at SD Islam Bustanul Ulum. The informants of this research were the homeroom teacher of grade IV and grade IV students totaling 36 people. Of that number, there were 12 male students and 24 female students.

Table 1
Research Data Sources

Position Initials	Position Initials
Mrs. P1, Class IV teacher	Mrs. P1, Class IV teacher
P2 Class IV students	P2 Class IV students

Data collection techniques through interviews, observation and documentation. Meanwhile, testing the validity of the data uses triangulation techniques (Hanson-DeFusco, 2023; Pratesi, 2023). Interviews are used to explore information related to the implementation of learning and the cultivation of students' independent character. Observation is used to observe learning activities using the Wordwall application and observe students' attitudes when learning takes place. Meanwhile, documentation is used to complete the report data that researchers can obtain, namely room data, teacher data and student data at the Bustanul Ulum Islamic Elementary School. The data obtained was then narrated to receive an overview of the use of the Wordwall application in learning to foster independent character in class IV students at Bustanul Ulum Islamic Elementary School.

This study applies the Miles and Huberman interactive data analysis model, which emphasizes data reduction, display, and conclusion drawing as a cyclical process. Bradley et al. (2007) view this model as flexible, allowing continuous refinement of interpretations. Maskur (2018) highlights its usefulness in structuring complex educational data, while Asipi et al. (2022) stress its iterative nature in strengthening validity. Together, these perspectives show that the model ensures both methodological rigor and adaptability for classroom-based research.

Chart 1
Miles and Huberman Data Analysis Design

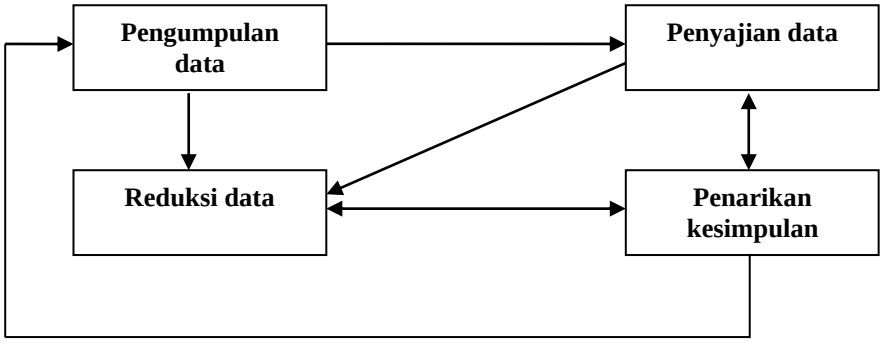

Chart 1 shows the data analysis design used in this research. The data analysis method used is according to the Miles and Huberman approach (Thorne et al., 2004; Naeem et al., 2023). The data analysis process begins by collecting all the necessary data such as conducting interviews with the class teacher and one of the students, observing classroom learning activities, documenting the activities required in the research. After the data is collected, a data presentation process is carried out to select and sort the data according to predetermined categories according to the research topic that has been determined. The final step is to conclude the results of the data that has been analyzed.

RESULTS AND DISCUSSION

Result

Wordwall application in science learning

According to interviews with homeroom teachers and several students, the use of the Wordwall application has brought significant improvements to science learning in the classroom. This digital tool provides features that allow teachers to design interactive questions and engaging quizzes, which help students participate more actively and create a more enjoyable and conducive learning atmosphere. Teachers noted that the incorporation of game-like elements within Wordwall motivates students to pay closer attention to lesson materials while enhancing focus and collaboration during activities. However, the interviews also revealed initial challenges, as some students required additional explanations and guidance to operate the application effectively. With consistent support, Wordwall can serve as an innovative medium that enriches science learning experiences.

Table 2
Interview Results

No	Informant	Description
1	Mother P1	The learning conditions in my class may have been less conducive lately; the children are starting to get bored with the same old learning methods and styles. Only limited to lectures and assignments. Especially in science and natural science lessons that discuss a lot about theoretical explanations.
2	P2	Learning in class makes me bored; the teacher only explains things in lectures. Many of his friends do not pay attention to the teacher's explanation. The class becomes noisy because many of my friends are chatting with each other.
3	Mother P1	A few days after observing children's boredom in class, I found a website-based application called Wordwall that can be used as a fun evaluation tool. This application combines game elements in the evaluation questions, thus encouraging children to pay attention to the lesson material before working on the questions, especially in science lessons. This helps improve their focus and activeness in learning.
4	P2	At first, we were confused about the Wordwall application, but after the teacher explained it many times, we began to understand and enjoy using it because it integrates games. The games are fun and help us learn to answer questions. As a result, when the teacher explains the material, everyone becomes calmer and more focused, making the classroom atmosphere more conducive than before.

