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# Improving Teacher Digital Literacy through Wordwall Training in the Tegalwaru District Teacher Working Group Forum Community

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**ABSTRACT**
This study aims to describe how teachers' digital literacy improves through training in using Wordwall as an interactive learning medium. The study was conducted in April–May 2025 and involved 20 elementary school teachers participating in the Teacher Working Group Forum Community in Tegalwaru District, Karawang Regency. The approach used was a descriptive, qualitative approach, with data collection through in-depth interviews, observation of training activities, and documentation of teachers' digital work. Data were analyzed using the interactive model of Miles and Huberman, which includes data reduction, data presentation, and conclusion, and triangulation was carried out to ensure the validity of the results. The results showed that Wordwall training improved four aspects of teachers' digital literacy: technical, pedagogical, social-collaborative, and digital ethics. Teachers became more reflective and creative in designing technology-based learning, and showed increased adaptability to digital developments. Despite obstacles such as limited infrastructure, differences in digital skills, and limited time, teachers still showed resilience. They took the initiative to build collaborative networks through the Teacher Working Group Forum community.

*Keywords: teacher digital literacy, wordwall training, community*

# Peningkatan Literasi Digital Guru melalui Pelatihan Wordwall dalam Komunitas Forum Kelompok Kerja Guru Kecamatan Tegalwaru

**ABSTRAK**
Penelitian ini bertujuan untuk mendeskripsikan peningkatan literasi digital guru melalui pelatihan penggunaan *Wordwall* sebagai media pembelajaran interaktif. Penelitian dilaksanakan pada bulan April–Mei 2025 dengan melibatkan 20 guru sekolah dasar sebagai partisipan di lingkungan Forum Kelompok Kerja Guru Kecamatan Tegalwaru, Kabupaten Karawang. . Pendekatan yang digunakan adalah kualitatif deskriptif dengan teknik pengumpulan data berupa wawancara mendalam, observasi kegiatan pelatihan, dan dokumentasi hasil karya digital guru. Data dianalisis menggunakan model interaktif Miles dan Huberman yang meliputi reduksi data, penyajian data, dan penarikan kesimpulan, serta dilakukan triangulasi untuk menjamin validitas hasil. Hasil penelitian menunjukkan bahwa pelatihan *Wordwall* mampu meningkatkan empat aspek literasi digital guru, yaitu keterampilan teknis, pedagogis, sosial-kolaboratif, dan etika digital. Guru menjadi lebih reflektif dan kreatif dalam merancang pembelajaran berbasis teknologi, serta menunjukkan peningkatan kemampuan beradaptasi terhadap perkembangan digital. Meskipun terdapat kendala berupa keterbatasan infrastruktur, perbedaan kemampuan digital, dan keterbatasan waktu, guru tetap menunjukkan resiliensi dan berinisiatif membangun jejaring kolaboratif melalui komunitas Forum Kelompok Kerja Guru.

*Keywords: literasi digital guru, pelatihan Wordwall, komunitas*

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## INTRODUCTION

The development of digital technology over the past two decades has brought about a major shift in the global education paradigm. The learning process, which was once teacher-centered, has now transformed into a more participatory, interactive, and flexible digital technology-based learning environment. This shift encourages teachers to possess strong digital literacy skills to navigate various platforms, manage information, and create learning experiences relevant to the needs of today's digital generation (Ferrari et al., 2014; Ng, 2012). Digital literacy involves not only the technical ability to use devices but also encompasses the cognitive, social, and ethical aspects of utilizing technology productively (Redecker, 2017).

Digital education also places new demands on teacher professionalism, particularly in selecting and integrating interactive learning media. Teachers are no longer simply users of technology but also designers of digital learning experiences (digital learning designers) capable of linking students' cognitive and affective aspects through innovative media. Teacher digital competence comprises six main domains, including professional skills, pedagogical skills, and student participation in digital environments (Redecker, 2017). However, many teachers in Indonesia still face challenges adapting to digital media due to limited training, infrastructure, and uneven digital literacy (Hulu, 2023; Saerang et al., 2023; Sari & Makaria, 2022; Sitompul, 2022; Zebua, 2023).

