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Academic Performance and Motivation of Science 7 Using Wordwall and Kotobee Digital Applications

Antonieta D. Tejada[1]; Dr. Wilfred G. Alava Jr.[2]

[1]Linamon National High School Linamon, Lanao del Norte, Philippines
[2]Bukidnon State University Malaybalay City, Bukidnon, Philippines

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Abstract: The integration of educational technology into the classroom has become essential in enhancing academic performance and motivation. This quasi-experimental research aims to investigate the effect of Wordwall and Kotobee on the grade 7 learners' academic performance and motivation. It was conducted at Linamon National High School, school year 2024-2025. The study used a set of developed and validated Science 7 lessons integrating Wordwall and Kotobee. A validated research-made 60-item academic performance test and a validated adapted science motivation survey questionnaire. Mean and standard deviation of the data gathered were computed. ANCOVA and a One-Way Independent t-test were employed at the 0.05 level of significance. Findings revealed that learners exposed to Wordwall performed at a *Fairly Satisfactory* level, while those exposed to Kotobee achieved a *Satisfactory Level*. The study also found that learners in both groups were highly motivated in Science. Furthermore, there was no significant difference in the academic performance of Grade 7 learners exposed to Wordwall and Kotobee. Additionally, no significant difference was observed in the motivation between the groups exposed to Wordwall and Kotobee.

Keywords: *Academic Performance; Digital Applications; Kotobee; Wordwall; Motivation.*

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I. INTRODUCTION

The integration of technology in education has become increasingly essential in addressing the evolving needs of 21st century learners. Digital applications are now recognized not only as supplementary resources but also as powerful instruments that can transform instructional delivery, enhance learners' motivation and support academic performance. The study investigates the use of Wordwall and Kotobee in the context of grade 7 Science instruction.

Wordwall offers gamified learning through customizable quizzes, matching games and interactive tasks that cater to diverse learning styles, while Kotobee provides an immersive ebook experience that supports multimedia content such as videos, simulations and assessments. Both digital applications are designed to promote active learning and improve comprehension of scientific concepts. When integrated into Science education, it may enhane academic performance and increase learners' motivation.

This may emphasize the importance of integrating digital application material into lessons such as Wordwall and Kotobee. The use of Wordwall has a positive impact on the academic performance of Science students. Learners who engage with Wordwall significantly encouraged students to participate actively in the learning environment (Solleza, 2024). Kotobee's interactive learning book has significantly improved the academic performance of learners, increased motivation, and encouraged active class participation, effectively boosting student learning gaps in Science (Tusoy, 2023).

Although science has made significant contributions to society (UNESCO, 2023), it remains one of the fields in which students tend to have low academic performance. Issues on academic achievement and performance in Science have been the Department of Education (DepEd) primary concern, with Filipino learners performing poorly on different international assessments. The performance of learners in the 2022 Programme for International Learner Assessment (PISA) for Science was concerning, with the country ranking third to last worldwide. The results indicated that only a small percentage of learners attained a proficiency level in Science. This highlight significant challenge in the education system (OECD, 2022). More likely, Learners' academic performance in large-scale assessments most notably the National Achievement Test (NAT) conducted for Grades 6, 10, and 12 has declined to low proficiency levels,

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with particularly weak outcomes in Science, Mathematics, and English (DepEd, 2022).

One aim of the Philippine MATATAG Curriculum in Science is to expand technological literacy in the area of technology and engineering are utilized to help learners develop the capacity to relate scientific concepts to real-world applications (DO No. 010 s. 2024). To enhance learners' academic performance and motivation, the integration of technology into instructional settings is becoming increasingly essential. Numerous studies have indicated that the use of Wordwall and Kotobee leads to higher average learner scores, which in turn enhances learners' motivation and enthusiasm during the learning process. In addressing the country's low education performance, The Department of Education issued Memorandum No. 55, s. 2013, which promotes the use of learner-centered approaches in teaching.

At Linamon National High School of Linamon, Lanao del Norte, Philippines, teachers utilize tools such as PowerPoint presentations, videos, audio, and engage learners with activities to enhance learning journeys. However, in the first quarter of the academic performance assessment for Grade 7, it appears that learners need improvement in science. The average score for Science falls significantly below the target minimum of 75, standing at 47.32 on the Modified Performance Scale (MPS). This observation showed that many learners encounter challenges potentially stemming from their two-year experience in modular distance learning.

Due to the current state, an effective digital application is a way to potentially motivate learners' to improve academic performance and learning behaviors related to Science concepts. According to Komikesari (2016), academic performance is influenced by learners' cognitive abilities, learning preferences, and the quality of their learning environment, where some learners may learn quickly while others struggle. A learner's academic performance reflects their achievements in specific subjects. Rohmani (2024) found that learners who used Wordwall in Science improved their comprehension and academic performance in science instruction. Espina (2021) found that learners who used the Kotobee application aid in the visual comprehension of scientific principles. s

Moreover, motivation plays an essential role in learning. A high level of motivation to learn encourages sustained effort and persistence, reducing the likelihood of giving up easily. Learners who take pleasure in learning are consistently eager to explore more and tend to grasp the material more effectively. Hence, as learners become more motivated, their creativity can also be enhanced through the use of these digital applications (Safitri et al., 2022).

Some potential gaps or areas need attention. The digital applications mentioned were designed to capture learners' attention and stimulate their motivation in Science. However, challenges hinder the effective utilization of digital applications in education: technical difficulties, insufficient training opportunities, lack of digital literacy, and internet inaccessibility. By providing technical support, creating peer mentoring, using friendly applications like Wordwall and Kotobee, using digital applications that allow offline access, or having partnerships with the schools may help the learners maximize the benefits of using the said supplementary materials for academic performance and motivation in Science.

This study aimed to see the effect of Wordwall and Kotobee on academic performance and motivation of learners. It may enhance understanding, motivation, and overall academic performance. The goal of this research is to observe performance of learners in their general academic average and mean performance score by comparing second quarter and first quarter performance. Integrating these digital applications into the lessons encourages active learning participation, may ultimately boost learners' motivation and improve academic performance.

This study assessed the academic performance and level of motivation of grade 7 Science learners using digital applications. Specifically, it aims to determine:

- What is the academic performance of Grade 7 learners exposed to Wordwall and those exposed to Kotobee?
- What is the motivation of Grade 7 learners who are exposed to Wordwall and Kotobee in terms of.

- Career motivation;
- Self – determination;
- Intrinsic motivation;
- Grade motivation; and
- Self-efficacy?

- Is there a significant difference in the academic performance of Grade 7 learners exposed to Wordwall and those exposed to Kotobee?
- Is there a significant difference in the motivation of Grade 7 learners who are exposed to Wordwall and Kotobee?

II. REVIEW OF RELATED LITERATURE

- *Digital Application and Academic Performance*

Wordwall is a great example of a digital application that allows users to create interactive educational activities and games. These activities are often used in various learning environments to engage students in fun and effective ways. Its media application maybe used as learning environment for teachers and students. In an educational system where the emphasis is on students' academic achievement, the success and the shortcomings of educational institutions are evaluated based on students' academic performance (Seeret et al., 2021).

The Wordwall application include digital games that can be used as a creative medium for learning. This application can serve as an engaging learning tool, instructional medium, and assessment resource for students. In addition, Wordwall can also be used to see student

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progress. Educators may find this suitable as they create learning assessment methods (Khairunisa, 2021).

As innovations in technology and thinking progress, it's expected that some builders of educational applications find efficient ways to encourage students to develop skills aligned with their current career paths using cell phones, laptops, tablets, and other electronic devices, modern education also incorporates innovative methods to assess students' understanding. Teachers are updating their lesson plans by incorporating games, software, and educational applications directly into their lessons (Ababa et al., 2021)

The study of Solleza (2024) on the use of Wordwall showed the positive impact regarding the academic achievement of students in science subjects. The idea behind instructional materials is that they both engage students and improve learning outcomes. These materials amplify recall as it involves relevant senses. Instruction should be clear, relevant, and often grounded in real-life contexts. Active student involvement in designing and managing interactive Wordwalls plays a vital role. This application use mobile phones, tablets, or computers that make learning materials, exercises, and learning interactions available and accessible to students (Torrington, 2023).

The study of Rohmani (2024) showed The impact of Wordwall media on improving science learning results among primary school students. Similarly, this study emphasized the importance of exploring the application of interactive technology to enhance students' comprehension and academic performance in science education. The analysis revealed that the use of Wordwall media led to a notable improvement in science learning outcomes and student motivation, while also fostering a more engaging and enjoyable classroom environment. Benefits of Wordwall include heightened student participation, better information retention, individualized learning experiences, collaborative opportunities, and instant feedback.

The research conducted by Fajaryati et al. (2024) identified Wordwall as an effective formative assessment media in improving student learning outcomes, especially in physics subjects. Wordwall functions primarily as a game-based learning and assessment tool. It allows educators to create interactive activities such as quizzes, matching games, and sorting tasks. Its resources are built on the principles of gamification, providing instant feedback and visual engagement to reinforce learning through repetition and recall. Hence, the implementation of Wordwall for conducting formative assessments media may be considered not only for physics subjects but also for other subjects in support of a more interactive and efficient formative assessment process.

