

The Impact of Technology Integration in English Language Teaching at SMAN 1 Gunungsari

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Abstrak

Technology integration is increasingly central to English language teaching, yet evidence remains limited on how teachers in Indonesian secondary schools experience newly introduced centralized classroom technologies such as Interactive Flat Panels (IFPs) in relation to pedagogy, classroom management, and local constraints. This descriptive qualitative study explored three English teachers' perceptions of technology integration at SMAN 1 Gunungsari, the challenges they experienced, and the strategies they used to address those challenges. Participants (F1, F2, and F3) were selected purposively because they taught English at the school and had experience using digital technologies. Data were generated primarily through semi-structured interviews and supplemented by a structured teacher questionnaire. The data were organized around the three research questions, compared across participants, and interpreted using Technological Pedagogical Content Knowledge (TPACK) as an interpretive framework. Teachers perceived technology as supporting access to learning resources, listening and pronunciation practice, student engagement, and classroom participation. They also described the IFP as a useful shared display that enabled multimedia presentation and could reduce reliance on individual smartphones. These perceived benefits were conditional: limited vocabulary, uneven technological competence, workload, shared access to IFPs, connectivity and electricity problems, and student distraction constrained implementation. Teachers responded through training, peer collaboration, continuous learning, lesson preparation, technical assistance, and flexible combinations of digital and conventional methods. The findings suggest that effective technology integration depends not only on device availability but also on teachers' pedagogical orchestration, professional support, and school-level conditions.

Keywords: English Language Teaching, Technology Integration, Teacher Perceptions, TPACK, Interactive Flat Panel

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INTRODUCTION

English language teaching is increasingly situated within a digitally mediated educational environment in which learners access information, communicate, collaborate, and produce meaning through multiple technologies and modes (Rintaningrum, 2023; Wiranata et al., 2024). In foreign-language education, digital technologies have expanded opportunities to provide learners with multimodal input, authentic language resources, flexible learning materials, and activities that extend beyond conventional printed textbooks (Pradana et al., 2022; Rintaningrum, 2023). Research in secondary education further indicates that technology integration can support access to instructional resources, learner participation, and pedagogical

flexibility, although its educational value varies substantially according to teacher competence, infrastructure, institutional support, and the way technology is embedded in teaching practice (Msafiri et al., 2023; Abel et al., 2022). This issue is particularly relevant in Indonesian English as a Foreign Language (EFL) classrooms, where teachers increasingly employ learning platforms, multimedia, online dictionaries, artificial-intelligence-supported tools, presentation technologies, and other digital resources while continuing to face differences in technological readiness and school facilities (Daulay & Fithriani, 2024; Lestari et al., 2026).

Technology integration, therefore, should not be understood merely as the availability or physical presence of digital devices but as the purposeful selection and pedagogical use of technologies to achieve identifiable learning objectives (Mishra & Koehler, 2006; Rintaningrum, 2023). In English language teaching, digital resources can provide online texts, audio, video, interactive presentations, pronunciation models, communication platforms, and other forms of multimodal language input that broaden students' exposure to English beyond teacher explanation and printed materials (Warschauer, 1999; Pradana et al., 2022). Recent reviews of technology-enhanced language instruction show that digital tools can create valuable opportunities for language practice and learner engagement, but their effectiveness depends on strategic pedagogical design rather than on technological novelty itself (Rintaningrum, 2023; Wiranata et al., 2024). Consequently, teachers remain central actors because their decisions about resources, activities, sequencing, scaffolding, assessment, and classroom organization determine whether technology functions as a pedagogical resource or simply as an additional classroom device (Abel et al., 2022; Brianza et al., 2024).

