

Teachers' and Students' Perspectives on Technology Integration in EFL Instruction: Strategies for Fostering Autonomy and Overcoming Challenges in Indonesian High Schools

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ABSTRACT

Technology integration is transforming English as a Foreign Language (EFL) instruction in Indonesian high schools. This study explores the role of technology in fostering student autonomy in EFL education and examines strategies employed by teachers to integrate technology effectively. A phenomenological approach was used, with data collected through semi-structured interviews and focus group discussions involving 20 students and 5 teachers from diverse Indonesian high schools. Thematic analysis revealed that technology enhances student autonomy by providing access to extensive resources, fostering collaboration, and delivering instant feedback. Teachers play a critical role in creating learner-centered environments using platforms like Google Classroom and various digital tools. However, challenges such as limited access to technology and inadequate infrastructure impede seamless integration. The study underscores the need for targeted investments in infrastructure, equitable access to digital tools, and comprehensive teacher training to address these challenges. Recommendations include equipping educators with skills to leverage technology effectively, integrating collaborative platforms into the curriculum, and prioritizing underserved areas for infrastructure development. Policymakers are urged to bridge digital divides and foster partnerships with technology providers to create sustainable EFL solutions. The findings have significant implications for curriculum design, teacher training, and policy development, promoting equitable and impactful technology use in EFL classrooms. Future efforts should focus on workshops and training programs to empower teachers with practical strategies for enhancing learner autonomy and fostering collaboration through digital tools.

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1. INTRODUCTION

In today's digital age, technology is reshaping education, particularly in the field of English as a Foreign Language (EFL). The integration of digital tools provides flexible and personalized learning experiences that enable students to pursue self-directed study, which is at the heart of autonomous learning (Reinders & Benson, 2017). Autonomous learning allows learners to take control of their educational journeys, enhancing metacognitive awareness and providing students with extensive exposure to the target language (Inayati & Karifianto, 2022). Beyond the classroom, technology-driven

autonomous learning environments foster student engagement in extracurricular activities, encouraging self-expression, motivation, creativity, and self-esteem (Dewi & Wilany, 2023; Inayati, 2015).

In Indonesia, the emphasis on 21st-century education prioritizes not only literacy and skills development but also technological proficiency, preparing students for the demands of a rapidly changing world (Loeneto et al., 2022). The COVID-19 pandemic further accelerated the adoption of digital tools in education, highlighting their role in maintaining continuity in learning during school closures (Waang, 2023). As educational institutions continue to integrate technology into the curriculum, its potential to support autonomous learning in EFL education becomes increasingly relevant.

Autonomous learning models, such as Zimmerman's, describe the process as comprising foresight, performance, and self-reflection phases, enabling students to develop critical skills like self-regulation and task analysis (Zhou & Bao, 2018). Effective autonomous learning requires students to employ cognitive, metacognitive, and resource management strategies to sustain motivation and achieve learning goals (Pang, 2003). In this context, technology plays a crucial role by providing structured tasks that guide students in independent content creation and open-ended tasks that encourage exploration and social interaction (Lee, 2017). This flexibility in learning allows students to customize their education based on individual needs and interests, offering an alternative to traditional, teacher-centred models that prioritize passive learning (Kucukler, 2018).

While these theoretical frameworks highlight the importance of autonomy, their practical application in classroom settings still requires further investigation. For example, in Indonesia's EFL classrooms, the integration of technology introduces both opportunities and challenges in fostering learner autonomy (Tamah et al., 2020; Dewi et al., 2023). Digital tools such as multimedia resources, mobile applications, and online learning platforms not only provide students with access to educational materials anytime and anywhere but also promote collaborative and interactive learning (Cahyani & Cahyono, 2012; Ally, 2005).

Numerous studies have examined the use of technology in language education, underscoring its role in enhancing learner autonomy. Research has shown that virtual language communities and chatbot-based language programs offer personalized practice and feedback (Van Campenhout et al., 2015). Similarly, platforms like Lang-8 and Web 2.0 technologies encourage independent language practice while facilitating peer interaction (Pollard, 2015; Lee, 2006). Multimedia resources, such as interactive games and videos, have also been found to engage learners and improve comprehension and vocabulary retention (Peterson, 2009; Wang et al., 2012).