In this context, Wordwall training is a relevant strategy for bridging teachers' digital literacy gap. Wordwall is a web-based platform that lets teachers create simple, engaging gamified learning activities, such as quizzes, matching games, and anagrams. Recent Research by Alfares shows that using Wordwall improves student engagement and learning outcomes in EFL (English as a Foreign Language) classes compared to conventional methods (Alfares, 2025). Similarly, Qurashi found that Wordwall positively contributed to Saudi Arabian students' vocabulary mastery through game-based learning (Almuafa & Alqurashi, 2025).

However, the success of Wordwall use is highly dependent on teachers' digital literacy levels. Teachers with strong digital literacy skills can use Wordwall creatively, adapt activities to students' characteristics, and integrate reflection on learning outcomes into the learning process (Nurzhanova et al., 2023). Teacher education should focus on improving digital literacy competencies through innovative pedagogical practices rather than just technical training (Taheri & Pennington, 2024). Therefore, Wordwall training is not merely an effort to teach application use but also a strategic tool for developing teachers' holistic digital literacy.

Digital literacy for teachers encompasses the ability to access, evaluate, create, and communicate information digitally (Ng, 2012; Ferrari, 2013). In practice, digital literacy plays a crucial role in building a culture of reflective and creative learning. This aligns with Research by Dinihari et al., who found that integrating microlearning and literacy in digital learning can improve focus, learning time efficiency, and collaboration between teachers and students (Dinihari et al., 2025). This Research confirms that digital literacy is not a single entity but an ecosystem that requires support from media, pedagogy, and a learning community.

Other studies have shown that a gamification approach can be an effective pedagogical strategy for developing digital literacy while increasing learning motivation (Dinihari, Rafli, et al., 2025). The use of Wordwall as a gamification medium is a concrete example of integrating literacy and technology in student-centered learning. If teachers already possess strong digital literacy, integrating Wordwall as an interactive learning medium can be more effective and impactful.

These findings are reinforced by research by Amreta, Wibawa, and Syahrul in the article "Numeracy Literacy Question Board as an Innovative Media for Interest in Learning Indonesian at Madrasah Ibtidaiyah," which shows that implementing innovative question board-based learning media can significantly increase student motivation and interest in learning (Amreta et al., 2025).

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Teachers who participated in digital training reported significant increases in self-confidence, creativity, and digital collaboration. A similar sentiment was expressed by Nguyen et al., who developed a digital literacy measurement tool for teachers and emphasized the importance of pedagogical and ethical dimensions in technology use practices (Nguyen, 2013).

Furthermore, both digital and emotional literacy require synergy between teachers, parents, and the school community (Solihatun et al., 2025). Thus, teachers' digital literacy cannot be separated from the social and emotional context that forms a collaborative educational ecosystem. This collaborative approach resonates with the concept of transformative learning (Mezirow, 2000), in which the learning process not only transmits knowledge but also changes ways of thinking and acting."In addition to the social and emotional dimensions, digital literacy also has implications for improving students' academic achievement. Reading literacy is positively correlated with learning outcomes (Jonathan et al., 2025). In this context, digital literacy extends the domain of reading literacy by enabling the search for and evaluation of relevant digital information. This means that when teachers have strong digital literacy, they are better able to guide students toward meaningful, context-based learning.

The findings above indicate that developing teachers' digital literacy requires training that is applicable and practice-oriented, such as Wordwall training. This training not only improves teachers' technical skills but also fosters critical awareness of the function of digital media in interactive learning. Therefore, this study aims to answer the following questions:

1) How can Wordwall training improve teachers' digital literacy?
2) What aspects of digital literacy are most developed through this training?
3) What challenges do teachers face in implementing Wordwall after the training?

Based on these questions, the purpose of this study is to describe the impact of Wordwall training on improving teachers' digital literacy, identify evolving dimensions of digital literacy, and uncover barriers to implementation in the field. The results of this study are expected to provide theoretical benefits in enriching studies of digital literacy and learning, as well as practical benefits for teachers and educational institutions in designing sustainable digital training.

Theoretically, this study is grounded in Ng's (2012) understanding of the three dimensions of digital literacy — technical, cognitive, and socio-emotional — and in the DigCompEdu model (Redecker, 2017), which emphasizes educators' digital competencies in designing and evaluating learning. In the context of interactive media, the concept of gamification, as explained by Dinihari and Sari et al., demonstrates that digital media such as Wordwall can catalyze the creation of meaningful, literacy-oriented learning experiences (Dinihari, 2025; Sari et al., 2024).