Note: The table summarizes teacher and student interview responses, showing that traditional lecture methods caused boredom, while the use of Wordwall improved engagement, focus, and classroom atmosphere, especially in science lessons

The interview results with Mrs. P1 and P2 revealed that monotonous teaching methods, dominated by lectures and routine assignments, led to student boredom and reduced engagement, particularly in science lessons. To address this issue, Mrs. P1 introduced the Wordwall application as an innovative solution. By integrating game elements into evaluation activities, Wordwall successfully increased students' interest, participation, and focus during learning. Students reported enjoying the interactive format, which made classroom activities more engaging and the learning atmosphere more conducive. Nevertheless, the transition to this new technology was not without challenges, as some students initially felt confused and required repeated guidance. These findings

highlight the importance of continuous teacher support and training to optimize technology integration and ensure effective, enjoyable learning.

Tabel 3
Wordwall Application Image

No	Picture	Explanation
1		Figure 1 illustrates the interface of the Wordwall application. The image shows a "start" button, which displays a series of questions for students to complete when clicked. Students are free to choose which questions they want to answer. The application provides immediate feedback on their answers, indicating whether they answered correctly or incorrectly. In addition, the student's score is displayed upon completion.
2		Figure 2 shows a student working on a problem independently with the help of a cellphone to access the Wordwall application. The student received an explanation from the teacher about how to use the application before starting. This application allows students to focus entirely on the device being used because the teacher gives each question a specific time limit, thus reducing the need for students to ask their friends for answers.

The Wordwall app, pictured in the table, offers interactivity and instant feedback that benefit learning. However, its use also requires critical consideration of students' reliance on technology and the potential pressures of strict time constraints. While "go" buttons allow for personalization and increased focus, too much reliance on digital feedback can reduce students' ability for self-evaluation and independent skill development. Therefore, it is important to balance the use of the app with traditional learning methods that support social interaction and the development of critical thinking.

Cultivating Independent Character in Elementary School Students

In an interview, Mrs. P1 explained the school's efforts to focus on character building in grade IV students, with a special emphasis on independence and noble morals. Through various daily habituation activities, the school tries to integrate important values such as cleanliness, politeness, and cooperation into students' lives. In addition, providing leadership roles and instilling honest and independent values are important parts of the curriculum, which are in line with the Pancasila student profile adopted by the school.

Tabel 4
Character Building in Students

No	Findings	Explanation
1	Focus on Independence and Noble Morals	This initiative recognizes that character education is as important as academic education. Independence and good morals prepare students for academic success and help them become responsible and empathetic citizens.
2	Daily Habits	Routines such as praying before studying and maintaining cleanliness reflect the practical application of ethical and spiritual values. These habits help instill daily discipline and social awareness in students, which is essential for holistic personal development.
3	Polite Behavior and Respect for Others	Teaching politeness and respect demonstrates the school's commitment to creating an inclusive and respectful learning environment. This is vital in developing students' ability to interact positively in a diverse society.
4	Formation of Pancasila Profile Character	Integrating Pancasila values in character education emphasizes the importance of national values in educating the younger generation. This encourages students to internalize national principles, including diversity, noble morals, and critical and creative thinking.

5	The Importance of Honesty and Independence	Emphasizing honesty and independence underscores the importance of personal integrity and self-reliance. These values are the foundation for personal and professional success and help students make ethical and responsible decisions.

The character-building strategies implemented by Mrs. P1 and her school, especially in the aspects of independence and noble character, demonstrate a deep commitment to students' ethical and moral development. However, there needs to be an improvement in the balance between the values of individualism and collectivism, ensuring that daily habits are followed mechanically and deeply understood by students. Furthermore, education must also include an understanding of empathy and cultural diversity and the relevance of Pancasila values in a global context. A practical evaluation of the impact of this program needs to be developed to ensure that character education is not only structured but also adaptive and responsive to current global needs and challenges.

Wordwall Application as an Effort to Grow Elementary School Students' Independence

In a recent interview, a teacher revealed how the Wordwall application increased students' independence in science lessons, motivating them to be more confident and less dependent on help from teachers or friends. The teacher highlighted that less engaging learning can lower students' self-confidence, prompting them to rely more on friends who are considered intelligent. A student also expressed frustration with the disruptive behavior of friends who often ask inappropriate questions, emphasizing the importance of a conducive learning environment to support independence.

