



JURNAL BASICEDU

Volume 10 Nomor 4 Tahun 2026 Halaman 2046 - 2056

Research & Learning in Elementary Education

<https://jbasic.org/index.php/basicedu>



Improving Teachers' Competency in Using Interactive Flat Panel as Technology-Based Gamification Learning Media

Desi Innanti Wicaya Ningrum^{1✉}, Sopingatun²

Teknologi Rekayasa Perangkat Lunak, Politeknik Sawunggali Aji, Indonesia¹

SD Negeri 1 Jogopaten, Indonesia²

E-mail: wicayaningrum.dinnanti@gmail.com¹, sofia.sopingatun@gmail.com²

Abstrak

Di era digital saat ini, integrasi teknologi dalam pembelajaran dasar sangat penting, namun kompetensi guru sekolah dasar dalam merancang media interaktif yang selaras dengan tujuan kurikulum masih terbatas. Penelitian ini bertujuan untuk mengevaluasi peningkatan kompetensi guru SD Negeri 1 Jogopaten dalam merancang aktivitas berbasis game interaktif "Tarik Tambang" menggunakan *Interactive Flat Panel* (IFP). Berbeda dengan penelitian terdahulu yang hanya mengidentifikasi kebutuhan pelatihan guru tanpa memberikan metodologi konkret, penelitian ini menawarkan keunikan berupa program pendampingan langsung yang melatih guru mengonstruksi materi dan memodifikasi perangkat lunak game secara mandiri. Penelitian tindakan sekolah ini dilaksanakan secara kolaboratif dalam dua siklus melalui komunitas belajar sekolah, dengan melibatkan 8 orang guru sebagai subjek penelitian. Setelah pendampingan intensif pada Siklus I dan Siklus II, guru mulai mampu mengelola lembar kerja digital (*spreadsheet*), memasukkan soal-soal berbasis rangsangan (*stimulus*) secara mandiri, hingga membagikan tautan pendek game yang siap pakai. Kemampuan guru meningkat signifikan dengan rata-rata skor kelompok sebesar 30%, yaitu dari kategori "kurang" (66,8) pada Siklus I menjadi kategori "baik" (86,9) pada Siklus II. Pada akhir penelitian, sebanyak 75% dari total guru berhasil mencapai target ketuntasan dengan predikat minimal "baik". Penelitian ini membuktikan bahwa pendampingan terstruktur melalui komunitas belajar efektif memitigasi kecemasan teknologi guru serta mengubah peran mereka dari sekadar pengguna pasif menjadi kreator konten digital yang kreatif.

Kata Kunci: kompetensi guru, *Interactive Flat Panel* (IFP), komunitas belajar, gamifikasi

Abstract

In today's digital era, integrating technology into elementary education is crucial; however, primary school teachers' competence in designing interactive media that aligns with curricular objectives remains limited. This study aims to evaluate the improvement of teachers' competencies at SD Negeri 1 Jogopaten in designing interactive, gamified activities—specifically the “Tarik Tambang” game via *Interactive Flat Panels*. Different with previous studies that only identify the need for teacher training without providing a concrete methodology, this research offers a unique approach through a direct mentoring program that trains teachers to independently construct learning materials and customize the game software. This school action research was conducted collaboratively across two cycles within a learning community, involving eight teachers as research subjects. Following intensive mentoring in Cycles I and II, teachers successfully mastered managing digital spreadsheets, independently inputting stimulus-based questions, and creating ready-to-use short game links. The teachers' competencies improved significantly, with the group's average score increasing by 30%, rising from the “poor” category (66.8) in Cycle I to the “good” category (86.9) in Cycle II. By the end of the study, 75% of the teachers successfully achieved the proficiency target with a minimum predicate of “good.” This study proves that structured assistance within a learning community effectively mitigates teachers' technological anxiety and transforms their role from passive consumers into creative digital content creators.

Keywords: teacher competency, *Interactive Flat Panel* (IFP), learning community, gamification.