This Research also seeks to complement previous findings with a new perspective: that improving teachers' digital literacy depends not only on technology training but also on their reflective, emotional, and collaborative abilities in interpreting technology within a learning culture. Thus, Wordwall training is not simply a knowledge-transfer activity but a transformative process toward a digitally literate, creative, and humanistic learning ecosystem.

## METHOD

This study used a descriptive qualitative approach to describe in depth the experiences and reflections of teachers from the Tegalwaru District Teacher Working Group Forum who participated in Wordwall training as an interactive, digital literacy-based learning medium. This approach was chosen because it focuses on the contextual interpretation of social and pedagogical phenomena rather than on testing numerical hypotheses (Creswell, 2014). The Research was conducted from April to June 2025 in Tegalwaru District, Karawang Regency, in collaboration with TWGF community management, which served as

the organizing partner for the training. The training took place both offline and online via Google Classroom and Zoom Meeting, involving 20 elementary school teachers.

The researcher acted as both a facilitator and data collector, interacting directly with the participants. The Research procedure involved three stages: (1) pre-fieldwork (coordination with the TWGFC management, informant selection, and instrument preparation), (2) implementation (observation and interviews during the training), and (3) post-fieldwork (transcription, analysis, and verification of results). Informants were selected using a purposive sampling technique, with the criteria being active teachers at the TWGF, having at least three years of teaching experience, and demonstrating a strong interest in digital learning innovations.

Research data was obtained through semi-structured interviews, participant observation, and documentation of training activities. The interview guide included eight core questions exploring teachers' understanding of digital literacy, their learning experiences with Wordwall, changes in teaching practices, and the challenges of classroom implementation. Direct observations were conducted during the training to examine participant interactions, learning strategies, and teacher collaboration.

All data were analyzed using the Miles and Huberman (1994) model, which includes data reduction, data presentation, and conclusion. Validity was strengthened through triangulation of sources and techniques, comparing the results of interviews, observations, and digital artifacts, including teachers' work on Wordwall.

The analysis was conducted inductively, grouping themes such as improving technical digital literacy, strengthening pedagogical literacy, and the dynamics of teacher community collaboration. Furthermore, this study adhered to Research ethics by obtaining informed consent and maintaining the confidentiality of all informants. With this design, the research is expected to comprehensively describe how collaboration between researchers and the Tegalwaru District TWGP serves as an effective platform for developing teachers' digital literacy through interactive media-based training using Wordwall.

## RESULTS

The results of this study are compiled from in-depth interview data, observations of training activities, and documentation of teachers' digital activities in the TWGFC in Tegalwaru District, Karawang Regency. The findings of this study address three main Research questions: (1) how Wordwall training can improve teachers' digital literacy, (2) which aspects of digital literacy are most developed through the training, and (3) the challenges teachers face in implementing Wordwall after the training. The analysis shows that Wordwall training serves as a vehicle for improving teachers' technological, pedagogical, and reflective competencies. Furthermore, this training also fosters self-confidence and a culture of collaboration among teachers within the TWGF environment as part of a sustainable digital literacy process.

### 1. Improving Teacher Digital Literacy Through Wordwall Training

#### 1.1. Teachers' Experience Changes in Understanding the Meaning of Digital Literacy

Interview results indicate that Wordwall training significantly changed teachers' perspectives on digital literacy. Before the training, most teachers in the TWGF in Tegalwaru District had a narrow understanding of digital literacy, limited to operating devices such as laptops, projectors, and presentation software. Digital literacy was often perceived as synonymous with mechanical technical skills, unrelated to the learning process. However, after participating in the training and engaging in hands-on practice creating Wordwall activities, their understanding developed into a more reflective and functional one. Teachers began to see that digital literacy is not just about technical

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skills but also about the ability to think critically, adaptively, and collaboratively when integrating technology into meaningful learning.