Table 5
Efforts to Develop Student Independence

NO	Findings	Explanation
1	Increasing Independence with Wordwall Application	Wordwall application has been used in science learning to help students become more independent when working on questions. Students who previously relied on answers from teachers or friends are now starting to be confident in answering questions with their abilities.
2	Student Behavior Changes	After using the Wordwall application, students' behavior changed; they became more independent and no longer relied too much on help from others to work on questions.
3	Student Character	Boring learning can affect children's character, making them less confident and more dependent on others.
4	Student Behavior in Class	Children in class often rely on friends they consider brilliant and often ask questions or play pranks, which can disrupt the concentration and learning of other students.
5	Disturbance from Friends	Often, friends in class ask inappropriate questions and force them to get answers, which disrupts their learning process.

The findings from Table 4 show that the Wordwall application effectively improves students' independence in science learning but faces challenges from less interesting learning conditions and disruptive behavior in class. These conditions reduce students' self-confidence and increase their dependence on friends who are considered intelligent. Behaviors such as asking inappropriate or idle questions also disrupt the concentration of other students' learning. Therefore, improving the quality of teaching and classroom management is important to create a more conducive learning environment and support the development of students' independence.

Discussion

Strategies to increase student engagement in learning with wordwalls

Wordwall has been widely recognized as an educational tool that is not only efficient but also engaging, providing substantial support in the learning process by integrating engaging media into teaching methods. Wordwall increases student participation as a digital platform by providing various interactive features and services, significantly making the learning process more dynamic and enjoyable. According to Bereczki & Karpati (2021), Haleem et al. (2022), and Farahani et al. (2022), the use of this kind of technology in education has been proven effective in increasing student engagement. In addition, Wordwall provides instant feedback on students' answers, verifies

accuracy, and displays scores immediately after the task is completed. This is very important in maintaining students' interest and motivation to learn, as recognized by Wang & Tahir (2020), Kuklick & Lindner (2023), and Widhiatama & Brameswari (2024). These capabilities make Wordwall a very valuable tool in the modern educational environment.

This tool effectively supports student autonomy, allowing them to choose the questions they want to answer, which directly addresses individual learning needs and supports diverse learning strategies (Hughey, 2020; Tetzlaff et al., 2021; Utami et al., 2022). Wordwall's instant feedback mechanism is also crucial in real-time learning, allowing students to immediately correct misunderstandings, which significantly supports the formative assessment process (Black & Wiliam, 2009). The score display feature in Wordwall not only allows students to assess their progress but encourages adaptive learning. This aligns with modern educational philosophies emphasizing the importance of self-directed learning and continuous improvement (Nicol & Macfarlane-Dick, 2006). Therefore, this tool plays a vital role in helping students develop their self-directed learning skills effectively.

Accessible through any web browser, Wordwall is ideal for various learning environments, including remote and hybrid settings, due to its ease of access from multiple devices. The platform's game-based learning approach makes learning fun and increases cognitive engagement, which can simplify the comprehension and retention of complex or tedious content (Hamari et al., 2016). Teachers find Wordwall a flexible resource for customizing educational activities to meet specific educational goals and classroom needs. The variety of templates available helps maintain student interest and engagement over time (Utami et al., 2022). While effective, Wordwall has some limitations, including limited font size customization, the risk of academic dishonesty due to instant feedback, and the need for a stable internet connection that can affect the tool's effectiveness and the accuracy of assessments (Palupi et al., 2023). Despite these challenges, Wordwall is still considered a valuable resource for teachers. The platform provides a rich combination of self-paced and collaborative learning experiences with diverse features, including pre-designed games and versatile modes that can be adapted to various classroom learning situations. This makes Wordwall a flexible and adaptive tool to enhance the educational experience.

The Wordwall application integrates interactive features with self-paced learning to enhance student engagement. This visualization emphasizes that the use of technology in education is not only to attract students' interest but also to develop their independence in learning. The interactive features of Wordwall not only facilitate more engaging teaching and strengthen students' ability to learn independently, demonstrating that Wordwall is an effective educational tool in supporting holistic education and increasing overall student engagement. This encourages educators to consider technology an integral part of learning strategies that combine theory and practice, increasing engagement and enriching students' learning process.