Despite these advances, balancing teacher guidance with student independence remains a crucial aspect of successful autonomous learning. While digital tools foster independent learning, teacher support through scaffolding and feedback is essential to help students navigate their learning experiences and develop self-regulation skills (Blidi, 2017). Therefore, the potential of technology to enhance autonomy must be carefully aligned with pedagogical strategies that provide a balanced distribution of responsibility between teachers and students (Kucukler, 2018).

However, the empirical research on how technology fosters learner autonomy in the specific context of Indonesian high school EFL education is limited. This study aims to address this gap by exploring the role of technology in promoting autonomous learning and collaborative learning. By investigating the experiences and perspectives of both teachers and students, this research seeks to uncover the opportunities and challenges of technology integration and its impact on learner autonomy and language outcomes. Therefore, the research questions guiding this study are: (1) How do teachers and students perceive the role of technology in fostering learner autonomy and collaborative learning in EFL instruction, and what challenges do they face in its implementation?; and (2) How do teachers employ strategies to foster learner autonomy in EFL instruction?

2. METHODS

This qualitative study employs a phenomenological research design to explore the lived experiences, perspectives, and practices of EFL teachers and students regarding technology integration in English language education. Phenomenology is well-suited for investigating the subjective meanings and interpretations individuals attribute to their experiences, making it an appropriate approach for examining the complex phenomenon of technology-mediated language learning.

The participants in this study consisted of five teachers and twenty students from five high schools across Indonesia. Purposive sampling was employed to ensure diverse representation in terms of socioeconomic and geographic backgrounds. Schools were selected based on their use of technology in EFL instruction, varying levels of access to technological infrastructure, and representation of urban, suburban, and rural contexts, ensuring the study captured a broad spectrum of experiences reflective of the Indonesian education landscape. Teachers were selected based on their experience in EFL instruction, familiarity with integrating technology into teaching practices, and willingness to participate and share detailed insights into their practices. Their levels of experience varied, ranging from novice to experienced educators. Students were chosen based on their enrollment in EFL classes, active engagement in learning activities, and diversity in academic performance levels, which included high-achieving, average, and low-performing learners.

To gain a comprehensive understanding of the experiences of EFL teachers and students with technology integration, semi-structured interviews and focus group discussions were conducted over three months. Each participant group participated in two sessions, allowing the researchers to capture both initial perceptions and changes in practices over time. Sessions were scheduled to minimize disruption to regular teaching and learning activities, with each lasting 60 to 90 minutes to enable a thorough exploration of participants' experiences.

The Technology Acceptance Model (TAM) provided the theoretical framework for designing the questions. TAM emphasizes two key factors—*influencing perceived usefulness and perceived ease of use*—which affect individuals' acceptance and effective use of technology. For teachers, interview questions focused on how technology supports language learning outcomes, tools frequently used, reasons for tool selection, challenges encountered, and strategies employed to address these challenges. Teachers were also asked to evaluate these strategies and suggest improvements for integrating technology more effectively into EFL instruction.

Focus group discussions with students explored their use of technology tools for learning English, including how these tools supported independent learning and specific challenges they faced. Discussions highlighted their perceptions of technology's role in fostering autonomy and included suggestions for enhancing its effectiveness in English classes.

Teacher interviews were conducted in private, ensuring confidentiality and encouraging honest feedback, while student focus groups, consisting of four to five participants, fostered interaction and collaborative reflection. All sessions were audio-recorded with consent, and detailed field notes were taken to supplement the recordings, providing a rich dataset for analysis.