The relationship between students and digital technology also requires careful consideration because familiarity with digital devices should not automatically be interpreted as competence in using those devices for academic learning (Tinmaz et al., 2022; Wicaksono & Prasetyo, 2023). Although the influential concept of "digital natives" emphasized that younger generations grow up surrounded by digital technologies, contemporary research suggests that frequent exposure to technology does not necessarily produce critical digital literacy, effective information evaluation, or academically purposeful technology use (Prensky, 2001; Tinmaz et al., 2022). Indonesian reviews similarly emphasize that students' digital competence involves more than routine access to devices because productive digital learning requires information literacy, strategic use, critical evaluation, and responsible participation in digital environments (Wicaksono & Prasetyo, 2023). This distinction is particularly important in EFL classrooms because smartphones can provide dictionaries, videos, pronunciation models, translation resources, and authentic English materials while simultaneously giving students access to games, social media, and applications unrelated to the lesson (Lestari et al., 2026; Rintaningrum, 2023). Teachers must therefore manage a dual pedagogical challenge: using the affordances of students' digital devices while controlling forms of digital participation that may divert attention from language-learning objectives (Abel et al., 2022; Msafiri et al., 2023).

The Technological Pedagogical Content Knowledge (TPACK) framework offers a relevant theoretical perspective for explaining why effective technology integration requires considerably more than operational knowledge of digital devices (Mishra & Koehler, 2006). TPACK proposes that meaningful technology-supported

instruction emerges through the interaction of technological knowledge, pedagogical knowledge, and content knowledge, including teachers' capacity to select technologies that fit particular learners, instructional strategies, and subject-matter objectives (Mishra & Koehler, 2006; Santos & Castro, 2021). Research in Indonesian EFL contexts demonstrates that technology-infused teaching is strongly shaped by teachers' pedagogical reasoning, language-content goals, and adaptation to learners rather than by technological skill alone (Haryati et al., 2023; Daulay & Fithriani, 2024). Professional development is consequently important because teachers require continuing opportunities to develop operational competence while simultaneously learning how technology can be incorporated into pedagogically appropriate lesson designs (Sirajuddin et al., 2023; Abel et al., 2022). More recent work has further emphasized that TPACK is enacted within particular educational contexts, meaning that infrastructure, school culture, workload, technical support, access to devices, and institutional expectations can enable or constrain teachers' ability to translate their knowledge into classroom practice (Brianza et al., 2024).

A significant development within the Indonesian digital-education context is the introduction of Interactive Flat Panels (IFPs) as part of the national digitalization of learning program (Kementerian Pendidikan Dasar dan Menengah, 2025). The Indonesian Ministry of Primary and Secondary Education describes the IFP as an interactive touchscreen technology capable of displaying text, video, audio, gamified materials, and other multimedia resources while supporting direct teacher-student interaction with digital content (Kementerian Pendidikan Dasar dan Menengah, 2025). Unlike smartphones that distribute digital access across individual student screens, interactive boards and flat panels provide a centralized digital interface through which teachers can present, organize, and mediate learning resources for the entire class (Luo et al., 2023). Research on interactive whiteboards in English-language instruction suggests that perceived usefulness is associated not only with device functionality but also with teachers' capacity to connect interactive features to appropriate instructional purposes (Luo et al., 2023). Emerging Indonesian evidence similarly indicates that perceived usefulness, perceived ease of use, teacher acceptance, digital competence, and institutional conditions influence the adoption and use of IFP technology in schools (Firman et al., 2026). A recent systematic review of IFP implementation further identifies teacher competence, digital literacy, instructional strategy, training, and school-management support as important conditions influencing the educational effectiveness of interactive panels (Hermawan & Widiastuti, 2026).

These findings are consistent with broader evidence showing that technology integration in Indonesian EFL classrooms is simultaneously characterized by pedagogical opportunities and practical constraints (Lestari et al., 2026; Daulay & Fithriani, 2024). Recent research in an Indonesian senior high school found that teachers and students used diverse digital technologies to support comprehension, vocabulary, pronunciation, assignment completion, participation, and access to learning materials, while teachers selected tools according to pedagogical clarity, practicality, device compatibility, and available school facilities (Lestari et al., 2026). The same research nevertheless identified unstable internet connections, insufficient devices, technical disruption, and infrastructure limitations as continuing barriers, illustrating that positive perceptions of technology do not eliminate implementation

difficulties (Lestari et al., 2026). This coexistence of perceived pedagogical benefits and contextual barriers is also evident in broader research showing that teachers' technology use is shaped by professional competence, workload, training, resources, institutional culture, and immediate classroom conditions (Abel et al., 2022; Msafiri et al., 2023). Technology integration should therefore be investigated as a situated pedagogical practice in which teacher knowledge, technological affordances, infrastructure, learner characteristics, and classroom-management demands interact rather than as a simple relationship between device availability and educational improvement (Brianza et al., 2024; Rintaningrum, 2023).