Formation of independent character in elementary school students

As regulated in the 2003 National Education System Law, Indonesian National Education focuses on forming independent character as the primary goal (Hamied & Musthafa, 2019; Fadilla & Wulandari, 2023; Susanto et al., 2024). The law emphasizes the development of intelligence, personality, and noble morals in students, with the hope of producing a generation that is not only academically intelligent but also rich in moral, national, and religious values (Revell & Arthur, 2007; Pulimeno et al., 2020; Akhmad, 2024). To implement this goal, Bustanul Ulum Islamic Elementary School has adopted the Pancasila student profile. This profile includes noble character, appreciation of global diversity, independence, cooperation, critical reasoning skills, and creativity (Glassner & Schwarz, 2007; Thornhill-Miller et al., 2023; Pratiwi et al., 2024). These elements are designed to be mutually supportive and continuous, helping students build a strong sense of self-identity while preparing them to contribute positively to a pluralistic and dynamic society.

Independence is an important aspect that shows a person's ability to rely less on others and complete tasks independently (Krell et al., 2021; McClure & Leah, 2021). In elementary education,

the development of an independent character begins with education that directs students to learn independently. This includes taking full responsibility for their organization and self-discipline and building the ability to understand subject matter independently, without excessive dependence on help from teachers or others (Monin et al., 2014; Gauvain, 2020). Thus, students are taught to develop skills that allow them to take responsibility for their learning process, strengthening the foundation for becoming independent and responsible individuals in various aspects of life.

Students who develop self-directed learning skills tend to initiate their studies with initiative, effectively manage their study time, and adapt their study methods to their personal needs. They also proactively identify their weaknesses for continuous improvement (Whitebread et al., 2005; Broad, 2006; Hockings et al., 2017). Self-directed learners often demonstrate discipline in studying, contributing to homework, and engaging in enriching activities such as reading and praying regularly (Epstein & Van Voorhis, 2001; Nowell et al., 2017). On the other hand, students who are not yet independent tend to rely more on help from others, are often hesitant to engage in the learning process, and are less likely to make meaningful contributions to groups or communities. Independence not only supports academic success but also helps in shaping individuals who can participate productively in society (Darling-Hammond et al., 2019; Cao et al., 2024).

Self-Determination Theory by Brenner (2022) and Manninen (2022) plays a significant role in supporting the self-directed learning approach, emphasizing that autonomy and intrinsic motivation are key to enhancing learning motivation. This theory argues that students who are free to decide about their learning process tend to feel more motivated and responsible for their education. This independence increases the desire to learn and helps students develop a sense of ownership of their educational process. Meanwhile, Vygotsky's Social Development Theory (1978) adds that teachers play an important role as facilitators in students' transition from being dependent on others to being self-regulated. According to Vygotsky, social interaction in the educational context helps students develop from needing assistance to a stage where they can effectively regulate and direct their own learning.

The integration of Problem-Based Learning (PBL) and Project-Based Learning (PjBL) methods is an effective strategy in education that facilitates the development of student independence (Sukackė et al., 2022). Through PBL, students are presented with real-world problems to solve, while PjBL requires them to complete complex projects (Duke et al., 2021). Both methods encourage students to take initiative, utilize existing resources, and apply their knowledge in practical situations. This process trains them to think critically, make informed decisions, and hone their self-reflection ability. By analyzing and evaluating their approach to a problem or project, students learn to identify their strengths and weaknesses and make necessary strategic adjustments (Pang, 2022). Through these activities, students develop greater independence and self-confidence, key components of an independent character.

The role of teachers in schools in shaping independent character in children is also vital. By creating a supportive learning environment, teachers can help students develop independence (Hidayanti et al., 2023). This can be done by giving responsibilities appropriate to their level of development, such as individual tasks in learning, time management in completing tasks or setting independent learning strategies. Encouraging self-discipline and problem-solving skills is also important, where teachers can facilitate situations that encourage students to find their own solutions to academic challenges before asking for help (Vaknin-Nusbaum & Nevo, 2021; Jeong et al., 2021). For example, teachers can give project assignments that require students to design their learning strategies or face differences of opinion in group work. This supportive school environment not only strengthens independence but also fosters students' self-confidence and adaptability, which are very important for the development of their independent character in the future.

Building independent character through wordwall application

The application of the Wordwall application in science learning has the potential to foster student independence, especially in answering questions without relying too much on teachers or friends (Bhaumik, 2012; de Juana-Espinosa et al., 2023; Moorhouse & Kohnke, 2024). Before using Wordwall, students tended to rely on teachers or friends to answer questions, which showed limitations in taking the initiative and a lack of confidence in their understanding. This dependence can be caused by conventional learning approaches that are still teacher-centered or students' lack of experience developing independent learning strategies (Matsuyama et al., 2019; Almulla, 2020).