The study of Tosari and Kasriman (2024) showed that utilizing Wordwall media leads to a significant enhancement in student learning outcomes in science subject grade III at SDN Tanah Baru 1. The average post-test score of students in the experimental class using Wordwall was higher (84.18) compared to the control class (78.74). The results of the hypothesis test supported these findings by showing that a notable difference was observed in the learning outcomes between the two groups. Wordwall media has proven to be effective in helping students understand the material more deeply and motivate them to be more active in the learning process. This showed that Wordwall media is very helpful for students in the process of learning. This approach not only improves students' learning outcomes but also increase their interest and motivation in learning science. Thus, this Wordwall media can be a quality tool in improving Science learning in elementary school.

The study of Azimah et al. (2023) determined that the use of Wordwall-based evaluation tools proved effective in enhancing the science learning outcomes of sixth-grade elementary students. The study found that Wordwall increased student enthusiasm and engagement during online learning. Employing creative and innovative technology in assessments contributed to a positive and enjoyable learning environment, which in turn led to improved academic performance. As students' interest and motivation in learning grew, so did their achievement levels.

Sentani et al. (2022) state that Wordwall is a web-based application that serves as both a learning tool and an engaging evaluation resource for students. It can be effectively utilized in education, particularly for science subjects in elementary schools, and helps motivate students as they complete quizzes. This further helped learners improve overall learning outcomes (Agusti & Aslam, 2022).

Moreover, learning apps enhance student involvement in the learning process through their interactive features. Learners at elementary school level prefer learning to be more fun. The educational games embedded in this apps tend to stimulate learners' brains to think. This also provide opportunities for students to develop according to their potential. With the emergence of learning applications, it provides easy access to various learning resources. This further provide opportunities for students to learn outside of class hours and have a deeper understanding of the topics discussed (Asta et al., 2024).

Kotobee is another example of a digital application. It is a software platform designed to help users create, publish, and distribute interactive digital books. It provides tools for both individuals and organizations to design eBooks that are more engaging and immersive through multimedia integration, interactive features, and a variety of customization options. Integrating technology in the classroom is not just an innovative idea, but a necessity to adapt to the new norms in education. It transforms lessons into interactive learning experiences that enhance information retention and boost understanding (Hoai & Giang, 2020).

Kotobee is one of the most used by interactive ebook creators and editors. It is appropriate for educators, editors, and module designers in creating learning materials including platform for publishing works. In addition, it is also relevant for students because of the accessibility that it offers: "A

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professional software, relatively easy to use" according to Hoai & Giang (2020). Most of the modules developed with Kotobee authors are evaluated with minimal challenges in terms of their utilization as a learning material. Learning materials created with the use of Kotobee Author are developed, used, and tested for learners in elementary (Perocho et al., 2023), high school (Yulianto, 2022), and senior high school (Calatrava, 2023).

There is a significant improvement in results of written exams after the intervention of a digital module developed with the use of Kotobee Authors according to Bawal & Cuenca (2023). In a similar study, it concluded that developed digital modules were not only effective in the learning aspect but were also enjoyable for students who used the app as observed by Goneda et al. (2021). Kotobee Author, when paired with the validity and reliability of its content, would highly enhance the learning-teaching process (Calatrava, 2023). In another study conducted by Yuliantano (2022), the students also deemed the app helpful in improving their proficiency.

There has been a positive development of perception towards e-learning after the utilization of the app as a supplement to a core subject. The only problem reported is the connectivity issue, which was due to the internet connection of both teachers and students as observed by Otico et al. (2023). However, despite the app being used in various subjects, i.e., Science (Calatrava, 2023) ICT (Goneda et al., 2021), Technical-vocational (Bawal & Cuenca, 2023), Math (Otico et al., 2023) and English (Yulianto, 2022), there is a necessity to utilize Kotobee Author in other fields of education like health education and drug education.

The study of Tusoy (2023) investigated the impact of using digitized Kotobee interactive learning eBooks in teaching science to enhance students' academic performance. The results indicated that the digitized Kotobee interactive learning eBook had a significant impact on the performance of students in the experimental group. The study further revealed that the intervention enhanced learner engagement in digital learning, improved the use of eBooks, and promoted active participation in class. As a result, it effectively addressed learning gaps and boosted performance in science. Students had an outstanding learning experience when using the digitized Kotobee interactive learning eBook.

The study by Perocho et al. (2023) demonstrated that students developed a better understanding of science after being exposed to digital versions of Self-Learning Materials (SLM) through the Kotobee intervention. It was evident that students who engaged with the additional features of the Kotobee software achieved a sufficient level of success. The findings indicated that using Kotobee as an offline supplement in Online Distance Learning (ODL) enhanced students' performance in science. This research highlighted the potential of Kotobee's application. The integration of offline digital tools alongside traditional teaching methods can support the visual understanding of scientific concepts (Espina, 2021). Combining online learning with asynchronous technologies leads to improvements in teaching practices and learning outcomes. These offline features transform how, what, and why students learn, as well as how teachers instruct (Maheshwari et al., 2021). This study contributed to the existing research of distance teaching and the study examined the substantial effect of digitalized modules on learners' academic performance. The findings showed that the Kotobee-digitalized modules played a key role in significantly enhancing the performance of Grade 4 students in Science.

The study of Kabak (2021) stated that significant differences were observed in the academic performance of the experimental group, where the innovative application was implemented. When examining students' attitudes toward English lessons and computer-assisted learning, favorable results were found for the experimental group. Overall, the findings indicated that, with proper preparation, the innovative application used in this study could positively impact students' academic achievements, their attitudes toward English lessons, and their perceptions of computer-assisted teaching.

Another study by Baring and Berame (2022) showed that the innovation in the research and development process was the creation of digital module created with Kotobee Author. The study's outcomes were deemed reliable, feasible, and efficient in enhancing students' achievement and self-sufficiency in learning. This conclusion was grounded in the validation process, which included assessments of content quality, media suitability, and language appropriateness. Consequently, the development of digital module was considered viable and can serve as a learning resource to support learners' understanding of concepts. Furthermore, the study's findings encourage teachers and stakeholders to incorporate technology and various online learning tools resources into the process of instruction and learning to foster an interactive and motivating educational setting, while also enhancing knowledge retention and transfer among students.

The study of Otico et al. (2023) stated that learners of all skill levels would find Kotobee's platform easy to use and intuitive. Students were able to understand the content, whether online or offline, while maintaining access to interactive features. This flexibility allows learning to occur anytime and anywhere. Kotobee's broad range of features supports the shift from traditional to blended learning, elevating educational outcomes. Free interactive eBooks are accessible on mobile devices, personal computers, and laptops, offering well-structured lessons that can include audio, video, images, and links to videos.

The study by Catahan et al. (2025) stated that Kotobee's capabilities in mobile, desktop, and web applications make it highly adaptable, and its export functionalities align with various learning management systems. Using the software's latest features will broaden flexibility in developing and publishing instructional materials. To better assess its effectiveness as a supplementary learning material, let students and instructors integrate the developed digital module followed by conducting an evaluation survey; in this way, classroom

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facilitators may also validate the developed product. Conducting such an evaluation would offer valuable real-world insights into the effectiveness of the module, supporting its validation as a supplementary learning resource.

The integration of digital applications such as Wordwall and Kotobee in educational settings reflects a significant shift toward interactive, learner-centered pedagogies. While serving different functions Wordwall for gamified assessments and Kotobee for interactive e-learning modules both platforms demonstrate how technology can transform traditional classroom environments into dynamic, engaging, and personalized learning spaces.

Wordwall excels in fostering active engagement and motivation through game-based learning, especially in science education at the elementary level. Studies consistently show improvements in student academic performance, motivation, and retention when Wordwall is used as a formative assessment and instructional tool. Its real-time feedback and multimedia features not only make learning more enjoyable but also support differentiated instruction and increased student participation.

Kotobee served as a powerful tool for content delivery and digital module creation, offering a flexible platform for developing interactive eBooks enriched with multimedia. It proves especially effective in supporting self-paced and distance learning, improving academic outcomes across all subjects. The application can support both online and offline modes, making it accessible in low-connectivity environments and contributing to equity in education.

Collectively, these platforms address different yet complementary aspects of learning, with engagement of Wordwall and the content mastery of Kotobee highlighting how technology integration enhances teaching efficacy and student learning experiences. The continued development and use of such tools underscore the evolving role of educators as facilitators in technology-rich, student-driven classrooms where learning is personalized, interactive, and measurable.

- *Digital Application and Motivation*

Digital literacy is closely linked to self-directed learning, which involves learners' ability to recognize their learning needs and assume responsibility for their own learning education. This includes activities such as planning their study schedule, selecting resources, and seeking assistance when needed (Kara, 2022).

Digital literacy and self-directed learning are both closely related to the traits of learners and their degree of engagement. Elevated digital literacy and greater self-directed learning contribute to increased involvement, which turn contributes to improved academic performance (Hwang & Oh, 2021; Kara, 2022). These concepts are also strongly linked to self-efficacy, which refers to an individual's belief in their own ability to conquer challenges and address future challenges. To put it another way, it pertains to learners' capacity to handle circumstances that contain novel and uncertain factors (Hamann et al., 2021).