Copyright (c) 2026 Desi Innanti Wicaya Ningrum, Sopingatun

✉ Corresponding author :

Email : wicayaningrum.dinnanti@gmail.com

DOI : <https://doi.org/10.31004/basicedu.v10i4.12665>

ISSN 2580-3735 (Media Cetak)

ISSN 2580-1147 (Media Online)

INTRODUCTION

Education plays a vital role in preparing human resources who can adapt to the changing times. In the digital age, the education sector faces the challenge of delivering learning experiences that are not only effective but also engaging, interactive, and relevant to students' needs. The digital age is characterized by rapid advancements in digital technology that have brought about new lifestyles. The digital age presents many challenges across various aspects of life, including education. Technological advancements have brought about changes in the field of education (Silvester et al., 2023). According to (Najmudin et al., 2025) technological advances are transforming education from traditional methods into innovative, interactive approaches that use digital tools. In today's digital era, technology is a vital part of everyday life, and bringing it into the classroom is key to making teaching and learning more effective and higher quality. As the first step in formal schooling, elementary education is crucial. It builds the essential knowledge, skills, and character that students need to succeed (Handayani et al., 2026). Teacher professionalism is a key element that influences the learning quality in educational institutions. In line with that (Sirait, 2021; Wathoni & Noor, 2020) the quality of a student's education heavily depends on their teacher's skills, subject knowledge, and ability to use creative teaching methods. Skilled educators not only have a deep understanding of their subjects, but they also create fresh and efficient teaching strategies that enhance students' comprehension and inspire their desire to learn (Sitorus et al., 2025). Not only just delivering lessons, elementary teachers serve as mentors and facilitators for their students. By bringing technology into the classroom, can help students develop vital 21st-century skills: critical thinking, creativity, communication, and collaboration. (Tintis et al., 2024). This is supported by Piaget's constructivist theory, which emphasizes the importance of students' active involvement in constructing knowledge through exploration and interaction with the environment, a process that can be greatly facilitated by simulations and interactive media (Waite-Stupiansky, 2022).

However, the primary key to improving this quality of education lies in teacher competence, specifically in utilizing digital technology. In this era, technology-based learning is a necessity. Despite the increasing availability of educational tools, many primary school teachers still do not possess adequate digital literacy competencies. On the other hand, the increasing demands for the use of technology in learning also bring new consequences for teachers. The work-related stress arising from the use of technology without adequate support has the potential to diminish teachers' positive attitudes toward the use of technology itself (Bourlakis et al., 2023). In additional (Syvänen et al., 2016) stated that Integrating technology into education induces teacher stress by demanding continuous learning and adaptation, ultimately leading to work overload and time constraints. This situation indicates that teacher professional development must be designed in a realistic and balanced manner, taking into account pedagogical readiness, workload, and the school context. Without the right approach, the use of technology risks becoming a source of obstacles in the learning process.

To bridge the gap between the availability of technology and its effective classroom application, it is essential to focus on enhancing teacher competency in mastering modern tools, such as the Interactive Flat Panel (IFP), to meet the demands of the digital-age curriculum. IFP is an interactive touchscreen device that can be used as a learning tool to display multimedia-based content, enable digital writing, and facilitate interactive activities such as discussions and quizzes (Suryandari et al., 2026). Through IFP teachers can present engaging material such as simulation videos, educational videos, instructional videos, interactive digital storytelling, gamified learning tools that changing traditional classroom into multimedia environment. Additionally, IFPs help teachers customize their instruction for every student. These tools easily accommodate different learning styles, including visual, auditory, and hands-on learners. (Jayadi, 2025).

Meanwhile, teachers only need to master in using IFP as educational media based-technology to make teaching and learning activity run effective without ignoring the learning objectives in each subject. This statement is in line with (Falloon, 2024; Umara et al., 2025) To prevent technology from having a limited

impact, it must be pedagogically designed to transcend mere visual appeal, requiring seamless integration with clear learning objectives and appropriate instructional strategies. The findings of a recent meta-analysis further support the view that technology-based learning interventions must holistically integrate pedagogical knowledge, content, and technology in order to bring about significant changes in teaching practices (Fabian et al., 2024). Current pedagogical practices often limit the utility of IFP to rudimentary multimedia presentation functions, including music playback and video streaming, thereby underutilizing their potential as interactive media designed to foster active student engagement (Naitboho et al., 2025). Moreover, empirical evidence from (Chien, 2024) usability study indicates that despite the significant positive impacts of IFPs on teaching quality and student engagement, prominent barriers remain concerning usability design and professional development for educators. The study recommended stronger institutional support, improved software interfaces, and comprehensive teacher training to fully optimize IFP-based interactive instruction. Based on the four researches statements it can be conclude that while Interactive Flat Panels (IFPs) possess the potential to significantly enhance teaching quality and student engagement, their current underutilization for passive multimedia tasks, combined with persistent barriers in usability and professional development, highlights the critical need for holistic pedagogical integration, improved software interfaces, and robust institutional support to achieve meaningful instructional impact. Based on the result of those researches, the researchers decided to give the solution by giving teachers assistance that can support the teachers' competency in using IFP as educational media based-technology that meets with the objectives of learning for each subject. This investigation addresses a distinct gap left by the four previous studies, which, despite advocating for objective-driven technology use, limit their scope to identifying the need for teacher training rather than outlining training methodologies or addressing software development in using IFP.