Several teachers noted that the hands-on learning experience in the Wordwall training provided a "new moment of awareness" about the importance of digital creativity. A sixth-grade teacher stated, "I used to think digital literacy was just being able to open a laptop and a projector, but it turns out it's much broader, including how I choose appropriate media for my students." This statement demonstrates a shift from simply using tools to strategically using technology as an interactive learning tool. Teachers began to associate digital literacy with the ability to design learning experiences that are relevant to students' contexts and curricula. For example, several teachers mentioned that they are now more careful in selecting media so that it is not only visually appealing but also builds students' conceptual understanding.

Furthermore, there has been a shift in value orientation toward digital technology. Before the training, some teachers viewed technology as an additional burden or a complex administrative tool. After the training, technology was perceived as an opportunity to enrich learning interactions. One teacher stated, "Now I see technology not as a burden, but as a tool to help students understand more quickly and enjoy learning." This indicates that the Wordwall training fostered a new pedagogical awareness of technology's role as a catalyst for active, participatory learning.

Another interesting finding was the emergence of reflective awareness among senior teachers who had previously been passive in digital activities. Teachers with more than 20 years of experience reported gaining a new understanding of the importance of digital literacy as a professional competency. One teacher stated, "I used to think this kind of thing was only important for young teachers, but it turns out all teachers need to know it because students now live in a digital world." This quote demonstrates the dimension of mindset transformation across generations of teachers, where training serves as a space for dialogue among age groups and teaching practices.

Furthermore, interviews revealed that teachers understand digital literacy not only as "the ability to use" but also as "the ability to choose, evaluate, and create." One participant emphasized, "I'm now more selective in choosing media. Previously, I just chose what was interesting, but now I first consider whether it aligns with the learning objectives." This indicates an improvement in teachers' metacognitive abilities in linking technology functions with pedagogical objectives. Wordwall training helps develop a critical mindset, where teachers become learning designers rather than simply tool users.

Thus, the Research findings in this aspect confirm that Wordwall training not only improves teachers' technical digital skills but also shifts their understanding of digital literacy as a critical, creative, and ethical thinking competency in the context of 21st-century education. This change emerged because the training process focused on practical experiences, group reflection, and support from the teacher community within the TWGF environment, which functions as a shared learning space (community of practice).

### 1.2 Wordwall Training Improves Teachers' Ability to Design Interactive Learning

Wordwall training provides a concrete learning space for teachers to develop their digital pedagogical skills. During the training, teachers were not only introduced to Wordwall's technical features but also guided in designing learning activities tailored to student characteristics and curriculum objectives. Interviews revealed that teachers gained a new understanding of the importance of linking digital media to learning objectives and student needs. A fourth-grade teacher stated, "Usually, I just copy questions from textbooks into PowerPoint, but after the training, I was able to create interactive quizzes on Wordwall that align with the theme 'My Ambition.' The students were

more enthusiastic about answering because it looked like a game."

Observation data supported these findings: teachers were seen actively discussing in small groups to design quizzes and games relevant to their respective school contexts. Teachers with diverse backgrounds shared feedback on how Wordwall activities could foster students' critical thinking skills. One young teacher stated, "I helped a fellow teacher who wasn't familiar with the drag-and-drop feature. In the end, we were able to create thematic exercises together." This demonstrates that the training not only improves individual skills but also fosters collaborative learning, enriching teachers' professional experiences.

The training also fostered teachers' pedagogical creativity in modifying digital features into learning reflection tools. Teachers no longer use Wordwall solely as an evaluation tool, but also to foster participatory classroom interactions. For example, one teacher at Cintalaksana Elementary School created a reflection quiz titled "What Did You Learn Today?" where each question encouraged students to reflect on their learning process. The teacher explained, "I want the students to answer not just right or wrong, but also to think about what they understand." This demonstrates that Wordwall has helped teachers translate student-centered learning principles into measurable and engaging real-world practices.

Furthermore, the training encouraged teachers to develop pedagogical digital literacy skills that are adaptable to various classroom conditions. Teachers began integrating digital media into both online and offline learning activities. One teacher explained, "In class, I use an LCD to play together, but if students are absent, I send a link to parents so they can practice at home." This flexible strategy reflects teachers' ability to adapt technology-based learning to suit the social context and school infrastructure. This marks a shift from traditional teaching approaches to responsive, sustainability-oriented, digital-ecosystem-based learning.