People with strong self-confidence in one's abilities tend to be more determined in overcoming challenges. However, self-efficacy varies from person to person, often influenced by factors such as gender (Aslan, 2021). Additionally, variations in self-efficacy can arise regarding how it is evaluated, since both men and women may exhibit varying performance based on the particular outcome measures applied (Hamann et al., 2021)

In the study of Widowati and Wakid (2023), digital literacy, involvement, self-confidence, and academic achievement are tightly interconnected in intricate ways. Technological literacy directly influences engagement, which in turn significantly impacts academic achievement. Engagement also serves as a moderating factor in the relationship between technological proficiency and belief in one's capabilities, indicating that individuals with higher levels of engagement are more likely to develop greater confidence in their digital abilities. While digital literacy may not indirectly affect self-efficacy, the findings indicate that strategies designed to boost engagement with technology can positively influence academic success.

Learning involvement is regarded as a crucial element in forecasting academic achievement, which can ideally be measured as reflected in measurable learning results or students' grade point averages (Heo et al., 2020). It is crucial in both structured classroom settings as well as digital learning settings (Kuo et al., 2021). Student involvement in learning includes the extent of students' behavioral involvement and the quality of their emotional experiences during the learning process (Jie et al., 2020). It represents the mental and physical energy students dedicate to their academic and extracurricular activities, as well as their dedication to achieving educational goals. Student engagement encompasses curiosity, interest, a desire to master or understand knowledge, enthusiasm, and the ability to study or solve academic problems (Susilowati et al., 2021). Primary signs of learning engagement involve behavioral, emotional, cognitive, and agentic dimensions (Chiu, 2021). Additionally, learning engagement can be viewed through the development of interpersonal, action-based, and mental capacities (Alamri, 2021). The components of learner involvement also reflect a sense of autonomy, as students demonstrate involvement in activities that align with desired learning outcomes (Shin et al., 2020).

The study of Shemy (2020) confirmed that the children in the experimental group were more engaged and participative during the learning process, often sharing real-life experiences related to the lesson content. They enjoyed watching the digital storytelling and actively interacted with the teacher throughout the session. Their motivation levels showed positive results. In comparison to the control group, the teacher noted that using digital storytelling led to better performance on the achievement test and observed a positive impact on the children's overall learning experience.

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The research conducted by Widhiatama and Brameswari (2024) investigated the effectiveness of Wordwall an online platform that incorporates gamification principles into non-game settings in increasing learning engagement and motivation among English Letters students in literature classes. Wordwall was selected over other tools due to its practicality, being free and accessible without requiring student logins. The results showed that using Wordwall in literature instruction positively influenced students' motivation and active participation in the learning process. Incorporating gamified quizzes into literature lessons proved to be an innovative method for sparking students' interest in reading and interpreting literary texts. Additionally, the platform's enjoyable and friendly competitive environment helped students gain a deeper understanding of the material.

The study of Mazelin et al. (2022) concluded that using Wordwall had a positive impact on enhancing student participation. After incorporating Wordwall into the lesson, students became more actively involved in discussions, were more willing to respond to the teacher's questions, and expressed their opinions more freely. Classroom discussions became more engaging and comfortable, with most students contributing to questions featured in Wordwall activities. Furthermore, students showed increased motivation to learn when Wordwall was integrated into the lesson. Many believed it helped them better understand the material by providing instant feedback and a more enjoyable learning experience. Wordwall also promoted independent learning, as it offered clear instructions and allowed students to view their scores via the leaderboard without needing teacher supervision. Overall, the use of Wordwall fostered greater classroom engagement through interactive learning.

The study of Safitri et al. (2022) aimed to assess the effectiveness of using educational digital games built on the Wordwall platform in enhancing interest and motivation in science among fourth-grade pupils. The findings revealed that interactive digital gaming platforms successfully boosted students' desire to acquire knowledge. Previous research has also demonstrated that the use of digital games fosters a positive effect on learning motivation. The study further indicated that such games can enhance cognitive skills, including problem-solving, retention, concentration, and spatial awareness. To maximize their impact, educators should design digital games that are tailored to students' needs and learning environments in a structured and efficient way. The enjoyable experience students had while playing the games encouraged active participation in the learning process. In the context of educational innovation, game technology has emerged as a powerful tool that enables teachers to create more engaging and appealing learning activities.

According to the study of Dhaifi et al. (2024), the Internet has proven to be a powerful tool in supporting vocabulary acquisition, particularly when combined with Wordwall media. It not only facilitated access to a vast array of new vocabulary through online short story sites but also enhanced students' self-directed learning by providing a convenient and cost-effective learning resource. However, to maximize the benefits of these digital tools, it is essential that students utilize them under the careful guidance and supervision of their teachers. This study highlighted that employing Wordwall media and related activities significantly improved vocabulary skills among eighth-grade junior high school students. By leveraging the Internet, which offers free and diverse educational materials, students with high levels of self-directed learning are particularly well-positioned to benefit and excel. Self-directed learning is integral to advancing student outcomes and fulfilling the expectations set by schools and educators.

Another study by Siano and Potane (2022) demonstrated that using an interactive eBook created with Kotobee Author, which included developed and validated video lessons, significantly enhanced students' academic performance. According to the daily observations of the teacher-researcher overseeing the Kotobee group, students showed high enthusiasm, engagement, and motivation when using the interactive eBook—particularly in completing the assessment sections of each module. The Kotobee platform fostered a student-friendly learning environment, as reflected in their active participation and decision-making based on their observations. Student outputs indicated the development of problem-solving abilities and higher-order thinking skills. Given the notable improvement in academic achievement among students in the Kotobee group, the interactive eBook proves to be an effective tool for enhancing conceptual understanding, cognitive processing, and technical skills in mathematics education. Accessible through the Kotobee Reader app, this eBook also holds potential for supporting math teachers in delivering more effective instruction and may serve as a valuable educational resource for improving student learning experiences.

The study of Lasala et al. (2025) developed modules that involved the use of Kotobee software to deliver self-learning modules focused on Earth Science topics. To evaluate students' intrinsic motivation, the Intrinsic Motivation Inventory (IMI) was employed. Results showed that the self-learning modules had a positive effect on students' intrinsic motivation. Learners reported high levels of enjoyment, perceived competence, effort, perceived choice, and the overall usefulness of the modules. Interactive elements like videos, simulations, and animations played a significant role in enhancing student engagement and enjoyment. Additionally, students felt a greater sense of autonomy and control over their learning, which further boosted their motivation.

A study by Carstens et al. (2021) revealed that learners showed increased interest during the learning process when technology was involved. Teachers noted that students utilized technology for projects, creations, collaboration with peers or adults, reading, and other activities aimed at enhancing their learning. Technology sparked high levels of student interest, enabling them to engage with their learning in various ways. Both teachers' and students' motivation to use technology contributed to improving the learning experience. Participants also mentioned that students felt

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more comfortable using technology as part of their educational process.

The study by Efremova and Huseynova (2021) stated that the application of digital resources in education presents various difficulties for both teachers and students. First, there is a need for digital skills and competencies, and not everyone is fully prepared to leverage digital technology. Throughout the learning process, students may experience a range of psychological states, including surprise, confusion, anxiety, helplessness, or satisfaction. In all these situations, individual motivation plays a crucial role in determining how a student approaches the task, regardless of how appealing the activity may be. Typically, more complex tasks require support and strategies to boost motivation, guiding students toward effective learning. Research has shown that motivation tends to increase when students engage in interactive learning formats, where they can communicate with peers and teachers, learn from others, and receive constructive feedback on their progress.

The study by Sofiana and Mubarok (2020) stated that the use of an English mobile application (EBMA) in reading lessons has been shown to improve both student achievement and motivation in reading. This is because EBMA, as a learning tool, offers engaging activities that capture students' attention. The game-based elements of the application encouraged active participation, sparking students' interest in the learning process. In conclusion, it is recommended that EBMA be considered a valuable tool in the learning process and implemented in reading classes to make them more effective and engaging. However, its use requires smartphones, and some schools do not permit students to use these devices in class. Therefore, school policies regarding the use of technology should be reevaluated to accommodate this educational tool.

The study of Rafiq et al. (2024) examined the effect of digital technologies and online learning platforms on higher education results in Lahore, Pakistan. By gathering perspectives from both students and educators, the research highlighted the benefits and the problems encountered with incorporating such technologies. In summary, the results emphasized the beneficial impact of digital tools and online platforms on student involvement, motivation, and academic achievement. These systems, which offer real-time feedback and personalized learning paths, promote a more learner-focused educational approach (Fisher et al., 2020). The results supports existing findings, affirming the effectiveness of digital learning platforms in advancing educational experiences and outcomes. Nevertheless, the research also revealed significant challenges to productive use of digital technologies in the context of higher learning. Digital challenges, lack of adequate resources, and insufficient training were identified as major obstacles. While some institutions successfully integrated digital learning, some faced difficulties because of inadequate infrastructure, lack of digital proficiency among educators and learners, as well as issues with internet access (Ali, 2020).

In today's technology-driven educational landscape, digital literacy is more than a technical skill. It is the foundation of independent learning, student engagement, ultimately, academic performance. As learners increasingly take ownership of their learning through tools like Wordwall and Kotobee, the line between learning and teaching blurs, giving rise to a more autonomous, interactive, and personalized educational experience.

Students with advanced digital literacy are more capable to manage their own learning needs and navigate digital environments independently. Moreover, students engage in self-regulated, goal-oriented learning tasks. This competence naturally contributes to self-efficacy, characterized by confidence to one's capability to overcome obstacles. This belief plays a critical role in sustaining motivation, especially when learning becomes complex or unpredictable. As learners develop confidence in using digital tools, they become more resilient, persistent, and willing to tackle academic challenges head-on.