Therefore, this research establishes its novelty and academic urgency by providing a structured professional development program focused on the “Tarik Tambang” game as a software in IFP, systematically aligned with the diverse curricular objectives of teachers at SD Negeri 1 Jogopaten. This research addresses a critical need for professional development regarding the use of Interactive Flat Panels among eight teachers at SD Negeri 1 Jogopaten. Initial observations revealed that although teachers utilized the “Tarik Tambang” game, they relied exclusively on pre-set questions that often failed to align with their specific curricular objectives. To bridge this gap, the researchers facilitated a learning community to assist teachers in customizing game content to better reflect their subject matter. Consequently, this study evaluated a structured learning community at SD Negeri 1 Jogopaten designed to help elementary teachers build their digital skills. The focus was on training them to create gamified activities, like a digital “Tarik Tambang” game, using Interactive Flat Panels.

METHOD

This research took place on SD Negeri 1 Jogopaten, Kebumen Regency, Central Java. The selection place of this research is to know teachers' improvement in creating technology base-activity in teaching and learning focused on gamification of “Tarik Tambang” by IFP through learning community. The research approximately took one month start from 2nd May 2026 to 23rd May 2026 that carried out on Saturday since that day is the day for learning community activity schedule.

The subjects of this research were all the teachers in SD Negeri 1 Jogopaten who represented combination of experience level and subject. Those subjects were 8 teachers of class teachers, 1 physical education teacher and 1 Islamic religion education teacher. Subject selection method used total sampling, given that the school action research was conducted on all teachers who used IFP and “Tarik Tambang” game that still used pre-set questions that often failed to align with their specific curricular objectives.

The main data source was taken by teachers' ability in operating IFP, inputting the questions into game and the result of game that they made. This research focus in creating "Tarik Tambang" game that includes questions created by teachers in line with learning objectives and subject matter.

Data collections were interview, observation and reflection (discussion). Interview was used to dig information about teachers' knowledge and ability in operating IFP and creating "Tarik Tambang" game. To evaluate how well teachers created the "tarik tambang" game during assistance, the researchers filled out observation sheets tracking each teacher against specific indicators. The researchers then used this qualitative data—recorded in field notes—to measure teachers' ability in creating "Tarik Tambang" game by using questions that aligned with their subject areas and learning objectives during the practice. Reflection tool was used to get more information of the teachers about their point of view in creating game.

The observation instrument evaluated the stages teachers went through to create a "Tarik Tambang" game for their specific subjects. The instrument was validated to ensure it effectively measured how well teachers could align these games with their learning objectives. The indicators of observation data are as follow:

- a. Teachers' proficiency in managing spread sheet for inserting data,
- b. inputting the questions into spreadsheet as a base of game question,
- c. proficiency of combining link to make the game showed the teachers' questions,
- d. making short link
- e. implementation game with peer teachers.

Table 1. Observation Instrument Guidelines

No	Indicators	Criteria	1	2	3	4
1	Teachers' proficiency in managing spread sheet	Teachers are able to manage spread sheet				
2	inputting the questions into spreadsheet	Teachers are able to insert their own questions on spread sheet				
3	proficiency of combining link	Teachers are able to combine spreadsheet link and macros				
4	making short link	Teachers are able to make short link				
5	implementation game with peer teachers	Teachers' link of game can be implemented				

The scoring criteria use a Likert scale of 1 - 4 points based on the teacher's ability to design games. The assessment of the teacher's ability to design games is as follows.

Table 2. Teachers assessment criteria

Score	Criteria
4	(Exemplary) The teacher performs the task flawlessly, demonstrates advanced efficiency, or is capable of helping/teaching peer teachers.
3	(Proficient) The teacher performs the task independently, accurately, and smoothly without assistance.
2	(Developing) The teacher can perform the task but struggles, makes frequent errors, or needs occasional guidance/reminders.
1	(Unsatisfactory) The teacher cannot perform the task, or requires constant, step-by-step assistance to complete it.

$$\text{Final Score} = \left[\frac{\text{Total score obtained}}{\text{Maximum Score}} \right] \times 100$$

Score Categories

91 – 100	: Excellent
81 – 90	: Good
71 – 80	: Fair
< 70	: Poor

To evaluate the success of the assessment, the research established a target where at least 75% of participating teachers must score 85 as classified as 'good'. If this category was not met, the assessing transitioned into the next cycle until the success indicators were achieved. Quantitative analysis tracked the percentage of teachers reaching 'good' and 'very good' proficiency levels in game design across successive cycles.