Despite the growing literature on technology integration in ELT, important questions remain concerning how centralized interactive technologies such as IFPs are incorporated into everyday English instruction under ordinary secondary-school conditions (Rintaningrum, 2023; Wiranata et al., 2024; Luo et al., 2023). Much of the existing technology-enhanced ELT literature has concentrated on online learning environments, mobile devices, learning platforms, multimedia resources, and individual digital applications, whereas the pedagogical organization created by a shared interactive classroom display has received comparatively less attention in EFL research (Wiranata et al., 2024; Luo et al., 2023). Emerging IFP studies have begun to document teachers' acceptance, perceived usefulness, technological readiness, and general educational benefits, but the interaction between IFP use and language-specific pedagogical practice remains insufficiently understood, particularly within Indonesian secondary-school EFL contexts (Firman et al., 2026; Hermawan & Widiastuti, 2026; Luo et al., 2023). Furthermore, existing research provides limited explanation of how centralized IFP use intersects simultaneously with teachers' TPACK, smartphone-related classroom distraction, technological competence, workload, infrastructure limitations, technical assistance, and students' underlying English-language knowledge (Brianza et al., 2024; Lestari et al., 2026). This gap is theoretically important because contemporary TPACK research increasingly recognizes that teachers' technology-related knowledge is enacted through, and constrained by, the specific material and organizational conditions of their instructional environments (Brianza et al., 2024). The potential contribution of the present study therefore lies not simply in examining technology integration at another school location, but in exploring how English teachers perceive and negotiate the relationship among TPACK, centralized IFP use, classroom management, language-learning needs, and contextual constraints within an Indonesian secondary-school setting (Brianza et al., 2024; Luo et al., 2023; Lestari et al., 2026).

Against this background, the present study explores English teachers' situated perceptions of technology integration at SMAN 1 Gunungsari, with particular attention to the pedagogical role of the IFP, implementation challenges, and teachers' strategies for responding to those challenges (Abel et al., 2022; Luo et al., 2023). Specifically, the study addresses three questions: (1) How do English teachers perceive the pedagogical role, benefits, and limitations of technology integration, including the IFP, in English language teaching at SMAN 1 Gunungsari? (2) What challenges do teachers experience when integrating technology into their English classes? and (3) What strategies do teachers use to navigate those challenges? Consistent with research emphasizing the importance of distinguishing teachers' perceptions from objectively measured student outcomes, the study does not claim causal effects on students'

motivation, participation, achievement, or English proficiency but examines how teachers interpret technology within their professional practice. Conceptually, the study seeks to extend the contextual application of TPACK by showing how technological, pedagogical, and content-related decisions are mediated by classroom-management demands, infrastructure, workload, technical support, and the organization of technology as either individualized or centralized access. Practically, the findings may inform TPACK-oriented professional development, hands-on IFP training, school-level technical assistance, infrastructure planning, contingency lesson design, and policies governing students' use of personal digital devices in English classrooms.

METHOD

This study employed a descriptive qualitative design because the research questions focused on how teachers interpreted their experiences of technology integration rather than on estimating causal effects. The study was conducted at SMAN 1 Gunungsari and was bounded to English language teaching in that school. Three English teachers, identified as F1, F2, and F3 to protect confidentiality, participated in the study. Purposive sampling was used because the participants were directly involved in English teaching at the school and had experience integrating digital technologies into their instruction. The small number of participants was treated as a source of contextual depth rather than as a basis for statistical generalization; the intended value of the study is the information richness of the teachers' accounts and the transferability of the contextual description.

Data were generated primarily through semi-structured interviews and supplemented by a structured teacher questionnaire. The interview guide addressed perceived pedagogical benefits and limitations of technology, student engagement and participation as observed by teachers, English-language skills supported by digital resources, technical and pedagogical challenges, classroom management, and strategies for responding to difficulties. Follow-up questions were used when clarification was required. The structured questionnaire elicited teacher responses on technology integration, workload, facilities, professional training, collaboration, continuous learning, and related implementation issues. The researchers also observed the learning context during the data-collection process; because the previous manuscript did not distinguish this contextual observation clearly from the questionnaire, the present version treats questionnaire responses and interview accounts as the two reported evidence sources and does not present observation as an independently quantified measure.