Thematic analysis was conducted following Braun and Clarke's (2006) six-phase framework. The analysis began with familiarization, where transcripts, observation notes, and relevant documents were reviewed repeatedly to identify preliminary concepts and recurring ideas. A systematic coding process was then applied to label significant segments of text, ensuring that all relevant data were captured. Using qualitative data analysis software, the coded data were organized and grouped into potential themes based on patterns and connections among codes. Themes represented key aspects of participants' experiences with technology integration. The themes were then validated through iterative analysis and discussions among researchers to ensure coherence and relevance to the research questions. Discrepancies were resolved collaboratively, and the thematic framework was refined. The final themes were defined to represent distinct yet interconnected concepts, such as fostering learner autonomy and challenges in technology access. A structured narrative was then developed, supported by illustrative examples and quotations to provide context and depth. To ensure the reliability and

validity of the data, multiple strategies were employed. Member checking was conducted by sharing summaries of the findings with participants to confirm the accuracy of interpretations. Data were triangulated by comparing themes across teacher interviews, student focus groups, and observation notes. The coding process involved collaboration among researchers to minimize personal bias, and disagreements were resolved through discussion to achieve consensus.

3. FINDINGS AND DISCUSSION

3.1 Teachers' and Students' Perceptions of Technology in EFL: Role, Benefits, and Challenges

To address this question, data were collected from interviews with both teachers and students and analyzed using thematic analysis. The themes that emerged highlight the various perspectives on how technology facilitates autonomous learning in EFL education.

Table 1. Perspectives of Teachers and Students on the Use of Technology in EFL Instruction

Themes	Teacher's Perspective	Students' Perspective
Practical and Accessable	Emphasize practicality and accessibility of tools like Google Classroom, Drive, Docs, and Slides.	Appreciate practicality of familiar tools that don't require additional installations, reducing technical barriers to learning.
Real-time Monitoring and Feedback	Value ability to monitor student progress in real-time, provide timely feedback, and track student work throughout projects.	Benefit from immediate feedback, track progress, and adjust learning strategies accordingly, fostering autonomy.
Supportive Learning Environment	Integration of technology creates supportive learning environment, offering additional resources and support outside class.	Access to resources and support outside class promotes independence and autonomy in learning.
Collaborative Learning	Technology facilitates collaborative learning and group work through tools like Google Docs and Slides.	Enjoy collaborative aspects of technology, working together on assignments and projects, promoting teamwork and independent learning.
Technical Challenges and Solutions	Acknowledge technical challenges such as inconsistent WiFi and limited access to computer labs, but adapt solutions.	Face technical challenges like connectivity issues, but adapt by working in groups and sharing resources, overcoming barriers.

Table 1 summarizes the key themes identified in both teachers' and students' perspectives regarding the role of technology in promoting autonomous learning in EFL education. The explanation of each theme is as follows:

3.1.1 Theme 1: Practicality and Accessibility

Teachers emphasize the practicality and accessibility of technology in promoting autonomous learning. They prefer using tools like Google Classroom, Google Drive, Docs, and Slides because they are easily accessible through a browser. This accessibility ensures that all students can participate without significant barriers as seen in the excerpt *"I prefer using tools like Google Classroom, Drive, Docs, and Slides because they are easily accessible through a browser. It avoids the need for additional app installations which can be hindered by storage limitations on students' devices."* (T2)

The students' interviews also revealed that they appreciate the practicality of using familiar tools that do not require additional installations. The use of widely available technology such as Gmail and Google apps makes learning more seamless and reduces the anxiety related to technical issues. It can be seen in the following excerpt: *"I appreciate the practicality of using familiar tools that don't require additional installations. It's easier to access and reduces the anxiety related to technical issues."* (S5)

The practicality and accessibility of widely available tools such as Google Classroom, Google Drive, and Google Docs play a pivotal role in fostering autonomous learning. Teachers' preference for these tools stems from their accessibility through browsers, eliminating the need for additional app installations and minimizing device storage constraints. Similarly, students appreciate the simplicity of using familiar tools, which reduces anxiety related to technical challenges. These findings suggest that adopting universally accessible tools can promote inclusivity in educational contexts, particularly in areas with limited resources. For policy and practice, it is essential to prioritize the integration of user-friendly platforms to enhance technology adoption among both teachers and students, particularly in resource-constrained settings.