This research was designed using the School Action Research framework that allows for an iterative cycle of planning, action, observation, and reflection. The research data were analysed using both quantitative and qualitative descriptive approaches. Quantitative data were analysed by calculating the percentage of teachers who achieved “good” and “excellent” category in creating their own games in each cycle to determine improvements in teachers’ competency. Meanwhile, qualitative data obtained through observations and field notes were analysed through the stages of data reduction, data presentation, and drawing conclusions.

The results of the qualitative analysis were used in the reflection stage to identify the strengths and weaknesses of the action implementation as a basis for improvement in the next cycle. Qualitative data were analysed descriptively to explain the process of implementing the action. The results of the qualitative analysis are presented in the form of descriptive narratives based on the results of observations and field notes collected during the study. The implementation plan is carried out in two cycles, namely:

Cycle 1

- a. Researchers plan actions in cycle 1 making interview format to dig information of teachers’ ability in using IFP and understanding about “Tarik Tambang” Game, and making observation formats to assess teachers’ ability in operating IFP and creating “Tarik Tambang” Game
- b. Researchers prepared the material to introduce and to create “Tarik Tambang” Game for the teachers
- c. Researchers assisted the teachers in creating “Tarik Tambang” Game by inserting questions they made
- d. Researchers assisted the teachers in merge questions link with “Tarik Tambang” Game
- e. Researchers provide opportunities for teachers to express difficulties or obstacles in in making “Tarik Tambang” Game
- f. Researchers made observations of creating “Tarik Tambang” Game
- g. Researchers and teachers do reflection.

Cycle 2

- a. Researchers plan actions in cycle 2 based on improvements in cycle I, such as asked the teachers to prepare the second materials that will be inputted in “Tarik Tambang” Game
- b. Researchers make improvements or revisions to the preparation of creating “Tarik Tambang” Game which new innovation.
- c. Researchers carry out actions according to the plan in cycle 2.
- d. Researchers made observations on the creating “Tarik Tambang” Game when the teachers practiced to create “Tarik Tambang” Game
- e. Researchers and teachers do reflection.

This study was conducted collaboratively by the school principal and researcher 1 during the learning community sessions, which were held in every Saturday at SD Negeri 1 Jogopaten for 45 minutes per session. All teachers at SD Negeri 1 Jogopaten served as research subjects.

RESULT AND DISCUSSION

Cycle I

From the result of teachers' interview of 8 teachers, researchers obtained information that all teachers already used IFP in teaching and learning activities, it also showed that their ability in operating IFP can be categorized good. However, the researcher found that all teachers already used "Tarik Tambang" Game in their teaching and learning activities by using "Tarik Tambang" Game questions. This was happened because they did not know how to insert their questions in "Tarik Tambang" Game.

There are many steps that should be done in making their own "Tarik Tambang" Game for teaching and learning process. The researchers thought if the teachers only used "Tarik Tambang" Game without their own questions, it would make the teaching process did not meet with the objectives of the study. As we know that teaching activities; every subject and theme should meet with the objectives of the study.

The action in cycle I were giving introduction material about "Tarik Tambang" Game and google spread sheet that would be used to insert the questions. Furthermore, the researcher gave steps in making teachers' own question in "Tarik Tambang" Game. Each step in making "Tarik Tambang" Game was indicators competency of observation to gain information about teacher's competencies.

In terms of teachers' competencies, there was an increase in making their own "Tarik Tambang" Game from cycle to cycle based on the observation in Cycle I. This can be seen in attachment table 3

Tabel 3. Teachers' Competency in Creating Technology Base-Activity in Teaching and Learning Focused on Gamification of "Tarik Tambang" by IFP Cycle I

No	Class	Score	Category
1	I	75	Fair
2	II	70	Poor
3	III	60	Poor
4	IV	65	Poor
5	V	70	Poor
6	VI	65	Poor
7	IRE	65	Poor
8	PE	65	Poor
Total		535	
Highest Score		75	
Lowest Score		60	
Average		66,8	Poor

Table two shows that all teachers could not passed the indicators of observation in making their own "Tarik Tambang" Game. The highest score is 75 and the lowest score is 60. There is one teacher who gets highest score and one teacher who gets lowest score. The average of Cycle I is 66,8.

Based on the result of researchers' observation in cycle I there were teachers who were difficult in using google spreadsheet, for example how to copy and paste the questions and placing the right answer in column B. Then, in merging link between google spreadsheet document with s.id/ttkifp or "Tarik Tambang" Game link still hard to be done well. Some of them felt that copying an important part in a link and merge that into another link was difficult. The difficulties also came into making short link after they merge questions

link and game link. In the part of implementation there were found that three teachers could not create perfect questions especially in stimulus questions. It is kind of question that have one text for more than one questions.