Research underscores that student engagement—behavioral, emotional, cognitive, and agentic—acts as the bridge between digital literacy and academic success. Platforms like Wordwall, through gamified learning and instant feedback, increase classroom interaction and participation. Likewise, Kotobee's interactive books empower learners to explore content deeply on their terms, improving both understanding and motivation.

Furthermore, intrinsic motivation and autonomy are enhanced when students use interactive digital resources. Research has shown that students are more inclined to participate in meaningful learning experiences when they feel a sense of control, curiosity, and competence, all of which are amplified through well-designed educational technologies.

However, the digital divide still poses a challenge. Without access to devices, the Internet, or proper training, some students and educators are left behind. To maximize the potential of these tools, infrastructure, digital inclusion, and pedagogical support must evolve alongside technological integration.

III. METHODOLOGY

This study adopted a quasi-experimental design involving two intact classes to evaluate students' academic performance and motivation in Science, integrating Wordwall and Kotobee as instructional tools. Participants were assigned to two intact classes in this design: one utilizing Wordwall and the other, Kotobee. Each class incorporated their assigned tool into their Science instruction.

This study was conducted at the Junior High School Department of Linamon National High School, situated in the Linamon District under the Division of Lanao del Norte, within the Department of Education (DepEd) system in the Philippines. This educational institution provided learners from various barangays and sitios including Robocon, Purakan, Bosque, Tilapass, Poblacion, Mago-ong, Samburon

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Napo, and Larapan. Its diversity and local backgrounds characterize the learners.

Linamon National High School is organized into fifteen (15) sections in Junior High School and six (6) sections in Senior High School. Junior High School included four (4) sections in Grade 7. Learners engaged with educational technology in a classroom environment. The school supported this integration with two internet connections designated for the Junior and Senior High School ICT laboratories, 58 desktop computers, and 91 newly acquired laptops for student use. Furthermore, Linamon National High School has been identified as one of the pilot schools for administering regional online assessments on a quarterly basis. Also, teachers receive training for instructional strategies through school Learning Action Cells organized by department per grade level.

The study included 40 learners exposed to Wordwall and 40 learners exposed to Kotobee, all from Grade 7 at Linamon National High School, Linamon, Lanao del Norte. Using a purposive sampling technique, the researcher selected 2 out of the 4 Grade 7 sections for the 2024-2025 school year.

➢ *Development of 7E's Lesson Plan Integrating Wordwall and Kotobee*

This 7Es Lesson Plan integrates the use of Wordwall and Kotobee to enhance student engagement and learning outcomes. By incorporating these digital tools, the lesson promotes active participation, collaborative learning, and critical thinking. The plan follows the 7Es instructional model—Engage, Explore, Explain, Elaborate, Evaluate, Extend, and Exit—to guide students through a structured learning experience that fosters deeper understanding and skill development in an interactive, technology-rich environment.

- *Elicit:*

To begin the lesson, the learners were given a short review activity on the topic to be discussed, aimed at assessing their prior knowledge. This allowed the teacher to evaluate the learners' existing understanding and identify areas that required further attention during the lesson.

- *Engage:*

In this phase, learners were given a short activity designed to capture their interests and engage them in the upcoming lesson. This activity served as a preparation for the main lesson, setting the stage for the learning experience.

- *Explore:*

During this phase, the learners engaged in activities using Wordwall and Kotobee digital applications. This hands-on approach allowed them to investigate and explore the topic, actively promoting experiential learning.

- *Explain:*

At this point, each group discussed and explained their outputs, while the teacher provided additional information to address any missed concepts. This phase aimed to provide clear explanations and deepen the learner's understanding of the topic.

- *Elaborate:*

In this phase, the learners were given opportunities to deepen their understanding of the concept through short takeaways, such as visual representations, trivia, or additional information. This stage encouraged the application of knowledge in new and challenging contexts, fostering a deeper understanding with the integration of Wordwall and Kotobee. The Wordwall activities included labeling components, matching parts with their functions, sorting items into groups, vocabulary-based games, and sequencing tasks. In contrast, the Kotobee platform featured interactive diagrams, embedded video content, and cell comparison exercises.

- *Evaluate:*

To assess student learning, a formative assessment was given using digital tools like Wordwall and Kotobee, allowing the teacher to gauge learners' understanding. This assessment aimed to evaluate the effectiveness of the lesson and learners' understanding of the material. The integrated activities in Wordwall involved matching-type quizzes, while in Kotobee, assessments were conducted through embedded quizzes within the digital content.

- *Extend:*

To extend their learning, learners were assigned a task to apply the concepts they had learned, such as a project-based activity, to enhance creativity and critical thinking skills while reinforcing their understanding of the topic.

In this study, two (2) research instruments were utilized. These instruments included a 100-item researcher-developed achievement test and the modified Science Motivation Questionnaire, originally developed by Ardura and Perez-Britrain in 2018. The questionnaire covered five different components: career motivation, self-determination, intrinsic motivation, grade motivation, and self-efficacy.

To answer problems 1 and 2, mean and standard deviation were computed to assess the proficiency level of learners' academic performance and level of motivation of learners as exposed to Wordwall and Kotobee. To answer problem 3, it used Analysis of Covariance (ANCOVA), and for problem 4, it used One-Way Independent T-Test. The significant predictor of learners' academic performance proficiency was tested using Regression Analysis at a 0.05 significant level.

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IV. PRESENTATION, ANALYSIS, AND INTERPRETATION OF DATA

Table 1 Academic Performance of Learners Exposed to Wordwall and Kotobee

		Wordwall						Kotobee					
Level of Performance	Score Range	Pre-test			Post-test			Pre-test			Post-test		
		f	$\bar{x}$	%	f	$\bar{x}$	%	f	$\bar{x}$	%	f	$\bar{x}$	%
Outstanding	54-60	0	0	0	9	55.22	22.5	0	0	0	12	55.0	30
Very Satisfactory	51-53	0	0	0	7	52.43	17.5	0	0	0	13	52.15	32.5
Satisfactory	48-50	0	0	0	8	49.5	20	0	0	0	6	48.3	15
Fairly Satisfactory	45-47	0	0	0	2	46.0	5	0	0	0	0	0	0
Did not meet the Expectation	44 and Below	40	12.52	100	14	37.09	35	40	14.32	100	9	40.11	22.5
Mean			12.52			47.03			14.32			49.8	
sd			4.97			7.82			4.86			6.05	
Level of Performance			DE			FS			DE			S	

Legend: O = Outstanding, VS = Very Satisfactory, S = Satisfactory, FS = Fairly Satisfactory, DE = Did not meet the Expectation

As can be gleaned, the pre-test results indicate that 40 learners in the Wordwall group and 40 learners in the Kotobee group were on the *Did not Meet Expectation* level during the pre-test. The Wordwall group obtains a mean of 12.52 with a standard deviation of 4.97, whereas the Kotobee group shows a mean of 14.32 and a standard deviation of 4.86. The mean score of the pre-test difference was only 1.8. This indicates that the levels of learner's abilities in Grade 7 Science from both groups were very close and, therefore, comparable prior to the conduct of this study. This may be attributed to the fact that both groups were enrolled in the same school and had similar backgrounds and experiences in their previous science subjects. In addition, the Wordwall group showed a slightly higher standard deviation than the Kotobee group, suggesting a minor difference in the dispersion of scores. This indicates that both the learners in the Wordwall and Kotobee had similar scores on their pre-tests.

The post-test results indicate that students in the Wordwall group showed improvement, implying that the intervention positively influenced their academic performance: 9 out of 49 learners under the score range of 54-60 were classified as *Outstanding*, 7 out of 40 learners under the score range of 51-53 as *Very Satisfactory*, 8 out of 40 learners under the score range of 48-50 as *Satisfactory*, 2 out of 40 under the score range 45-47 as *Fairly Satisfactory*. However, 14 out of 40 learners under the score range of below 45 remained in the *Did Not Meet the Expectation* level. The post-test mean of the Wordwall group increased to 47.03 showing a standard deviation of 7.82. Learners in the Wordwall group display the minimum knowledge, skills, and core understanding of the topics in Science.

Similarly, the learners exposed to Kotobee demonstrated significant progress, 12 out of 40 learners under the score range of 54-60 were rated as *Outstanding*,13 out of 40 learners under the score range of 51-53 as *Very Satisfactory*, 6 out of 40 under the score range of 48-50 were rated as *Satisfactory*. Unlike the Wordwall group, none of the learners were rated as *Fairly Satisfactory*, and 9 out of 40 learners under the score range below 45 remained in the *Did Not Meet the Expectation* level. The Kotobee group recorded a higher post-test mean of 49.8 with lower standard deviation of 6.05. This indicates that learners in Kotobee group developed fundamental knowledge, skills, and core understanding of the topics in Science.

These findings suggest that both Wordwall and Kotobee effectively improved learners' academic performance. Although the Kotobee group attained a slightly increased mean score on the post-test compared to the Wordwall group, the performance levels suggest that both tools are similarly effective in fostering academic growth. The improvement in post-test scores underscores the value of integrating these interventions into teaching strategies to enhance learners' understanding and performance.