Data collection involved preparing the instruments, familiarizing the researchers with the school learning context, obtaining questionnaire responses, conducting and recording interviews with F1, F2, and F3, transcribing the interviews, and organizing the material in relation to the three research questions. Analysis proceeded through data reduction, data display, and conclusion drawing. The three research questions provided the top-level analytic structure—perceived roles and benefits, challenges, and strategies—while recurrent ideas within those areas were grouped into descriptive subthemes such as language-skill support, access to resources, vocabulary limitations, technological competence, workload, facilities, connectivity, collaboration, training, and preparation. Patterns were compared across

the three teachers and then checked against the structured questionnaire responses. Because the sample consisted of three teachers, questionnaire results are reported as absolute counts (for example, “two of the three teachers”) rather than percentages.

TPACK was used as an interpretive framework rather than as a quantitative measurement instrument. It informed the interpretation of how technological knowledge interacted with teachers’ pedagogical decisions and English-content goals, while school-level conditions such as infrastructure, workload, and technical support were treated as contextual factors influencing the enactment of TPACK. Trustworthiness was supported through the use of the same interview guide across participants, follow-up clarification during interviews, audio recording and transcription, systematic documentation of the analytic process, and comparison of interview accounts with the structured questionnaire. Participant identities were protected through the codes F1, F2, and F3.

Table 1. Participants and Data Sources

Data source	Description	Role in the study
F1, F2, F3	Three English teachers at SMAN 1 Gunungsari selected purposively because they taught English and had experience using digital technology.	Primary participants providing contextual accounts of perceived benefits, challenges, and strategies.
Semi-structured interviews	Open-ended questions with follow-up clarification; interviews were recorded and transcribed.	Primary qualitative evidence for the three research questions.
Structured teacher questionnaire	Structured responses concerning technology integration, workload, facilities, training, collaboration, and related issues.	Supplementary evidence used to compare with interview accounts; reported as absolute counts because $n = 3$.

FINDINGS

Teachers’ Perceptions of the Role of Technology Integration in English Language Teaching

Across the interviews, F1, F2, and F3 described technology as a useful support for English teaching, particularly for accessing resources, presenting multimedia input, and encouraging participation. These statements are reported as teacher perceptions rather than as evidence of objectively measured changes in students. The teachers emphasized different functions of technology, and their accounts also identified conditions under which those perceived benefits were reduced.

F1 associated technology with opportunities to support reading, speaking, listening, and pronunciation. According to F1, students can access varied online sources and use artificial-intelligence-supported or other online platforms to locate information. F1 also noted that online texts may be accompanied by audio or video that can provide pronunciation models. In F1’s account, the main pedagogical value of technology was therefore broader access to multimodal language input and opportunities for students to work with resources beyond the textbook.

F2 placed particular emphasis on listening. F2 reported that digital audio can be played through classroom speakers so that students hear target-language input from sources other than the teacher’s own voice. F2 also perceived students as more motivated and more willing to participate when technology was used. These

observations indicate a teacher-perceived shift toward more interactive classroom activity, but they should not be read as direct measurements of student motivation or participation.

F3 emphasized attractiveness and practicality. F3 reported that digital resources make it easier to locate teaching materials and can make lessons more interesting for students. F3 also perceived greater student enthusiasm during technology-supported activities. At the same time, F3's account cautioned against treating engagement with a device as equivalent to language learning.

The clearest limitation in F3's account concerned vocabulary. Technology was perceived as helpful only to a certain extent when students did not understand key words in the learning material. Multimedia presentation could increase access or attention, but it could not remove a basic vocabulary barrier. This condition is important because it shows that technology was understood by the teachers as a supporting medium rather than as a substitute for language knowledge or teacher explanation.

The structured questionnaire was consistent with the generally positive interview accounts. Two of the three teachers strongly agreed and one agreed that technology should be considered a fundamental part of modern teaching. Because the questionnaire involved only three teachers, the results are presented as counts rather than percentages. The questionnaire data are used here to supplement, not quantify beyond, the qualitative interview evidence.