The result of reflecting in cycle I shows that process of creating technology base-activity in teaching and learning focused on gamification of “Tarik Tambang” by IFP carried out by 8 teachers at SD Negeri 1 Jogopaten is good enough, but must still pay attention to teachers who have difficulties in inserting question especially in kind of stimulus question, merging link and making short link. Researchers thought that the assistance in creating technology base-activity in teaching and learning focused on gamification of “Tarik Tambang” by IFP should be continued into cycle II that focus on the problems that found in the observation.

Cycle II

Same as the Cycle I in Cycle II consisted of four stages they are planning, action, observing, and reflection. Planning for cycle II were creating simple material about how to input questions on spreadsheet. It was not only focus stimulate questions but also kinds of other questions such as simple questions and HOTS questions that already made in the last semester. Creating the simple material in merging links and making short link. Researchers also made observation and interview list to know teacher's score and opinion about this activity. The action in cycle II was carried out all the plans in planning activities by giving materials and practice to create “Tarik Tambang” Game.

Based on the result of observation in cycle II researchers found that there was improvement in creating technology base-activity in teaching and learning focused on gamification of “Tarik Tambang” by IFP. The result can be seen on table 3.

Tabel 3. Teachers' Competency in creating technology base-activity in teaching and learning focused on gamification of “Tarik Tambang” by IFP Cycle II

No	Class	Score	Category
1	I	95	Excellent
2	II	90	Good
3	III	90	Good
4	IV	85	Good
5	V	90	Good
6	VI	80	Fair
7	IRE	80	Fair
8	PE	85	Good
Total		695	
Highest Score		95	
Lowest Score		80	
Average		86,9	Good

In cycle II, the average score for teachers in creating technology base-activity in teaching and learning focused on gamification of “Tarik Tambang” by IFP reached 86,88 in good category. The highest score was obtained by first grade teacher who got 95 in the excellent category. There were three teachers who achieved 90 in the category of good, those were second grade, third grade and fifth grade teachers. Two teachers of fourth grade and PE (Physical Education) teacher recorded 85 score of fair categories. While the sixth grade and IRE (Islamic Religious Education) teachers achieved 80. Although the sixth and IRE teachers obtained the lowest score, their score was categorized as fair category. When the result compared to the cycle I, the scores obtained by all teachers in cycle II showed a significant improvement. As shown in Table 3, the post-cycle evaluation revealed that 12.5% of the teachers were categorized as excellent, 62.5% as good, and 25.0%

as poor. Because 75.0% of the teachers achieved at least a "good" category, the research target was successfully achieved.

Furthermore, the researchers calculated the percentage of teachers' improvement in creating technology base-activity in teaching and learning focused on gamification of "Tarik Tambang" by IFP from cycle I to cycle II that is presented in table 4

Tabel 4. Percentage of Teachers' Improvement in creating technology base-activity in teaching and learning focused on gamification of "Tarik Tambang" by IFP

No	Class	Cycle I	Cycle II	Improvement
1	I	75	95	26%
2	II	70	90	28%
3	III	60	90	50%
4	IV	65	85	30%
5	V	70	90	28%
6	VI	65	80	23%
7	IRE	65	80	23%
8	PE	65	85	30%
Average		66,8	86,9	30%

Based on the table 4 the researchers could state that all teachers of SD Negeri 1 Jogopaten experienced in increasing percentage of their ability in creating "Tarik Tambang" by IFP. The first-grade teacher achieved a score of 75 in Cycle I, which was the highest starting baseline among all teachers but she was in fair category. She experienced the difficulty in merging link and make short link. In cycle II she could solve those problem, her score increased to 95, representing the highest final proficiency score in the group. This growth constituted a 26% improvement in her ability to integrate the "Tarik Tambang" gamification activity into her teaching.

The second-grade teacher got 28% improvement in Cycle II after he underwent the mistake in inputting stimulus questions and making short link thus made imperfect implementation game in Cycle I. After performed of assisting in Cycle II his score rose to 90 in good category from Cycle I score was 70 in poor category.

The third grade-teacher demonstrated the most significant growth among all the participants. Beginning with the lowest Cycle I score of 60 after he experienced the mistake of inputting stimulus text questions, the difficulty of merging link and creating short link. Those problems made imperfect of implementation game. In cycle II he was able to handle his problems that make him got 90 in good category. This remarkable progress reflects a 50% improvement.