3.1.2 Theme 2: Real-Time Monitoring and Feedback

Teachers value the ability to monitor student progress in real-time. Platforms such as Google Classroom allow teachers to track student work from the initial planning stages to the completion of projects. This continuous monitoring supports autonomous learning as students receive timely feedback and can adjust their learning strategies accordingly. One of the teachers (T4) stated: *"Platforms like Google Classroom allow me to track student work in real-time. I can provide timely feedback and monitor their progress throughout projects."*

Meanwhile, the students benefit from immediate feedback and the ability to track their own progress. Knowing that teachers can provide comments and feedback directly on their work through tools like Google Docs encourages students to take more responsibility for their learning as seen in the excerpt: *"Knowing that teachers can provide comments directly on our work through tools like Google Docs encourages us to take more responsibility for our learning."* (S1)

The ability to provide real-time feedback through platforms like Google Classroom and Docs is instrumental in supporting autonomous learning. Teachers benefit from continuous monitoring of students' progress, enabling timely interventions to guide their learning. From the students' perspective, immediate feedback fosters greater accountability and encourages them to take ownership of their learning process. This underscores the importance of training educators to utilize real-time monitoring tools effectively. Policy-makers should consider incorporating provisions for teacher professional development on leveraging technology for formative assessment and personalized feedback, which can enhance students' learning outcomes and autonomy.

3.1.3 Theme 3: Supportive Learning Environment

The integration of technology creates a more supportive learning environment. Teachers note that technology enables them to provide additional resources and support outside traditional classroom hours. This flexibility helps students to work at their own pace and seek help as needed, as seen in teacher's interview result: *"Technology enables me to provide additional resources and support outside traditional classroom hours. This flexibility helps students work at their own pace and seek help as needed."*

Students feel that technology helps them access a wealth of resources that support their learning. They appreciate the ability to use tools like Grammarly for writing assistance and plagiarism checkers, which help them improve their work independently as mentioned in the excerpt: *"We can access a wealth of resources that support our learning. Tools like Grammarly help us improve our work independently."* (S20)

Technology creates a supportive environment by extending learning beyond traditional classroom boundaries. Teachers leverage digital tools to provide additional resources, enabling students to work at their own pace and seek help when needed. Students also utilize tools such as Grammarly and plagiarism checkers, which empower them to improve their work independently. These practices highlight the potential of technology to bridge learning gaps and foster independent learning habits. For practice, schools should ensure equitable access to supportive tools and resources. Policy initiatives could focus on subsidizing access to premium learning tools and creating digital literacy programs to equip both teachers and students with the skills to maximize technology use.

3.1.4 Theme 4: Collaborative Learning and Group Work

Teachers highlight the role of technology in facilitating collaborative learning and group work. Tools like Google Docs and Slides allow students to work together on projects remotely. This capability fosters a sense of autonomy as students can manage their group work independently. In this regard, they argued that, *"Tools like Google Docs and Slides facilitate collaborative learning and group work. Students can work together on assignments remotely."*

Moreover, the students enjoy the collaborative aspects of technology, which allow them to work together on assignments and projects. Group work using online platforms helps them develop their teamwork skills while also promoting independent learning, as they must manage their contributions and coordinate with peers. The student-respondent stated, *"We enjoy working together on assignments and projects using online platforms. It helps us develop teamwork skills and promotes independent learning."*(S4)

Technology facilitates collaborative learning by enabling students to work together on projects remotely through tools like Google Docs and Slides. This autonomy in managing group work allows students to develop both teamwork and independent learning skills. However, effective collaboration also depends on students' ability to self-regulate and coordinate with peers. To maximize the benefits of collaborative tools, teachers should integrate structured group work activities into their pedagogy. Policy-makers should invest in technologies and infrastructures that support seamless collaboration, such as reliable internet connectivity and access to collaborative software.