Taken together, the teachers perceived technology as most useful when it expanded access to language input, facilitated listening and pronunciation work, varied the presentation of materials, or created opportunities for participation. Their accounts also indicate that perceived usefulness remained dependent on vocabulary knowledge, student discipline, teacher guidance, and the fit between a tool and the immediate learning objective.

Table 2. Evidence Matrix for Teachers' Perceived Benefits and Conditions

Participant	Reported evidence (paraphrased)	Analytic significance
F1	Technology was described as supporting reading, speaking, listening, and pronunciation through internet sources, AI/online search, audio, and video.	Perceived value centered on broader resource access and multimodal language input.
F2	Digital audio through classroom speakers was described as useful for listening; technology was also perceived as motivating participation.	Perceived value centered on listening input and interactive classroom activity; motivation was not directly measured.
F3	Digital resources were described as attractive and practical, but technology was seen as limited when students lacked vocabulary.	Perceived usefulness was conditional on students' language knowledge and teacher support.

Interactive Flat Panel as a Centralized Classroom Technology

A distinctive finding concerned the Interactive Flat Panel (IFP), which the revised manuscript uses as the consistent term for the shared touchscreen device. F1 linked the school's access to the IFP to a wider government-supported digital-learning initiative. From the teachers' perspective, the device was not simply another screen; it represented a centralized form of technology use that could organize multimedia presentation for the whole class.

The IFP was described as enabling teachers to display videos, audio, presentations, online texts, and other digital materials on a large shared screen. This arrangement gave the class a common visual and auditory focus and allowed the teacher to sequence materials, pose questions, monitor comprehension, and move between resources within one lesson. Its pedagogical usefulness therefore depended on how the teacher designed and managed the activity, not merely on the presence of the device.

The centralized character of the IFP also had a classroom-management function in the teachers' accounts. Teachers were concerned that students could become distracted when each learner used a smartphone for games or unrelated applications. Displaying instructional material on a shared IFP could reduce reliance on individual screens and make the teacher's intended resource visible to the whole class. This should be understood as a perceived classroom-management advantage rather than as evidence that the IFP eliminated distraction.

Access, however, was limited. Two of the three teachers agreed in the structured questionnaire that limited facilities were a challenge. Although IFPs had been introduced at the school, the available devices were shared and could not be used consistently in every lesson. The perceived benefit of centralized technology was therefore accompanied by a practical constraint: teachers needed alternative plans when the IFP was unavailable.

Table 3. Roles and Constraints of the Interactive Flat Panel

IFP role	Teacher-reported classroom use	Condition / interpretation
Multimedia presentation	Displays video, audio, presentations, online texts, and other digital materials.	Supports shared visual and auditory input when aligned with lesson objectives.
Centralized display	Places the same resource on a large shared screen for the whole class.	Creates common attention and allows teacher-controlled sequencing of materials.
Classroom management	Can reduce reliance on students' individual smartphone screens.	May reduce opportunities for off-task phone use, but distraction was not directly measured.
Teacher orchestration	Combines multiple digital resources within one lesson.	Educational value depends on pedagogical design, monitoring, questioning, and feedback.

Access constraint	IFPs are shared and not available for every lesson.	Requires contingency planning and limits consistent implementation.
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Challenges in Implementing Technology Integration

The teachers described technology integration as constrained by interconnected professional, infrastructural, pedagogical, and behavioral factors. Difficulty operating a new device could reduce lesson time; limited facilities could prevent planned use; unstable internet or electricity could interrupt a digital activity; and student use of personal devices could create classroom-management problems. These challenges show that access to technology and readiness to use it were not equivalent.

Technological competence was a recurring concern. The interviews indicated that teachers sometimes experienced difficulty operating unfamiliar technologies and occasionally needed assistance. This gap was especially visible when new devices or platforms were introduced. The teachers' accounts therefore suggest that operational familiarity needs to develop alongside pedagogical confidence if digital tools are to be used efficiently during lessons.