The fourth grade-teacher in cycle I recorded base line of 65 in less category because she got difficulty in all indicators of observation. Following the second cycle, her score increased to 85 in good category. The percentage of the improvement from cycle I to cycle II was 30%. It happened because the willingness of the teacher in learning Cycle I material in her leisure time. The teacher also stated that the repetition of material in Cycle II was very helpful.

Fifth grade-teacher improvement in cycle I to Cycle II was 28%. In cycle I she obtained 70 in poor category with the weaknesses of merging link and making short link for the game. After assisting she obtained score of 90 in good category.

During Cycle I, the sixth-grade, Islamic Religious Education (IRE), and Physical Education (PE) teachers struggled to meet all observation indicators, with each receiving an identical baseline score of 65, placing them in the 'poor' category. These lower scores were primarily attributed to shared technical difficulties, specifically in managing spreadsheet tools, inputting questions, merging links, and generating shortened URLs, which ultimately hindered the successful implementation of the game. Following targeted

mentoring in Cycle II, significant progress was observed. The sixth-grade teacher's score rose to 80 (categorized as 'fair'), representing a 23% improvement. Similarly, the IRE teacher achieved a 23% improvement, reaching a score of 80 (categorized as 'good'). The PE teacher demonstrated the most substantial growth, achieving a 30% improvement to secure a score of 90, placing them in the 'good' category.

The improvement was not only obtained by teachers. The average of teachers scores also increased up to 30%. Collectively, the teachers showed strong upward progress across the board. The overall group average rose from 66.8 in Cycle I to 86.9 in Cycle II, culminating in a final average improvement of 30%. It can be concluded that the assessing in creating technology base-activity in teaching and learning focused on gamification of “Tarik Tambang” by IFP for teachers in SD Negeri 1 Jogopaten could give the good effect for teacher in mastering new media based on technology.

This research shows that learning community activities can improve teachers' competence in creating “Tarik Tambang” games that align with their subject matters and learning objectives. This result in line with recent studies of (Ingka Harlita & Zaka Hadikusuma Ramadan, 2024; Murwanto et al., 2023) showing that improving school performance and teaching quality begins with developing teacher skills within learning communities. When teachers actively participate in these communities, they improve their classroom practices, feel more motivated, and develop a stronger connection to their profession (Arifin et al., 2025). Furthermore, learning communities provide a valuable space for teachers to connect, share experiences, and develop their expertise (Khusna & Priyanti, 2023). Engaging in these collaborative groups directly strengthens their pedagogical skills and teaching practices.

During the pre-cycle phase, observed that although all teachers used the IFP and “Tarik Tambang” game, they did not align them with their lesson plans and learning objectives. Another case, PE teacher mostly used IFP to stream YouTube videos. This aligns with findings by (Hasbullah et al., 2024), who noted that IFPs are rarely used to their full potential; instead of engaging students with interactive features, most teachers simply treat them as basic presentation screens or video players. Consistent with (Salehuddin et al., 2024), successful technology integration relies on how well digital tools are used as educational resources. Rather than just being visually appealing, technology must be pedagogically designed to drive actual learning outcomes. This places teachers at the center of managing digital tools to fit student needs. Ultimately, interactive media like touchscreen devices yield much better results than passive video streaming by allowing students to engage directly with the content.

To solve these issues, the researchers used a learning community to help teachers design their own “Tarik Tambang” games. Instead of using pre-made templates with irrelevant questions, teachers can also learn how to input their own questions to match their specific subjects. This ensured that the gamified activities were directly aligned with both the teaching materials and the intended learning goals.

After participating in two cycles of training, all teachers were able to master the use of Google spreadsheet, including entering questions and answer choices into each column. Another skill-combining spreadsheet links with the s.id/ttkifp link-also showed significant improvement, as this was identified as the most challenging part during Cycle I. The next step in creating the “Tarik Tambang” game is to generate a short link so that the combined link becomes more concise; teachers can even customize the link name to their preference. This is taught with the goal that, once teachers are able to create games tailored to specific learning materials and objectives, the custom-named short links can be used to help them find them more easily. All of these skills will be tested by implementing the links created by the teachers so they can be played together with other teachers.

This finding of the research was in line with research by (Subiyantoro et al., 2024) on Indonesian teachers' preparedness for deep learning revealed that while educators possessed moderate technical confidence, their motivation was exceptionally high. These findings underscore the essential role that professional training and systemic support play in successful technology implementation. Effective IFP

integration depends on teacher readiness, institutional support, and reliable digital infrastructure. Additional by (Afnani & Attalina, 2025) both institutional support and teachers' internal motivation play a crucial role; high technical competence without adequate motivation will not result in meaningful integration of technology into the learning process. In this case, the researchers use as learning community as a space to offer support and motivation to teachers in developing their digital skills.