On the other hand, teachers demonstrated a shift in mindset from passive users to active designers of digital learning media. Before the training, some teachers relied on readily available online content. After the training, they were able to create their own content tailored to their students' characteristics. One teacher proudly stated, "I already have three self-made Wordwalls—about fractions, the solar system, and proverbs. The kids love it because it looks like a game, but they're actually learning." This increased productivity indicates that teachers have internalized ownership of digital innovation as part of their pedagogical competency.

Another finding showed that teachers active in the TWGP community achieved better results in developing interactive learning designs than those who worked alone. In an interview, an FKKG administrator said, "Teachers who frequently discuss in groups develop faster. They share their Wordwalls and give each other advice." This demonstrates that the Wordwall training not only develops technical skills but also strengthens professional collaboration among TWGP members. Thus, the ability to design interactive learning does not arise from one-way training, but from a collective learning process in which each teacher becomes an active learner who adds meaning to their digital practices.

Finally, the data collection results also showed that the Wordwall training raised teachers' awareness of the relationship between media design and student learning motivation. Teachers recognized that interactive, visual, and game-based activities can trigger students' emotional engagement. One teacher stated, "When I show a game on the Wordwall, the children immediately focus, even those who are usually quiet become willing to answer." This fact confirms that the digital pedagogical competencies acquired through the training not only impact teachers but also strengthen students' motivation and participation in the learning process.

Thus, the findings in this section indicate that the Wordwall training is an effective catalyst for improving teachers' abilities to design innovative,

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adaptive, and collaborative interactive learning. Teachers not only master digital media but also contextualize its use within student-centered learning and support the growing digital literacy culture within the Tegalwaru District TWGF community.

### 1.3 Introduction to Wordwall Media Encourages Teachers to Become More Adaptive to Technology

The Research results show that introducing Wordwalls plays a crucial role in developing teachers' adaptive attitudes toward developments in educational technology. Before the training, most teachers were passive and cautious about using technology due to limited experience and fear of making mistakes. However, after the training, teachers began to view technology as a natural part of the learning process, adaptable to the needs and context of their respective classes. TWGF teacher revealed, "I used to be nervous when asked to use new media, afraid it wouldn't work. But after learning about Wordwalls, it turned out to be easy, and I wanted to try other applications." This statement illustrates the shift in teachers' mindset from dependency to digital independence, where technology is no longer a barrier but an opportunity for innovation.

The Wordwall training also provided teachers with space to experiment independently and overcome technological barriers through creative solutions. Teachers not only practiced creating digital activities during the training but also adapted their use to suit their school's conditions and available facilities. For example, some teachers from schools with limited internet access worked around the issue by downloading Wordwalls and displaying them offline using LCD projectors. One teacher explained, "If the signal at school is bad, I download it at home. The kids can still play the quizzes without the internet." This finding demonstrates that digital adaptability doesn't always mean following the latest technology trends, but rather the ability to adapt existing media to the realities of the field.

Furthermore, teachers also began to demonstrate initiative in exploring other digital applications after being introduced to Wordwall. Several teachers mentioned that successful experiences using Wordwall increased their confidence to try other media such as Quizizz, Kahoot, or Liveworksheet. One teacher said, "Wordwall was the starting point for me. Now I'm brave enough to explore other media, because it turns out the concept is similar." This fact demonstrates a transfer of confidence—the courage fostered by successful, practice-based learning experiences. Teachers not only master one medium but also develop the flexibility to use technology relevant to their pedagogical needs.

Observations also revealed that Wordwall training fostered teachers' ability to adapt to the context of technology use (contextual adaptability). Teachers considered students' ages, subject matter characteristics, and available learning time when deciding when and how to use Wordwall. One teacher explained, "For lower grades, I create a Wordwall that's more visual and has cheerful sounds, but for upper grades, I add reflective questions to encourage students to think." This demonstrates that teacher adaptability is evident not only in technical aspects but also in pedagogical ability to adapt technology to students' learning styles and needs.