However, after getting used to Wordwall, there was a behavior change that showed increased independence, where this application provided an opportunity for students to practice and test their understanding without direct pressure from teachers or friends (Al Shloul et al., 2024). The interactivity in Wordwall allows students to get instant feedback, strengthening their confidence in answering questions. In addition, this application allows students to explore answers and understand concepts more independently (Widhiatama & Brameswari, 2024). They can improve their critical thinking and problem-solving skills through trial and error. If well-designed, the questions in the Wordwall can encourage students to think reflectively, identify their own mistakes, and correct them without too much intervention from the teacher, thus strengthening the character of independence in their learning process (Emihovich et al., 2020; Indrašienė et al., 2023).

The application of digital learning media such as Wordwall is claimed to form independent and disciplined characters in students in elementary school learning (Gillies, 2020; Azis & Ahmad, 2022). This application encourages students to think independently without relying on their friends' answers because there is a time limit for answering questions. This is in line with the theory of character development, which emphasizes the importance of cognitive, social, and emotional aspects in forming positive habits in students (Nuraini et al., 2020; Safitri et al., 2020). However, the effectiveness of Wordwall in character formation still needs to be studied further, especially whether the independence and discipline formed are long-term or only apply in the context of specific digital applications.

Several studies have shown that Wordwall can improve students' discipline because this application teaches them to manage time and follow instructions consistently (Utami et al., 2022; Sinaga & Soesanto, 2022). However, the challenge is whether the discipline is genuinely internalized or merely mechanical due to the technological system that regulates it. In addition, although Wordwall can increase student engagement in learning (Olisna et al., 2022; Pandita & Kiran, 2023; Hughes et al., 2023), its effectiveness needs to be further evaluated to ensure that students' conceptual understanding is improved and does not depend only on the gamification appeal of this application. Therefore, Wordwall should be combined with other learning strategies, such as class discussions and project assignments, to ensure sustainable character formation.

Applying Wordwall in science learning can develop students' independent character. However, whether the impact is long-term or only occurs in a digital context needs to be studied. Although it shows benefits, it still needs to be ascertained whether the independence formed becomes a habit or is simply a response to the application mechanism. Its effectiveness depends on individual factors, learning styles, and educational environments. Therefore, Wordwall should be combined with a broader pedagogical approach to contribute to the formation of students' character sustainably.

CONCLUSION

Using the Wordwall application in science learning has great potential to increase student engagement, form independent characters, and foster discipline in learning. Wordwall offers interactive features that can increase motivation and allow students to learn more autonomously with instant feedback. In addition, this application aligns with modern learning principles that emphasize the importance of independent learning and improving critical thinking skills. However, its effectiveness still needs to be further evaluated, especially in determining whether its positive

impacts can last in the long term or only occur in a digital context. In addition, several challenges, such as dependence on technology, potential academic dishonesty, and limitations in customization, still need to be considered. Therefore, in order to be genuinely effective in forming student character sustainably, Wordwall should be combined with other more comprehensive learning strategies, such as class discussions, problem-based projects, and broader pedagogical approaches to ensure that the independent and disciplined characters that are formed can be internalized in students' academic and social lives.

The theoretical implications of these findings suggest that using Wordwall in learning supports constructivist learning theory, which emphasizes the importance of active student involvement in the learning process. By providing an interactive and independent learning experience, Wordwall reinforces the self-determination theory that emphasizes the role of autonomy in increasing student motivation. Practically, these findings guide educators to integrate technology into learning strategies to increase student independence and discipline. However, using Wordwall must be combined with other approaches so that the impact of character formation remains sustainable. Teachers need to design learning that is not only technology-based but also includes reflection and discussion. In addition, infrastructure support and teacher training are important so that the implementation of Wordwall can run effectively in various learning contexts.

Further research is recommended to explore the effectiveness of Wordwall in shaping students' independent and disciplined character in the long term, both inside and outside the digital environment. Comparative studies with other learning methods, such as Project-Based Learning (PjBL) or Problem-Based Learning (PBL), can provide a deeper understanding of the effectiveness of this application in various educational contexts. In addition, research can focus on individual factors, such as students' learning styles and age differences, to identify groups that benefit most from using Wordwall. Qualitative studies through interviews and observations are also needed to understand how students' interactions with this application affect their motivation and learning habits. Finally, research on optimal strategies for educators in integrating Wordwall with conventional learning methods can help ensure its positive impact is broader and sustainable.

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