Workload was also prominent. All three teachers strongly agreed in the structured questionnaire that workload was an obstacle to technology integration. Preparing digital materials, designing interactive activities, anticipating technical problems, managing student behavior, and developing assessments can add to existing teaching responsibilities. In this context, technology was not perceived simply as an efficiency tool; it could also increase preparation demands.

Facility limitations affected consistency. Two of the three teachers agreed that limited facilities were a challenge. Because IFP access was shared, teachers could not assume that the device would be available for every lesson. This required flexibility and the preparation of non-digital or lower-technology alternatives.

Rapid technological change created a related professional-learning challenge. Two teachers strongly agreed and one agreed that rapid technological development was difficult to keep up with. The teachers were generally positive toward technology, yet they also reported the need to continually update their skills. This combination of positive attitude and incomplete competence is an important feature of the data.

Infrastructure problems were reported directly in the interviews. F2 identified unstable internet connections and power outages as possible disruptions, while F1 also acknowledged connectivity problems. These conditions could interrupt a planned activity and required teachers to move quickly to alternative resources or methods.

Student behavior and assessment created pedagogical challenges. Teachers reported that smartphones could be used for games or unrelated applications, making monitoring necessary. They also recognized that easy access to online information could make it difficult to determine whether students had understood material or had simply copied an answer. These concerns encouraged the use of tasks that required explanation, interpretation, application, or production rather than simple retrieval.

Finally, technical assistance remained important. F3 reported sometimes asking others for help when technology was difficult to operate. The need for immediate

assistance is consequential in a classroom because even a minor technical problem can consume instructional time. Peer support and accessible technical help therefore formed part of the practical conditions under which technology could be used.

Table 4. Evidence Matrix for Challenges

Challenge	Evidence from participants / questionnaire	Interpretation
Technological competence	Teachers reported difficulty operating some technologies and occasional need for assistance.	Operational skill remains uneven and needs continued development.
Workload	All three teachers strongly agreed that workload is an obstacle.	Technology can add preparation, troubleshooting, assessment, and management demands.
Limited facilities	Two of the three teachers agreed that limited facilities are a challenge.	Shared IFP access prevents consistent use in every lesson.
Rapid technological change	Two teachers strongly agreed and one agreed that rapid change is challenging.	Positive attitudes coexist with a need for continuous professional learning.
Internet / electricity	F2 reported internet and power problems; F1 also reported connectivity issues.	Digital lessons require flexible planning and alternatives.
Student distraction	Teachers reported that smartphones may be used for games or unrelated applications.	Digital activities require explicit classroom-management strategies.
Assessment	Teachers noted that online information is easily accessible.	Tasks should require explanation, interpretation, application, or production.
Need for assistance	F3 reported sometimes asking others for technical help.	Immediate peer or technical support can protect instructional time.

Strategies Used by Teachers to Navigate the Challenges

Teachers responded to the challenges through a combination of professional learning, collaboration, preparation, and pedagogical flexibility. The interview and questionnaire evidence indicated that training, a constructive attitude toward technology, continuous learning, assistance from colleagues or students, contingency planning, and the continued use of conventional methods were all part of teachers' responses.

Professional training received the strongest support. All three teachers strongly agreed that training was needed to improve technological competence. Two teachers agreed and one strongly agreed that training also creates opportunities to learn new teaching approaches. F1 emphasized training before teachers are expected to use the IFP with students, while F2 similarly described technology training as important for understanding new devices.

The interviews also showed that training should not be treated as a one-time solution. Teachers could remain uncertain even after initial exposure to a tool. The participants' accounts therefore point to a need for repeated, practical, hands-on learning that includes device operation, troubleshooting, lesson design, and opportunities to apply a tool in authentic classroom situations.

Attitude was another part of teachers' adaptation. All three teachers strongly agreed that a positive perception of technology was important. Their accounts suggest willingness to use technology and recognition of its relevance to contemporary education, but they also show that positive attitudes alone do not remove operational or infrastructural barriers.

Collaboration functioned as immediate problem solving and informal professional learning. All three teachers strongly agreed that collaboration was important. F3 described seeking help from other teachers or students when technical difficulties occurred. This practice allowed problems to be addressed during teaching while also distributing technological knowledge within the school.