Other findings revealed that more adaptive teachers tend to have reflective and collaborative learning patterns. The training, conducted as a community through the TWGFC, created a safe and supportive learning environment. Several teachers mentioned being more willing to experiment because of peer support. One TWGF teacher said, "If we have difficulties, we just ask in the group. So we're not afraid to try, because we have friends to help." This social support strengthens the internalization of digital competency through horizontal learning among teachers, rather than just

from trainer to participant. In other words, the Wordwall training successfully fostered a growth mindset within the TWGF community, where teachers learned to learn, unlearn, and relearn about technological developments.

Overall, the Research findings in this regard indicate that introducing Wordwall media is a starting point for transforming teachers' attitudes toward technology. Teachers no longer view digitalization as an external demand, but as part of their professionalism and teaching creativity. Technological adaptability grows as confidence, curiosity, and collective support within theTWGFC increase. This indicates that Wordwall training is not merely a skills-building activity but a social learning process that shapes teachers' readiness to navigate the dynamics of technology-based education going forward.

### 1.4 Wordwall Strengthens Teachers' Culture of Digital Knowledge Sharing

Research findings indicate that the Wordwall training not only improved individual teacher competencies but also fostered a culture of knowledge sharing among members of the Tegalwaru District TWGFC. After participating in the training, teachers began actively exchanging digital work, discussing learning strategies, and providing feedback on the media they created. This sharing activity occurred spontaneously and continuously, both in official FKKG meeting forums and through online communication channels such as WhatsApp groups and shared Google Drives. One TWGF administrator explained, "Previously, we only gathered during routine meetings. Now, every week, someone sends a Wordwall link to the group, tests it, and provides feedback."

This change marked a shift in the role of the TWGF community from an administrative forum to a digital professional community that serves as a space for collaboration and learning innovation. Teachers began to view their colleagues as learning partners who could mutually enrich their teaching practices. In interviews, several teachers reported gaining new ideas from each other's work and immediately adapting them to their own classroom contexts. One teacher said, "I saw a Wordwall my friend made for the theme 'My Hero.' I changed it a bit for the fifth-grade social studies topic. It turns out the kids really liked it." This finding suggests that sharing activities are not only oriented toward distributing results, but also toward the creative process of adaptation and innovation.

Observations from follow-up training indicate that digital knowledge sharing has evolved into peer mentoring. More experienced teachers become facilitators for colleagues still experiencing technical difficulties. In one post-training session, a senior teacher helped two other participants understand how to link Wordwall results to Google Classroom. She stated, "Now I'm helping friends who don't understand. If I can, I should share it so everyone can use it." This pattern of interaction confirms that the Wordwall training has fostered community-driven learning, where competency improvement occurs through horizontal support among members rather than solely from the resource person.

Beyond the digital space, the culture of sharing is also reflected in the TWGF community's regular face-to-face activities. At monthly meetings, several teachers volunteered to present the results of their digital media implementations in class. Other teachers offered suggestions for improvement or enrichment ideas. One administrator stated, "We created a rotating schedule for sharing digital practices. Every month, two teachers share their Wordwall results." This activity demonstrates a new social structure within the teacher community, where innovative practices are valued and serve as inspiration for other members. In other words, the Wordwall has become a catalyst for building a knowledge-sharing ecosystem focused on continuous professional development.

Other findings indicate that the culture of sharing that developed after the training also strengthened teachers' solidarity and professional identity as agents of digital change in schools. Teachers felt more valued because they had the opportunity to contribute to learning development in their com-

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munities. One teacher proudly remarked, "Now we learn not only from the trainers, but also from our peers. I feel more confident when I can help other teachers." This sense of belonging strengthens social cohesion among members and creates a positive learning climate in which individual success is seen as the community's collective success.

Overall, the Research findings on this aspect indicate that the Wordwall training has strengthened teachers' digital knowledge-sharing culture by creating a sustainable collaborative network. Teachers no longer work in isolation, but are interconnected in an adaptive, reflective, and mutually supportive digital learning ecosystem. This culture of sharing is a key factor in sustaining the training's impact, as it allows teachers to update their knowledge and practices as educational technology continues to evolve.

**2. Aspects of Digital Literacy Most Improved Through Wordwall Training**

The Wordwall training has established a sustainable collaborative network among the teachers who are members of the Tegalwaru District TWGFC. Teachers no longer work in isolation but are instead connected within an adaptive, reflective, and mutually supportive digital learning ecosystem. Within this network, they share media links, provide feedback, and discuss best practices in using learning technology. The culture of digital knowledge sharing is a crucial factor in the training's sustainable impact because it encourages teachers to continually update their skills and enrich their experiences as educational technology evolves. One teacher said, "We're no longer alone, because we always have friends to discuss the digital media we create."