The result aligns with Solleza's (2024) statement that using Wordwall has a beneficial effect on science learners' academic performance. It also affirms Rohmani's (2024) claim that the use of word walls emphasizes the importance of exploring the use of interactive technology to enhance student comprehension and academic performance in science lessons.

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The research of Fajaryati et.al (2024) parallels the results that Wordwall can be an effective formative assessment media in improving student learning outcomes, especially in physics subjects. Therefore, the use of Wordwall as a tool for formative assessment media can be considered not only for physics subjects but also for other subjects in order to support a more interactive and efficient formative assessment process. Moreover, the study of Tosari and Kasriman (2024) shows that the use of Wordwall media significantly improves student learning outcomes in science subject grade III at SDN Tanah Baru 1. Wordwall press has proven to be effective in helping students understand the material more deeply and motivate them to take a more active role in the learning process.

The result agrees with the statement of Azimah et al. (2023), who was concluded that Wordwall-based evaluation tools are effective in enhancing science learning outcomes. The use of creative and innovative technology in learning evaluations creates a positive and engaging learning environment, which in turn boosts student performance. When students' interest in learning increases, their academic results also improve. Wordwall, a technology-based evaluation tool, can be utilized to conduct learning assessments effectively. According to Sentani et al. (2022), Wordwall is a website that serves as both a learning tool and an engaging evaluation resource for students. The platform encourages students to complete quizzes, contributing to improved overall learning outcomes for those who use it (Agusti & Aslam, 2022).

Another affirmation that supports this result is the study of Tusoy (2023), who explored the effectiveness of the digitized Kotobee interactive learning ebooks in teaching Science to improve the student's academic performance. Perocho et al. (2023) added that students who utilized the additional features of the Kotobee software achieved a satisfactory level of success and improved child performance in Science. Kotobee Author, paired with the validity and reliability of its content, would highly enhance the learning-teaching process (Calatrava, 2023). In a study conducted by Yuliantano (2022), the students also deemed the app helpful in improving their proficiency. With the appropriate preparations, the innovative application employed in this study can enhance students' academic performance Kabak (2021).

Table 2 Motivation of Learners in Terms of Career Motivation

	WORDWALL			**KOTOBEE**		
Indicators	Mean	SD	Descriptive Level	Mean	SD	Descriptive Level
Learning Science will help me get a good job	4.68	0.57	Very Highly Motivated	4.58	0.78	Very Highly Motivated
Knowing Science will give me a career advantage	4.40	0.59	Very Highly Motivated	4.25	0.73	Very Highly Motivated
Understanding Science will benefit me in my career	4.55	0.55	Very Highly Motivated	4.35	0.69	Very Highly Motivated
My career will involve Science	4.48	0.64	Very Highly Motivated	4.23	0.70	Very Highly Motivated
I will use science problem-solving skills in my career.	4.63	0.67	Very Highly Motivated	4.53	0.74	Very Highly Motivated
Mean	4.55	0.61	Very Highly Motivated	4.39	0.74	Very Highly Motivated

Legend: VHM = Very Highly Motivated, HM = Highly Motivated, MM= Moderately Motivated, LM = Low Motivated, VLM = Very Low Motivated
Range: 4.20-5.00 = VHM, 3.40-4.19 = HM, 2.60-3.39 = MM, 1.80-2.59 = LM, 1.00-1.79 = VLM

Among the indicators, the belief that *Studying Science will help me secure a good job* obtained the highest mean score. In the Wordwall, this parameter had a mean score of 4.68 and a standard deviation of 0.57. Likewise, in Kotobee, the mean score for this indicator is 4.58, showing a standard deviation of 0.78. These findings indicate that both groups were very highly motivated toward Career Motivation.

In addition, it is worth noting that Kotobee showed the lowest average score for the indicator *My career, which will involve Science*. It obtained a mean score of 4.23 with a standard deviation of 0.70. Wordwall conversely, obtained a mean value of 4.40, accompanied by a standard deviation of 0.59 in indicator *Having knowledge of Science will provide me with a competitive edge in my career*. Since both groups have sd more significant than 1, learners have different ratings or preferences, which caused the variation in the results.

The findings suggest that learners are very highly motivated by career-related goals when studying science, as reflected in the high mean scores for the belief that *Studying Science will help me get a good job* in both Wordwall

($\bar{x}$ = 4.68, sd = 0.57) and Kotobee ($\bar{x}$ = 4.58, sd = 0.78). This indicates that career relevance is a strong motivational factor, and that interactive learning platforms effectively support this dimension of science motivation. However, the lower average score in Kotobee for the indicator *My career, which will involve Science* ($\bar{x}$ = 4.23, sd = 0.70) suggests that while students recognize the value of science for future employment, they may be less certain about directly pursuing

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science-related careers. Additionally, the relatively high score in Wordwall for the belief that *having knowledge of Science will provide me with a competitive edge in my career* ($\bar{x}$ = 4.40, sd = 0.59) implies that students view science as a versatile asset that can enhance their employability across fields. Although the standard deviations are below 1, they still reflect some variation in responses, indicating that not all learners are equally driven by career motivation. These findings highlight the importance of integrating career connections into science instruction and suggest a need for differentiated strategies to engage students with diverse motivational profiles.

This result parallels the study of Safitri et al. (2022), signifying the use of Wordwall-based digital media games has been effective in boosting students' motivation to learn. Evidence shows that Wordwall can enhance cognitive skills such as problem-solving, memory retention, focus, and spatial ability. Similar findings have been reported by other researchers, indicating that incorporating digital games into learning fosters greater enthusiasm and engagement among students. Additionally, using digital games as instructional tools can improve both the efficiency and effectiveness of the learning process.

Moreover, this agrees with Siano and Potane's (2022) statement that the Koto Bee interactive ebook improved learners' academic performance. All participants reported that they had discovered or engaged with new experiences, had learning desires, and had learning opportunities across various interactive links attachments and features included in each module to support learning of mathematical concepts. Technology enriches the teaching of math and science, while interactive and engaging media can enhance the learning experience and make concepts more tangible.

Table 3 Motivation of Learners in Terms of Self-Determination

	WORDWALL			**KOTOBEE**		
Indicators	Mean	SD	Descriptive Level	Mean	SD	Descriptive Level
I put enough effort into learning science	4.40	0.84	Very Highly Motivated	4.20	0.87	Very Highly Motivated
I use strategies to learn Science well	4.50	0.64	Very Highly Motivated	4.45	0.74	Very Highly Motivated
I spend much time learning Science	4.28	0.60	Very Highly Motivated	4.55	0.64	Very Highly Motivated
I prepare well for science tests and labs	4.60	0.63	Very Highly Motivated	4.33	0.85	Very Highly Motivated
I study hard to learn Science	4.53	0.55	Very Highly Motivated	4.48	0.60	Very Highly Motivated
Mean	4.46	0.66	Very Highly Motivated	4.40	0.76	Very Highly Motivated

As can be seen, the learners exposed to Wordwall obtained the highest mean in the indicator *I thoroughly prepare for science tests and labs,* achieving a mean value of 4.60, with a standard deviation of 0.63. On other hand, Kotobee obtained the highest mean in the indicator *I spend much time learning Science,* with a mean of 4.55 and a standard deviation of 0.64. Conversely, wordwall group achieved lowest mean in *I spent much time learning Science,* with a mean of 4.28 and a standard deviation of 0.60. Whereas Kotobee group attained the lowest average in *I put enough effort into learning Science,* with a mean score of 4.20 and a standard deviation of 0.87. This implies that both groups demonstrated a very high motivation in this component.

These findings show that both groups exposed to Wordwall and Kotobee exhibited very high motivation toward Self-Determination in the subject matter by their highest mean scores. Despite these differences, both groups still demonstrated a very high level of motivation in their respective indicators with the lowest means. Since both groups have SD greater than one, learners have different ratings or preferences, which caused the variation in the results. Overall, the learners in both groups showed very high motivation in the subject matter on their respective indicators.

The results indicate that learners exposed to both Wordwall and Kotobee platforms demonstrated very high levels of self-determination in learning science, as shown by their high mean scores across various indicators. Specifically, Wordwall participants showed the strongest agreement with the statement *I thoroughly prepare for science tests and labs*

($\bar{x}$ = 4.60, sd = 0.63), suggesting that this platform may be particularly effective in promoting disciplined preparation. In contrast, Kotobee users reported the highest agreement with *I spend much time learning Science* ($\bar{x}$ = 4.55, sd = 0.64), indicating that Kotobee may better support time-on-task motivation. Interestingly, the lowest mean scores within each group still reflected very strong motivation.

Wordwall users scored lowest on time spent learning ($\bar{x}$ = 4.28, sd = 0.60), while Kotobee users scored lowest on perceived effort ($\bar{x}$ = 4.20, sd = 0.87). Despite these variations, the consistently high scores suggest that both platforms effectively foster self-motivated engagement in

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science. The standard deviations, though not all above one as previously stated, still indicate some variation in individual responses, pointing to the diverse ways learners express their motivation. These findings imply that both Wordwall and Kotobee can be valuable tools for enhancing self-determined learning in science, but educators may consider blending approaches to balance preparation, time investment, and perceived effort across learners.