CONCLUSION

This study demonstrates that a collaborative learning community is highly effective for helping primary school teachers integrate technology. Originally, teachers only used IFPs for passive tasks like playing videos or running pre-made games that did not align with their curriculum. To address this, structured assistance sessions were introduced. Through this support, teachers shifted from being passive tech users to active creators. They mastered the technical skills needed to customize the “Tarik Tambang” game such as managing backend spreadsheets and inputting their own advanced questions. This collaborative environment reduced technical anxiety and encouraged peer learning. Ultimately, all teachers met the proficiency targets, proving that purposeful classroom gamification is highly achievable with the right training and support.

REFERENCES

- Afnani, M. R., & Attalina, S. N. C. (2025). Studi Kesiapan Guru Dalam Mengintegrasikan Peran Teknologi Digital Pada Pembelajaran Kurikulum Merdeka Di Sekolah Dasar. *Nusantara: Jurnal Pendidikan Indonesia*, 5(2), 482–495. <https://doi.org/10.62491/Njpi.2025.V5i2-17>
- Arifin, Bestari Laia, Ni Luh Ika Windayani, Lies Dian Marsa Ndraha, Ni Wayan Risna Dewi, Jean Imaniar Djara, & Imam Subayil. (2025). Improving The Professional Competence Of Teachers Through Learning Communities. *Jurnal Iqra': Kajian Ilmu Pendidikan*, 10(1), 95–109. <https://doi.org/10.25217/Ji.V10i1.4154>
- Bourlakis, M., Nisar, T. M., & Prabhakar, G. (2023). How Technostress May Affect Employee Performance In Educational Work Environments. *Technological Forecasting And Social Change*, 193(May), 122674. <https://doi.org/10.1016/J.Techfore.2023.122674>
- Chien, Y. H. (2024). Heuristic Evaluation Of Interactive Flat Panel For Interactive Teaching. *Applied Human Factors And Ergonomics International*, 156, 129–134. <https://doi.org/10.54941/Ahfe1005422>
- Fabian, A., Backfisch, I., Kirchner, K., & Lachner, A. (2024). A Systematic Review And Meta-Analysis On Tpack-Based Interventions From A Perspective Of Knowledge Integration. *Computers And Education Open*, 7(February), 100200. <https://doi.org/10.1016/J.Caeo.2024.100200>
- Falloon, G. (2024). An Exploration Of Online Technoliteracy Capability Teaching And Learning In Early Years Classrooms. *Education And Information Technologies*, 29(1), 625–654. <https://doi.org/10.1007/S10639-023-12239-W>
- Handayani, F., P, D. H. P., Sanidra, A., & Elfrianto. (2026). How Technostress May Affect Employee Performance In Educational Work Environments. *Indonesian Journal Education*, 5(1), 48–52. <https://doi.org/10.56495/Ije.V5i1.1480>
- Hasbullah, Timorwoko, Agus Insyirah, A. D., Puspitasari, E., Ira, Novita, Akbari, M. H. H., Nurlaeli, & Magfirah, N. (2024). Analisis Hambatan Guru Dalam Pemanfaatan Interactive Flat Panel (Ifp) Pada Mata Pelajaran Matematika Di Sdn Ciracas 14 Jakarta Timur. 2, 306–312.
- Ingka Harlita, & Zaka Hadikusuma Ramadan. (2024). Peran Komunitas Belajar Di Sekolah Dasar Dalam Mengembangkan Kompetensi Guru. *Didaktika: Jurnal Kependidikan*, 13(3 Se-Articles), 2907–2920. <https://jurnaldidaktika.org/Contents/Article/View/989>