Data analysis revealed that four aspects of digital literacy significantly improved after the training. First, technical skills improved most significantly. Teachers became more skilled at operating Wordwall, creating quizzes, organizing templates, and sharing results online. Some teachers even integrated it with Google Classroom or student WhatsApp groups. Second, pedagogical skills significantly improved through teachers' ability to design interactive learning that was relevant to students' needs. Teachers began to adapt digital media designs to students' learning styles, thinking levels, and social contexts, making learning more meaningful and student-centered. Third, social and collaborative aspects developed through the sharing of good practices within the TWGF environment. Teachers actively reviewed their colleagues' work, provided suggestions for improvement, and replicated ideas deemed effective for implementation in other schools. This collaboration fostered a professional learning community that supported the development of collective competencies. Fourth, affective and digital ethics also advanced significantly. Teachers became more aware of their ethical responsibilities when using technology, such as maintaining data security, respecting copyright, and instilling digital citizenship values in students. Thus, the Wordwall training not only improved teachers' technical skills but also developed pedagogical, social, and moral competencies, which are essential foundations for sustainable digital literacy in 21st-century education.

**3. Challenges for Teachers in Implementing Wordwalls After Training**

The study revealed that limited infrastructure was a major challenge in implementing Wordwall media in schools within the TWGF community area of Tegalwaru District. Several elementary schools in this area still faced internet connectivity issues, limited access to digital devices, and a lack of supporting facilities, such as LCD projectors or speakers. These obstacles forced some teachers to make adjustments to maintain learning activities. One teacher revealed, "When the network at school is weak, I download the Wordwall activities at home and run them offline in class." This strategy demonstrates that, despite infrastructure constraints, teachers still strive to implement the training findings with creativity and flexibility. However, this situation also underscores the need for systemic support from schools and local governments in providing educational technology

resources."In addition to infrastructure factors, this study found that differences in teachers' digital skills contribute to disparities in Wordwall implementation. Younger teachers tend to adapt quickly to digital media because they are accustomed to using technological devices, while more experienced teachers take longer to master the application's features. TWGF community administrator explained, "Younger teachers catch on quickly, while more experienced ones need more intensive guidance." However, this difference creates a new collaborative space within the TWGF community. More experienced teachers serve as mentors to peers who are still learning, creating a peer-learning environment that supports equitable digital skills across the community. Thus, Wordwall training not only builds technical skills but also strengthens professional solidarity among TWGFcommunity members.

Another challenge frequently expressed by teachers is the limited time required to develop digital media consistently. Administrative tasks, teaching responsibilities, and other school activities often consume teachers' time, making the creation of Wordwall content unsustainable. One teacher stated, "We want to keep creating media, but often the time is spent on reports and administration." However, some teachers overcome this by working together in small groups to share roles in creating media based on learning themes. This collaborative strategy demonstrates that time constraints do not completely stifle teacher creativity but rather encourage more efficient functional collaboration. However, these findings also reinforce the importance of time management and institutional support for sustainable digital innovation.

Furthermore, the Research findings indicate that consistent Wordwall use after training is highly dependent on support from school policies and the teacher community. Teachers who receive support from the principal or supervisor are more motivated to continue digital learning practices. One teacher stated, "If the principal supports us and gives us opportunities to present our media, we become more enthusiastic about creating new ones." Conversely, in schools that are less supportive of innovation, teacher enthusiasm declines over time. To address this, the TWGF community management initiated regular digital practice-sharing sessions to maintain teacher enthusiasm. This fact confirms that the success of the training is determined not only by individual competence but also by the support of an institutional ecosystem that encourages sustainable digital innovation. Therefore, Wordwall training is not merely a short-term skills-building activity, but rather part of a learning culture transformation process that requires adequate policy support, time, and infrastructure.