The study of Dhaifi et al. (2024) highlighted that employing word wall media and related activities significantly improves vocabulary skills. The incorporation of self-directed learning strategies has become a crucial factor in achieving superior outcomes for English language learners. By leveraging the Internet, which offers free and diverse educational materials, students with high levels of self-directed learning are particularly well-positioned to benefit and excel. Self-directed learning is integral to advancing student outcomes and fulfilling the expectations set by schools and educators.

Table 4 Motivation of Learners in Terms of Intrinsic Motivation

	WORDWALL			KOTOBEE		
Indicators	Mean	SD	Descriptive Level	Mean	SD	Descriptive Level
The Science I learn is relevant to my life	4.65	0.62	Very Highly Motivated	4.48	0.68	Very Highly Motivated
Learning Science is interesting	4.70	0.61	Very Highly Motivated	4.48	0.68	Very Highly Motivated
Learning Science makes my life more meaningful	4.63	0.67	Very Highly Motivated	4.53	0.90	Very Highly Motivated
I am curious about discoveries in Science	4.33	0.76	Very Highly Motivated	4.33	0.76	Very Highly Motivated
I enjoy learning Science	4.68	0.62	Very Highly Motivated	4.53	0.67	Very Highly Motivated
Mean	4.59	0.66	Very Highly Motivated	4.47	0.74	Very Highly Motivated

Legend: VHM = Very Highly Motivated, HM = Highly Motivated, MM= Moderately Motivated, LM = Low Motivated, VLM = Very Low Motivated
Range: 4.20-5.00 = VHM, 3.40-4.19 = HM, 2.60-3.39 = MM, 1.80-2.59 = LM, 1.00-1.79 = VLM

As revealed, in the Wordwall group, the learners demonstrated the highest mean score in the indicator *Learning Science is interesting* the mean score achieved was 4.70, with a standard deviation of 0.61. This implies that they are very highly motivated to learn Science. On the other hand, Kotobee showed a very high motivation in the indicators *Studying Science, which adds meaning to my life, and my enjoyment of learning Science.* Both resulted in an average score of 4.53, with standard deviations of 0.90 and 0.67, respectively, respectively. This suggests that learners in the Kotobee group found Science activities to be both meaningful and enjoyable.

Conversely, both the Wordwall group and Kotobee group have the lowest mean in *I am curious about discoveries in Science*, indicating a very high motivation in this area, the mean score was 4.33, with a standard deviation of 0.76. Since both groups have sd greater than one, it can be inferred that learners have different ratings or preferences, which caused the variation in the results.

The learners in both the Wordwall and Kotobee showed very highly motivated, as indicated by the highest mean scores in their respective indicators. These findings highlight learners' interest in actively participating in Science activities. On the other hand, the Wordwall and Kotobee, with their lowest mean, also showed a very high level of motivation. Both of them demonstrated high motivation toward Intrinsic Motivation.

The findings suggest that both Wordwall and Kotobee platforms effectively promote intrinsic motivation among learners in science education. The Wordwall group reported the highest mean score on the indicator *Learning Science is interesting* ($\bar{x}$ = 4.70, sd = 0.61), highlighting that the platform fosters a strong sense of interest and engagement. Meanwhile, learners in the Kotobee group showed equally very high intrinsic motivation, particularly in the indicators *Studying Science adds meaning to my life* and *I enjoy learning Science*, both with mean scores of 4.53, indicating that they perceive science not only as enjoyable but also personally meaningful. Although both groups reported their lowest mean on the indicator *I am curious about discoveries in Science* ($\bar{x}$ = 4.33, sd = 0.76), the score still reflects a high level of curiosity, which supports the overall conclusion that intrinsic motivation was strongly present. The observed variations in responses, as reflected by standard deviations though not consistently above 1 suggest that while motivation is generally very high, individual learners differ in how they express their interest and enjoyment in science.

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These findings imply that both digital platforms can successfully cultivate learners' internal drive to engage with science, making them valuable tools in promoting sustained interest and participation in scientific learning activities.

This result aligns with the study by Tosari and Kasriman (2024), which predicts that the use of Wordwall positively impacts student learning outcomes, particularly in Grade 3. This is due to the platform's interactive and engaging approach, which fosters greater student interest and active participation in the learning process. As a result, Wordwall proves to be an effective tool in supporting the achievement of learning goals and enhancing students' understanding of the material. The activities in the game can inspire students to engage actively in the learning process, boosting their interest and capturing their attention towards learning Sofiana & Mubarok (2020).

This further result agrees with the study of Lasala Jr. et al. (2022), which found that interactive ebooks developed using Kotobee are effective in encouraging student engagement is enhanced by incorporating various elements like videos, simulations, audio, animations, and more. These features help maintain students' focus, making the lesson both enjoyable and captivating. lesson enjoyable, fun, interesting, engaging, and worth their attention.

The study of Shemy (2020) confirms that the children in the experimental group were more engaged and livelier during the educational sessions, often sharing real-life experiences connected to the content being taught.

Table 5 Motivation of Learners in Terms of Grade Motivation

	WORDWALL			KOTOBEE		
Indicators	Mean	SD	Descriptive Level	Mean	SD	Descriptive Level
I like to do better than other students in Science tests	4.28	0.75	Very Highly Motivated	4.23	0.80	Very Highly Motivated
Getting a good science grade is important to me	4.85	0.43	Very Highly Motivated	4.70	0.64	Very Highly Motivated
It is important that I get an "A" in Science	4.75	0.49	Very Highly Motivated	4.78	0.47	Very Highly Motivated
I think about the grade I will get in Science	3.80	0.97	Highly Motivated	3.87	1.08	Highly Motivated
Scoring high on science tests and labs matters to me	4.63	0.63	Very Highly Motivated	4.25	0.87	Very Highly Motivated
Mean	4.51	0.63	Very Highly Motivated	4.46	0.74	Very Highly Motivated

Legend: VHM = Very Highly Motivated, HM = Highly Motivated, MM= Moderately Motivated, LM = Low Motivated, VLM = Very Low Motivated

Range: 4.20-5.00 = VHM, 3.40-4.19 = HM, 2.60-3.39 = MM, 1.80-2.59 = LM, 1.00-1.79 = VLM

As indicated, the indicator *Achieving a good grade in science matters to me* obtained the highest mean score. In the Wordwall, this indicator recorded a mean score of 4.85, with a standard deviation of 0.43**.** In Kotobee, *I must get an A in science* has the highest mean score. The average score for this indicator was 4.78, accompanied by a standard deviation of 0.47. Both groups showed very high motivation in their respective indicators. Conversely, the Wordwall group gained the lowest mean in *I consider the grade I might receive in Science*, the mean score was 3.80, accompanied by a standard deviation of 0.97**.** Whereas the Kotobee group gained lowest mean in *the grade I will get in Science*, the indicator received a mean score of 3.87, with a standard deviation of 1.08, both groups demonstrated a strong motivation in this area.

The Wordwall and Kotobee groups showed a very high of motivation toward Grade Motivation by their highest mean scores. Despite these differences, both groups still demonstrated a high level of motivation in their respective indicators with the lowest means. Since both groups have SD greater than one, learners have different ratings or preferences, which caused the variation in the results. Overall, the learners exposed in both Wordwall and Kotobee were very highly motivated in terms of Grade Motivation towards the subject matter.

The findings indicate that both Wordwall and Kotobee platforms effectively promote grade motivation among learners in science education. The Wordwall group recorded the highest mean score for the indicator *Achieving a good grade in science matters to me* ($\bar{x}$ = 4.85, sd = 0.43), while the Kotobee group's highest score was on *I must get an A in science* ($\bar{x}$ = 4.78, sd = 0.47). These results suggest that learners in both groups are highly driven by academic achievement and place strong value on performing well in science. This very high grade motivation can positively influence students' effort, focus, and persistence in learning.

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Conversely, while both groups showed their lowest mean scores on indicators related to considering the grade they might receive (Wordwall: $\bar{x}$ = 3.80, sd = 0.97; Kotobee: $\bar{x}$ = 3.87, sd = 1.08), the scores still reflect a moderate to high level of concern about academic performance. The higher standard deviations in these lower-scoring indicators suggest variability in learners' motivation, possibly reflecting individual differences in how much external performance drives their motivation. These findings imply that while grade-related motivation is generally strong, instructional strategies should also consider integrating elements that appeal to both high achievers and those less focused on grades, ensuring that all learners remain motivated. Ultimately, both digital platforms appear to support students' desire to excel academically, making them valuable tools for encouraging goal-oriented behavior in science education.

The claims of Siano and Potane (2022), demonstrated that the interactive ebook created with Kotobee, which included developed and validated video lessons, significantly enhanced students' academic performance.

Table 6 Motivation of Learners in Terms of Self-Efficacy

	WORDWALL			KOTOBEE		
Indicators	Mean	SD	Descriptive Level	Mean	SD	Descriptive Level
I am confident I will do well on science tests	4.48	0.64	Very Highly Motivated	4.45	0.71	Very Highly Motivated
I am confident I will do well in science labs and projects	4.65	0.53	Very Highly Motivated	4.55	0.71	Very Highly Motivated
I believe I can master science knowledge and skills	4.33	0.57	Very Highly Motivated	4.53	0.60	Very Highly Motivated
I believe I can earn a grade of "A" in Science	4.35	0.58	Very Highly Motivated	4.48	0.64	Very Highly Motivated
I am sure I can understand Science	4.63	0.49	Very Highly Motivated	4.43	0.74	Very Highly Motivated
Mean	4.49	0.57	Very Highly Motivated	4.49	0.74	Very Highly Motivated

Legend: VHM = Very Highly Motivated, HM = Highly Motivated, MM= Moderately Motivated, LM = Low Motivated, VLM = Very Low Motivated
Range: 4.20-5.00 = VHM, 3.40-4.19 = HM, 2.60-3.39 = MM, 1.80-2.59 = LM, 1.00-1.79 = VLM

As can be seen, the indicator, *that I would do well in science labs and projects* had the highest mean score. In the Wordwall, this indicator attained a mean score of 4.65, with a standard deviation of 0.53. Similarly, in Kotobee this indicator reported a mean score of 4.55, with a standard deviation of 0.71. These findings indicate that both groups were very highly motivated toward Self-Efficacy.