- 2056 *Improving Teachers' Competency in Using Interactive Flat Panel as Technology-Based Gamification Learning Media*—Desi Innanti Wicaya Ningrum, Sopingatun
DOI : <https://doi.org/10.31004/basicedu.v10i4.12665>
- Jayadi, U. (2025). The Role Of Interactive Flat Panel (Ifp) In Shaping Indonesia's Digital Learning Policy: A Vision For Educational Reform In The Prabowo-Gibran Era. *International Journal Of Education And Digital Learning* |, 3(6), 301–310. <https://doi.org/10.47353/ijedl.V3i6.354>
- Khusna, R., & Priyanti, N. (2023). Pengaruh Komunitas Belajar Terhadap Kemampuan Pedagogik. *Jurnal Ilmiah Potensia*, 8(2), 252–260. <https://ejournal.unib.ac.id/index.php/potensia>
- Murwanto, P., Triayomi, R., Fibriana, A., Kurniawati, Sri, D., & Yanti, Y. (2023). Bulletin Of Community Engagement. *Bulletin Of Community Engagement*, 3(2), 2019–2024.
- Naitboho, O., Naldo, R., Deku, E. R., Bulan, R. E., Bumbung, M. E., & Duka, S. (2025). The Effectiveness Of Interactive Flat Panel (Ifp) Utilization In Supporting Innovative Ipas Learning In Elementary Schools. *Paradigma: Jurnal Filsafat, Sains, Teknologi, Dan Sosial Budaya*, 31(2), 854–861. <https://doi.org/10.33503/Paradigma.V31i2.2760>
- Najmudin, D., Susanti, L., & Pebrian, I. (2025). Digital Transformation In Education: Challenges And Opportunities In The Age Of Ai. *Pedagogia*, 23(1), 71–86. <https://doi.org/10.17509/Pdgia.V23i1.78405>
- Salehuddin, S. N., Putra, Y. D., Anisa, N., & Arifin, I. (2024). Dinggo Sedaya Website: Innovation In Digital Learning Resources For Early Children's Education. *Jurnal Inovasi Teknologi Pendidikan*, 11(4), 468–481. <https://journal.uny.ac.id/index.php/jitp/article/view/76097>
- Silvester, S., Purnasari, P. D., Saputro, T. V. D., & Jesica, M. (2023). Analisis Kompetensi Guru Sekolah Dasar Dalam Implementasi Pembelajaran Berbasis Digital. *Jurnal Dimensi Pendidikan Dan Pembelajaran*, 11(1), 166–174. <https://doi.org/10.24269/Dpp.V11i1.8281>
- Sirait, J. E. (2021). Analisis Pengaruh Kompetensi Guru Terhadap Keberhasilan Pembelajaran Di Sekolah Dasar Bethel Tanjung Priok Jakarta Utara. *Diegesis: Jurnal Teologi*, 6(1), 49–69. <https://doi.org/10.46933/Dgs.Vol6i149-69>
- Sitorus, Harianja, Simatupang, Silitonga, & Sianturi. (2025). Utilization Of Kahoot Application As Interactive And Fun Learning Media Inprivate High Schools In Bandung. *Arsy :Aplikasi Riset Kepada Masyarakat*, 6(2), 327–335. <http://journal.al-matani.com/index.php/arsy/online>
- Subiyantoro, S., Musa, M. Z., & Efendi, A. (2024). Cognitive Development - Journal - Elsevier. *Cognitive Development Journal*, 2(2), 49–58. <http://www.journals.elsevier.com/cognitive-development/>
- Suryandari, D. A., Wakidah, S. A., & Sudi. (2026). Jkip : Jurnal Kajian Ilmu Pendidikan Utilization Of Interactive Flat Panel (Ifp) Technology As An Active Learning Tool In Science Learning For Grade Iv At Sdn Menteng Atas 01 South Jakarta Pemanfaatan Teknologi Interactive Flat Panel (Ifp) Sebagai Sar. *Jurnal Kajian Ilmu Pendidikan*, 7(1), 313–319.
- Syvänen, A., Mäkinen, J.-P., Syrjä, S., Heikkilä-Tammi, K., & Viteli, J. (2016). When Does The Educational Use Of Ict Become A Source Of Technostress For Finnish Teachers? *Seminar.Net*, 12(2). <https://doi.org/10.7577/Seminar.2281>
- Tintis, S. S. S., Hasanuddin, B., Nugraha, M. E., & Adda, H. W. (2024). Peran Guru Dalam Menghadapi Tantangan Pembelajaran Abad 21. *Jurnal Riset Manajemen Dan Ekonomi (Jrime)*, 2(2), 43–51. <https://doi.org/10.54066/Jrime-Itb.V2i2.1590>
- Umara, R., Nurmilah, I., Haryati, E., & Warta, W. (2025). Manajemen Pemanfaatan Interactive Flat Panel (Ifp) Dalam Meningkatkan. *Journal Of Islamic Education Management*, 11(2), 104–112. <http://jurnal.radenfatah.ac.id/index.php/el-idare>
- Wathoni, K., & Noor, F. L. N. (2020). Ma 'Alim: Jurnal Pendidikan Islam Volume 1, Nomor 1, Juli 2020. *Jurnal Pendidikan Islam*, 1, 1–24.
- Waite-Stupiansky, Sandra. (2022). Jean Piaget's Constructivist Theory Of Learning. New York, Ny: Routledge.