Continuous learning was likewise emphasized by all three teachers, and F3 specifically noted the need to keep learning as technologies develop. At the same time, the workload findings indicate a practical tension: the teachers perceived ongoing learning as necessary, but the time needed for such learning competes with lesson preparation, assessment, and other responsibilities.

Lesson preparation served as a further strategy. In a context where IFP access, internet connectivity, and electricity could not always be guaranteed, teachers needed alternative materials and activities that could be implemented if a digital plan failed. Such contingency planning reduced the risk that a technical interruption would stop the lesson. Finally, teachers did not describe technology as a replacement for all conventional teaching. Two teachers strongly agreed and one agreed that technology is a fundamental part of modern teaching, yet the interviews indicated that teachers still used direct explanation or other non-digital methods when students required them. The strategy was therefore selective integration: choosing digital or conventional resources according to the language objective, learner needs, and classroom conditions.

Table 5. Evidence Matrix for Teachers' Strategies

Strategy	Evidence from participants / questionnaire	Purpose / interpretation
Professional training	All three teachers strongly agreed training is needed; two agreed and one strongly agreed that training introduces new approaches.	Develops operational and pedagogical competence; should be practical and ongoing.
Positive attitude	All three teachers strongly agreed that a positive perception of technology is important.	Supports willingness to adapt but does not remove technical or infrastructure barriers.
Collaboration	All three teachers strongly agreed collaboration is important; F3 described seeking help from colleagues or students.	Provides immediate troubleshooting and informal professional learning.

Continuous learning	All three strongly agreed ongoing learning is necessary; F3 emphasized keeping up with technological development.	Supports adaptation to new tools, although time and workload remain constraints.
Preparation / contingency planning	Teachers prepared materials and alternatives when facilities or connectivity were uncertain.	Reduces disruption when digital plans cannot be implemented.
Balanced methods	Two teachers strongly agreed and one agreed technology is fundamental, while interviews indicated continued use of conventional explanations when needed.	Encourages selective, learner-responsive integration rather than technology use as an end in itself.

DISCUSSION

The findings should be interpreted as teachers' situated perceptions rather than as evidence of causal effects on students. Within that boundary, the study shows that technology integration at SMAN 1 Gunungsari is best understood as an interaction between technological competence, pedagogical decision making, English-content goals, and school conditions. This interpretation is consistent with the logic of TPACK: knowing how to operate a device is insufficient unless the teacher can connect it to a specific pedagogical purpose and content objective (Mishra & Koehler, 2006). It also echoes broader syntheses showing that teachers' perceptions of ICT integration are shaped by both attitudes and contextual conditions (Abel et al., 2022).

The language-specific examples clarify this interaction. F1 associated online text, audio, and video with reading and pronunciation opportunities; F2 used digital audio to broaden listening input; and F3 valued easier access to teaching materials while also identifying vocabulary as a bottleneck. These examples are important because they show that perceived usefulness was task-dependent. Technology appeared most meaningful when it served a recognizable English-learning function, a pattern that aligns with Indonesian work on technology-infused EFL practice in which teachers' pedagogical and content decisions determine how digital resources are enacted (Haryati et al., 2023). The vocabulary finding also qualifies generalized claims that multimedia automatically improves learning: engagement with richer media does not remove the need for language scaffolding.

The IFP finding provides the clearest contextual contribution. Research on interactive whiteboards in ESL has emphasized perceived usefulness, training, and the teaching functions made possible by a shared interactive display (Luo et al., 2023), while recent Indonesian studies show that teacher acceptance and perceived ease of use matter for IFP adoption (Firman et al., 2026). The present study extends this discussion by highlighting the IFP as a centralized classroom technology. In the teachers' accounts, a shared display could support multimedia input and common attention while reducing dependence on students' individual smartphones, which were also associated with distraction. At the same time, this classroom-management advantage was limited by shared device availability. Thus, the contribution is not that

IFPs are universally effective, but that centralization may change the organization of digital participation in the classroom. This interpretation is consistent with the broader finding that IFP effectiveness depends on teacher competence, instructional strategy, and school support (Hermawan & Widiastuti, 2026).