In addition, Wordwall displayed the lowest mean score for the indicator regarding my belief in *being able to master science knowledge and skills.* This indicator received a mean score of 4.33, with a standard deviation of 0.57. The Kotobee achieved a mean score of 4.43 with a standard deviation of 0.74 for this indicator *I am sure I can understand Science.* Since both groups have SDs more significant than one, learners have different ratings or preferences, which caused the variation in the results.

These findings suggest that learners exposed to Wordwall and Kotobee exhibited a very high motivation toward Self-Efficacy, as evidenced by the high mean scores for these indicators in both groups. However, both groups demonstrated a low mean score in their respective indicators. Despite the differences, a very high motivation in the subject matter has been shown.

The results indicate that both Wordwall and Kotobee are effective tools for enhancing students' self-efficacy in science education, particularly in practical contexts such as labs and projects. The indicator *I would do well in science labs and projects* received the highest mean scores in both groups (Wordwall = 4.65, sd = 0.53; Kotobee = 4.55, sd = 0.71), indicating a very strong confidence among learners in their ability to succeed in hands-on scientific tasks. In contrast, the indicator related to mastering science knowledge and skills scored slightly lower (Wordwall = 4.33, sd = 0.57; Kotobee = 4.43, sd = 0.74), suggesting that students feel somewhat less confident in their conceptual understanding of science. Despite this, the overall high mean scores across all indicators reflect a very high level of motivation toward self-efficacy in both learning environments. The relatively low standard deviations indicate consistent responses among learners, underscoring the reliability of the data. These results highlight the importance of integrating digital tools that not only engage students in practical learning but also support their

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theoretical understanding, providing a balanced and effective approach to science education.

The results affirm the claims of Mazelin et al. (2022) that the use of Wordwall also allows students to work autonomously by providing clear instructions for completing the quiz and enabling them to check the leaderboard to see their scores without needing teacher supervision. The researcher also discovered that Wordwall helps increase student engagement in the classroom by facilitating interactive learning. Self-efficacy refers to a person's evaluation of their own abilities and belief in their capacity to overcome challenges and address future problems (Hamann et al., 2021). People with high self-efficacy tend to be more persistent and are more determined in their efforts to resolve issues Aslan (2021). The study of Perocho et al. (2023) parallels the result, stating students demonstrated a better understanding of Science after using Kotobee.

Table 7 Overall Learners' Motivation of Science 7

	WORDWALL			KOTOBEE		
Components	Mean	SD	Descriptive Level	Mean	SD	Descriptive Level
Career Motivation	4.55	0.61	Very Highly Motivated	4.39	0.74	Very Highly Motivated
Self-Determination	4.46	0.66	Very Highly Motivated	4.40	0.76	Very Highly Motivated
Intrinsic Motivation	4.59	0.66	Very Highly Motivated	4.47	0.74	Very Highly Motivated
Grade Motivation	4.51	0.3	Very Highly Motivated	4.37	0.86	Very Highly Motivated
Self-Efficacy	4.49	0.57`	Very Highly Motivated	4.49	0.74	Very Highly Motivated
Overall Mean	4.51	0.63	Very Highly Motivated	4.42	0.73	Very Highly Motivated

Legend: VHM = Very Highly Motivated, HM = Highly Motivated, MM= Moderately Motivated, LM = Low Motivated, VLM = Very Low Motivated
Range: 4.20-5.00 = VHM, 3.40-4.19 = HM, 2.60-3.39 = MM, 1.80-2.59 = LM, 1.00-1.79 = VLM

The data reveal that the learners in the Wordwall group displayed a very strong motivation, the mean score of 4.51, with a standard deviation of 0.63. On the other hand, learners in the Kotobee group also exhibited a strong level of motivation, with a mean score of 4.42 and a standard deviation of 0.73. In Wordwall group, learners showed a very high motivation toward Career Aspiration, Self-Motivation, Internal Drive, Academic Motivation, and Self-Confidence. Similarly, the Kotobee exhibited a very high motivation toward Career Aspiration, Self-Motivation, Internal Drive, Academic Motivation, and Self-Confidence. These findings suggest that both groups recognized the importance of learning Science in their career, had self-determination in learning Science, were interested in science-related activities, and were strived hard to get good grades in Science, and had self-confidence in doing well in Science.

The findings from this study have significant implications for science education, particularly regarding the use of digital learning platforms such as Wordwall and Kotobee. Both groups of learners exhibited very high motivation in key areas including Career Aspiration, Self-Motivation, Internal Drive, Academic Motivation, and Self-Confidence. These results indicate that digital tools, regardless of their design or format, effectively cultivate essential motivational factors that contribute to student engagement in science learning. The strong career-oriented motivation suggests that learners perceive science as relevant to their future professional goals, highlighting the need for educators to emphasize real-world applications within the curriculum.

Furthermore, the presence of high intrinsic motivation among students demonstrates that these platforms promote self-determined learning, which is critical for sustained academic achievement. The consistent positive outcomes observed across both tools underscore the value of integrating interactive digital resources into science instruction to enhance learners' confidence, persistence, and overall academic performance. Consequently, this study supports the adoption of digital learning technologies as a strategic approach to fostering motivation and improving educational outcomes in science.

Since Wordwall and Kotobee serve different purposes, learners' experience with them can differ. Upon using Wordwall learners often said that *I like how it felt like playing a game rather than studying* the game like format makes learning feel fun and less like traditional study. Learners appreciate getting instant right or wrong feedback, which helps reinforce learning. Some learners said that *I knew right away if I got something wrong and tried again.* Wordwall has competitive elements like scores and timer that can encourage learners to try harder. Learners often report that *I wanted to beat my last score, so I did the activity a few times.*

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Upon using Kotobee learners were able to read on various devices at their own pace, learners said that *I like that I could read on my phone during breaks.* Kotobee's format encourages independent learning and exploration, learners reported that *it felt more like exploring than reading a textbook.* Some learners *said that the video explained what I didn't get from the text.* Kotobee has interactive elements like videos, pop-up glossaries and embedded questions help clarify difficult content. Other learners reported that *the interactive quiz made me stop and think about what I just read*. The combination of text, video and interactivity helps learners who struggle with text-only learning.

Table 8 Summary of Learners' Academic Performance Scores in Science

Source	Adj SS	df	F-value	P-value
Intercept	11999.9	1	313.45	<0.0001
Group	46 .8	1	1.22	0.2723
Pretest	863.5	1	22.56	<0.0001
Residuals	2947.8	77		

Table 8 presets the summary of the differences in the post-test academic performance of learners exposed to Wordwall and Kotobee interventions while controlling for the influence of pre-test scores. It reveals that the group effect, which compares the post-test scores of learners exposed to the two interventions, produced an F-value of 1.22 and a p-value of 0.2723, indicating that the difference in post-test performance between the two groups is not statistically significant. Both Wordwall and Kotobee interventions demonstrated a comparable impact on learners' academic performance. On the other hand, the covariate, pre-test scores, significantly influenced post-test performance, as shown by an F-value of 22.56 and a p-value less than 0.0001. This finding highlights the critical role of baseline knowledge in shaping learners' academic outcomes.

Furthermore, result indicates that there is no significant difference (F=1.22, p=0.2723) in the post-test scores between Wordwall and Kotobee groups. The null hypothesis, asserting that no significant difference exists in the post-test scores of Grade 7 Science learners taught using Wordwall and Kotobee, was tested at a 0.05 significance level. Moreover, it indicates that the treatment within obtained a p-value of less than 0.0001.

It is worth noting that both Wordwall and Kotobee proved to be effective teaching tools in improving learners' academic performance though the results do not show a meaningful statistical difference between the two groups. This improvement is evident in the learners' significant gains in post-test performance compared to their pre-test scores, regardless of the intervention used. The findings suggest that educators can implement either tool based on their preference, resource availability, or institutional priorities, as both interventions offer comparable benefits. These results underscore the potential of both tools to enhance academic performance and support effective teaching strategies in educational settings.

The findings confirm that both Wordwall and Kotobee interventions effectively enhance learners' academic performance. Although no significant difference was found between the two groups, the notable improvement from pre-test to post-test scores supports the validity of the use of these tools in educational settings.Educators may select either intervention based on contextual needs and preferences.

A recent study by Rohmani (2024) study supports that using word wall media greatly enhanced science learning outcomes and motivation, while also fostering a more engaging and enjoyable learning environment for students. Wordwall application is suitable for use by educators who want to create learning assessment methods Khairunisa (2021). Educational Applications enable teachers to update their lesson plans Ababa et al. (2021). The academic performance of learners is central to the education system, with the success or failure of educational institutions being determined by students' academic achievements (Seeret et al., 2021).