## DISCUSSION

The results of this study indicate that the main challenges in implementing Wordwall media in the TWGF community area of Tegalwaru District are closely related to infrastructure aspects and the readiness of the school's digital ecosystem. Barriers such as limited internet connectivity and technological infrastructure hinder the implementation of digital literacy at the elementary school level. This finding aligns with the literature on digital infrastructure readiness as a crucial element in ensuring the successful integration of technology into learning (García-Vandewalle García et al., 2023). In this context, teachers' ability to creatively adapt digital media, for example, by downloading Wordwall activities for offline use, demonstrates digital resilience—the ability to survive and adapt to limited conditions (Howard et al., 2021). This reinforces the argument that digital literacy depends not only on the availability of devices but also on the flexibility and innovativeness of technology users.

In addition to technical challenges, this study revealed a digital skills gap among teachers, reflecting the heterogeneity of technological literacy within the education community. Younger teachers adapt more quickly due to their prior digital experience, while older teachers require ongoing support to adapt to changing learning paradigms.

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This phenomenon aligns with the findings of Hatlevik and Christophersen, who stated that age, professional experience, and intensity of technology use significantly influence teachers' digital literacy levels (Hatlevik & Christophersen, 2013). However, this study's results highlight a positive aspect of this dynamic: the emergence of peer learning and mentoring practices among teachers within the FKKG community. These practices reflect the professional learning community model described by Trust, Krutka, and Carpenter, where peer collaboration is key to building collective digital competence. In other words, Wordwall training not only enhances individual skills but also strengthens social and reflective professional solidarity (Trust et al., 2016).

Furthermore, time constraints are one of the most frequently encountered structural challenges in digital media implementation. Teachers must balance administrative and teaching responsibilities with innovative activities such as creating Wordwall content. A study by Schleicher of the OECD highlighted a similar finding, stating that administrative workload is a factor that often hinders teachers' classroom innovation (Fazraningtyas et al., 2020). However, this study demonstrated an adaptive response in the form of collaborative work among teachers in creating digital media, indicating the emergence of a new work culture based on efficiency and collaboration. These results align with Puentedura's perspective in the SAMR model, which positions digital collaboration as an indicator of learning transformation from mere substitution to redefinition, namely when technology is used to create new forms of learning that were previously impossible without digital media (Puentedura, 2010).

From a sustainability perspective, consistent post-training Wordwall use is strongly influenced by support from school policies and the teacher professional community. These findings reinforce the ideas of Tondeur et al. The integration of educational technology will be effective if supported by institutional policies that provide ongoing training, reflective supervision, and recognition of teacher innovation (Tondeur et al., 2017). In the context of the TWGF community, an internal policy of sharing digital practices has been shown to maintain motivation and the continuity of Wordwall media use in the target schools. This demonstrates that digital literacy success is not solely the result of improved individual competencies but also a product of the social and structural support systems within the teacher's workplace. As explained by Fullan and Langworthy, digital transformation in education requires a deep learning ecosystem that fosters ownership, participation, and collaboration among educational actors (Fullan & Langworthy, 2011).

Thus, this discussion confirms that Wordwall training at the TWGFC in Tegalwaru District has two strategic impacts: first, building adaptive digital literacy competencies at the individual teacher level, and second, encouraging a collaborative culture within the educational community. However, infrastructure challenges, skill gaps, and time constraints highlight the need for a systemic approach through stronger policy support, so that technology-based training like this does not stop at improving technical skills but becomes part of a sustainable, contextually tailored transformation of the learning culture, tailored to the characteristics of schools in Indonesia.

## CONCLUSION

Based on the Research and analysis, Wordwall training can improve teachers' digital literacy in the Tegalwaru District Teacher Training and Education Faculty by strengthening technical, pedagogical, social, and ethical digital skills in an integrated manner. Teachers not only become more skilled in using digital media but also more reflective and creative in designing interactive learning experiences that are relevant to students' characteristics. This training fosters a collaborative culture among teachers, encouraging the formation of a sustainable digital knowledge-sharing network. However, challenges remain, including lim-

ited infrastructure, digital skill gaps, and limited time for media development. Despite this, teachers demonstrate high adaptability and resilience by leveraging the TWGF community's support to maintain their innovative practices. Overall, Wordwall training has proven effective as a community-based teacher professional development strategy that not only improves individual digital literacy but also strengthens a collaborative and sustainable digital learning ecosystem in elementary schools.

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