Several tensions deepen the interpretation. Teachers were positive about technology but still reported gaps in technological competence; they valued technology for convenience and flexibility but also described additional workload; the IFP could reduce reliance on individual phones but was not always available; multimedia could increase perceived engagement but vocabulary remained a barrier; and teachers viewed continuous learning as necessary despite limited time. These tensions help explain why technology integration cannot be reduced to either teacher attitude or device access. Howard (2013) similarly showed that teachers' technology decisions are shaped by perceived risk and value, while Kirkwood and Price (2014) cautioned against assuming that technology automatically constitutes educational enhancement. In the present context, successful integration appears to require ongoing professional learning that links operational skills to pedagogical judgment, as also emphasized in TPACK-focused professional development (Sirajuddin et al., 2023).

The practical implication is that school improvement should combine equipment provision with sustained pedagogical and technical support. Training should include hands-on IFP use, troubleshooting, and lesson design rather than only device orientation; peer collaboration and accessible technical assistance should be institutionalized; teachers need preparation time and contingency plans for connectivity or electricity failures; and classroom policies should clarify appropriate smartphone use. Infrastructure investment also remains important because limited access can prevent teachers from applying what they have learned, a concern long identified in research on ICT integration (Pelgrum, 2001). The study also suggests a contextual extension of TPACK: the enactment of teachers' technological, pedagogical, and content knowledge is enabled or constrained by workload, infrastructure, technical support, and organizational access. These factors are not additional TPACK knowledge domains, but they shape whether teachers can put TPACK into practice.

Table 6. Research Questions, Teacher-Reported Findings, and Implications

Research question	Teacher-reported finding	Implication
RQ1: Perceived role and benefits	Teachers described technology as supporting resource access, listening/pronunciation input, engagement, participation, and varied presentation; vocabulary remained a limiting condition.	Technology should be framed as a pedagogical support rather than as a verified cause of learning gains.
RQ1: IFP	Teachers described the IFP as supporting multimedia, shared attention, and reduced reliance on	Centralized classroom technology may support both instruction and management when it is

	individual smartphones, but access was limited.	available and pedagogically orchestrated.
RQ2: Challenges	Technological competence, workload, facilities, rapid change, connectivity, electricity, student behavior, assessment, and need for assistance were reported.	Effective integration depends on technical, pedagogical, and institutional conditions.
RQ3: Strategies	Training, positive attitudes, collaboration, continuous learning, preparation, technical help, and balanced digital/conventional methods were reported.	Professional development should be continuous, hands-on, collaborative, and supported by school infrastructure and time.

CONCLUSION

This study suggests that the three participating English teachers perceived technology integration as beneficial when it supported access to digital resources, listening and pronunciation input, multimedia presentation, and opportunities for classroom participation. The teachers also perceived the Interactive Flat Panel as useful because it provided a shared platform for presenting and coordinating multimedia resources. Its centralized character may offer an additional classroom-management advantage by reducing dependence on individual smartphones, although the study did not directly measure student distraction, motivation, participation, or learning outcomes.

These perceived benefits were conditional. Teachers described gaps in technological competence, rapid technological change, workload, limited facilities, shared IFP access, unstable internet, electricity problems, student distraction, assessment concerns, and occasional dependence on technical assistance. F3's observation that vocabulary difficulties could persist despite multimedia use further indicates that technology does not replace basic language knowledge or pedagogical scaffolding.

Teachers responded through professional training, positive attitudes, peer collaboration, continuous learning, lesson preparation, technical assistance, and flexible combinations of technology and conventional methods. For schools, the findings support professional development that integrates TPACK with hands-on practice, reliable technical support, adequate IFP and internet access, protected preparation time, contingency planning, and clear expectations for student device use. The study's conceptual contribution is to show how the enactment of TPACK is shaped by school-level conditions and by the organization of technology as either individualized or centralized classroom access.

The findings should be transferred cautiously because the study involved only three teachers in one school and relied predominantly on teacher accounts. Possible self-report and social-desirability bias, the absence of student perspectives and objective learning outcomes, limited reporting of classroom observation, and potential researcher interpretation bias further constrain the claims that can be made. Future research should therefore combine interviews with systematic classroom observation, student perspectives, and learning-outcome evidence; compare IFP-supported and

non-IFP lessons; and extend the inquiry across multiple schools using qualitative or mixed-methods designs.

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