Specifically, Wordwall digital application can be used for mobile phones, tablets, or computers that provide learning materials, exercises, and learning interactions digitally Torrington, (2023). This will provide opportunities for students to learn outside of class hours and provide a deeper understanding of the topics discussed Asta et al. (2024). Added to this, Baring and Berame (2022) conducted a study with the result that Kotobee was deemed valid, practical, and effective in enhancing learners' performance and independence in learning. This assessment was based on the validation of content relevance, media suitability, and language appropriateness. Therefore, the developed e-module was considered feasible and suitable as a learning resource to support students' conceptual understanding. Integrating technology transforms classrooms into interactive learning experiences that aid students in retaining information and enhancing their comprehension (Hoai & Giang, 2020). There is a significant improvement in written exams after the intervention of a digital module developed with the use of Kotobee Authors Bawal & Cuenca (2023).

Conducting such an evaluation would offer important real-world perspectives on the effectiveness of e-learning module, supporting its validation as a supplementary learning resource Catahan et al. (2025). This further supports the study of Otico et al. (2023), which stated that learners of all ability levels find Kotobee's platform simple and intuitive to use.

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Table 9 Summary of Learners' Motivation in Science

Group	Mean	t-statistics	p-value	Remark
Wordwall	4.4205	1.2386	0.2198	Not significant
Kotobee	4.5090			

The data were screened and tested to ensure they met the assumptions for conducting a one-way independent t-test. The results show the degree of motivation among learners in Science exhibited a p-value equal to 0.2198. The Wordwall group achieved a mean score of 4.4205. The t-test analysis yielded a t-statistic of 1.2386 with an associated p-value of 0.2198. Since the p-value exceeds the commonly accepted significance threshold of 0.05, this result is considered statistically non-significant. This indicates that there is insufficient evidence to conclude that the observed mean score for the Wordwall group differs meaningfully from the comparison value. In other words, any difference observed may be attributed to random variation rather than a true effect of the intervention.

The Kotobee group exhibited a mean score of 4.5090. Statistical analysis using a t-test yielded a t-statistic of 1.2386 with a p-value of 0.2198. Since the p-value exceeds the standard threshold of 0.05, this result is considered statistically non-significant. This indicates that there is insufficient evidence to conclude that the observed mean score for the Kotobee group significantly differs from the comparison value or control condition. Therefore, any observed difference may be attributed to random chance rather than a definitive effect of the Kotobee intervention. The average scores for both groups were relatively close: Wordwall group had an average of 4.4205, whereas the Kotobee group had an average of 4.5090. The number of learners exposed to Kotobee was only slightly higher than that of the Wordwall group. This similarity in scores may be attributed to factors such as the learners' initial interest and confidence in learning Science, as reflected in the pre-test scores. Additionally, factors such as the study setting, the specific content covered, or the individual preferences of the learners may have contributed to the minimal difference.

Moreover, it can be gleaned that there is no notable difference in the learners' level of motivation between those exposed to Wordwall and Kotobee. The p-value, which helps determine if the difference is important, suggests that the levels of motivation between both groups were not significantly different. The results suggest that both interventions are equally effective in fostering motivation among Grade 7 learners.

A recent study by Widhiatama and Brameswari (2024) supports the idea that integrating Wordwall into Literature classes had a significant effect on motivating students to actively participate in the learning process. Using gamified quizzes in literature classes proved to be an innovative approach to sparking students' interest in reading and analyzing literary works. Moreover, the fun and friendly competition provided by Wordwall helped students gain a deeper understanding of the literature texts.

The study of Mazelin et al. (2022) concluded that the students were able to actively engage in discussions after Wordwall was introduced into the lesson. They became more responsive to teacher questions and more willing to share their thoughts. Additionally, students felt more at ease and involved during class discussions, with many contributing answers to questions featured in the Wordwall activity. The tool also increased their motivation to learn the material. Several students expressed their excitement about using Wordwall in class, noting that it helped them better understand the lesson by offering instant feedback and allowing multiple attempts. Furthermore, Wordwall promotes independent learning by providing clear instructions for completing quizzes and enabling students to view their scores on the leaderboard without needing teacher supervision.

The study by Siano and Potane (2022) supports this, indicating that Kotobee interactive eBook offered a user-friendly platform for students, as demonstrated by their active participation and choices informed by their observations. Their work indicated the ability to solve problems that enhanced their higher-order thinking skills. This tool may serve as an effective educational resource to foster positive developments in students' learning and overall experience. In a similar study, it was concluded that developed digital modules were not only effective in the learning aspect but were also enjoyable for students who used the app Goneda et al. (2021).

Furthermore, the results affirm the claims of Lasala et al. (2025) that implementation of self-learning modules through Kotobee software had a positive effect on students' intrinsic motivation. Learners reported strong extent of interest and enjoyment, perceived competence, effort, and importance, a sense of choice, and the value or usefulness of the content. The modules' interactive elements—such as videos, simulations, and animations—enhanced student enjoyment and engagement. Additionally, students expressed a feeling of autonomy and control in their learning process, which contributed to greater motivation.

The study by Efremova and Huseynova (2021) stated the use of digital tools in education introduces various challenges for both teachers and students. A key requirement is possessing the necessary digital skills and competencies, which not everyone is fully prepared for. Learners may experience a range of psychological responses during the learning process—such as confusion, anxiety, surprise, helplessness, or satisfaction. In all these situations, personal motivation plays a crucial role in how a student approaches tasks, regardless of how engaging the activity might be. These include technical problems, limited resource

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availability, and a lack of adequate training. While some institutions successfully implemented online learning, others struggled due to poor infrastructure, low digital literacy among educators and students, and unreliable internet access (Ali, 2020).

V. SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

➢ *Summary*

This study investigates the effects of Wordwall and Kotobee on the academic performance and motivation levels of Grade 7 learners in Science. Conducted at Linamon National High School, Division of Lanao del Norte, Region X, during the fourth grading period of the 2024-2025 school year, the study employed a quasi-experimental research design with purposive sampling. A total of 40 learners participated in each group. The study utilized a validated academic performance 60-item test about Compound Microscope, Plant and Animal Cells, and Level of Biological Organization to measure the academic performance of the Grade 7 learners. Also, used the modified Science Motivation Questionnaire originally developed by Ardura & Perez-Britrain in 2018. This was administered after the integration of Wordwall and Kotobee in the lessons. The data on the academic performance and level of motivation in science of Grade 7 learners were treated using mean and standard deviation. A one-way ANCOVA was conducted at the 0.05 significance level to evaluate the null hypothesis of no significant difference in academic performance. Similarly, a one-way independent t-test was performed at the same significance level to assess the null hypothesis regarding differences in motivation levels.

➢ *Findings*

Based on the collected and treated data, the following were the foremost findings of the study:

- Learners exposed to Wordwall and Kotobee improved in their science 7 than those who were not. The learners exposed to Wordwall improved a little since they reached the level of *Fairly Satisfactory* and the learners exposed to Kotobee improved also since they reached the level of *Satisfactory*. Both Wordwall and Kotobee effectively improved the academic performance of learners.
- Learners who are exposed to Wordwall and Kotobee were very highly motivated toward career, self-determination, intrinsic, grade and self-efficacy in learning science. The specific indicator with the highest motivation for both groups was the importance of achieving a good grade in Science.
- There was no significant difference in the academic performance of Grade 7 learners exposed to Wordwall and Kotobee. The study highlighted the potential of using both Wordwall and Kotobee to enhance academic performance.
- There is no significant difference in the learners' motivation between the groups exposed to Wordwall and Kotobee. The p-value suggests that the difference in motivation between the learners exposed to Wordwall and Kotobee did not reach statistical significance.

➢ *Conclusions*

- Wordwall and Kotobee affect the academic performance in science. These digital applications develop the fundamental knowledge, skills and understanding of the topics in Science, and enhanced academic performance effectively.
- Wordwall and Kotobee make science more meaningful and enjoyable for learners. These digital applications were very highly motivating learners toward intrinsic, career, self-determination, grade and self-efficacy.
- There was an effect on the academic performance of learners exposed to Wordwall and Kotobee. The study emphasizes the importance of integrating Wordwall and Kotobee into the lessons to enhance academic performance.
- In assessing the effectiveness of Wordwall and Kotobee, the motivation among learners was the most important factor. The concepts being taught have caught the learners' motivation and the different ways learners like to learn have affected their motivation in using Wordwall and Kotobee.

➢ *Recommendations*

- Learners may be given activities using Wordwall and Kotobee as supplementary materials, as these enhance their academic performance.
- Teachers, especially Science teachers, may implement Wordwall and Kotobee to foster a positive interest in learning science. They are encouraged to integrate Wordwall and Kotobee to ensure learners' success.
- The administrators of the Division of Lanao del Norte may support teachers by integrating Wordwall and Kotobee into Science instruction. The use of supplementary materials may be included in the In-Service Training (InSET) and suggested to be included in the School Learning Action Cells (SLAC).
- Science Education Programs may effectively utilize Wordwall and Kotobee by developing additional digital resources and supplementary materials that would spark the motivation in different ways learners wanted to learn, considering the individual learning styles.
- Future studies may consider the exposure of wordwall and kotobee by exploring interactive digital resources.

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