3.1.5 Theme 5: Technical Challenges and Solutions

Despite the advantages, teachers acknowledge some technical challenges, such as inconsistent Wi-Fi connectivity and limited access to computer labs. However, they adapt by encouraging the use of personal devices and promoting group work to ensure that all students can participate. Teachers also highlight the importance of learning how to use new tools to stay ahead and support their students effectively. *"Despite technical challenges like inconsistent WiFi, we adapt by encouraging the use of personal devices and promoting group work to ensure all students can participate."*

The technical challenges such as connectivity issues and device limitations were also confirmed by the results of students' interviews. However, they generally adapt by working in groups and sharing resources. They appreciate when teachers provide guidance on using technological tools, which helps them overcome these challenges and enhances their autonomous learning capabilities as they stated, *"We face connectivity issues and device limitations, but we adapt by working in groups and sharing resources. Teacher guidance on using technological tools helps us overcome these challenges."*

The integration of technology in education, while advantageous, is hindered by systemic challenges such as infrastructure limitations, digital divides, and gaps in teacher training. Teachers in this study highlighted recurring issues like inconsistent Wi-Fi connectivity and limited access to devices, which they addressed by promoting group work and encouraging the use of personal devices. Students similarly adapted by sharing resources and relying on guidance from teachers. While these strategies demonstrate resilience and adaptability, they also underscore significant systemic challenges that extend beyond the classroom.

The digital divide remains a critical barrier, particularly in rural or under-resourced areas where internet access and technological infrastructure are inadequate. This inequity limits students' and teachers' ability to fully utilize technology for autonomous learning, further perpetuating educational disparities. Addressing this issue requires targeted policy interventions to improve infrastructure, including expanding broadband access and providing affordable devices to underserved communities.

In addition, gaps in teacher training exacerbate the challenges of technology integration. Teachers' ability to navigate technical challenges and utilize digital tools effectively depends heavily on their training and professional development. Without sufficient support, even the most advanced tools may fail to achieve their intended impact. Investing in robust training programs for educators, including hands-on workshops and ongoing support, is essential to build teacher confidence and competence in using technology.

The findings also highlight a need for systemic collaboration between policymakers, educational institutions, and technology providers. A coordinated approach to infrastructure development, teacher training, and resource allocation can mitigate the challenges of technology integration. Furthermore, fostering partnerships with private and non-profit organizations could help bridge the digital divide by leveraging funding and expertise to create sustainable solutions.

3.2 How do teachers employ strategies to foster learner autonomy in EFL instruction?

Based on the result of students' and teachers' interview results, several themes were found through a thematic analysis. Table 2 provides a concise overview of the key themes related to the strategies employed by teachers to integrate technology effectively into EFL instruction and foster student autonomy.

Table 2. Teachers' Strategies to Integrate Technology in EFL Instruction

Theme	Description
Integration of Interactive Multimedia Resources	Incorporating videos, simulations, and language learning apps to provide engaging and diverse materials for EFL instruction, fostering autonomy in learning.
Utilization of Online Collaborative Platforms	Using platforms like Google Classroom for group activities and discussions to promote peer interaction and collaborative problem-solving, empowering students in their learning.
Personalized Learning Pathways	Tailoring instruction to students' individual needs and preferences through adaptive learning platforms and personalized tools, empowering students to progress at their own pace.
Providing Timely Feedback and Support	Offering constructive feedback on assignments and tasks through technology to scaffold students' learning experiences and foster self-regulated learning skills
Facilitating Self-Regulated Learning	Supporting students in developing metacognitive awareness, goal-setting skills, and effective learning strategies through technology, empowering them to take control of their learning process.

3.2.1 Theme 1: Integration of Interactive Multimedia Resources

The integration of interactive multimedia resources allows teachers to employ technology effectively by providing diverse and engaging materials for EFL instruction. By incorporating videos, simulations, and language learning apps, teachers create opportunities for students to explore language independently. Students can engage with these resources at their own pace and choose the activities that align with their interests and learning preferences.

Excerpt from Teachers' Interview:

"I often incorporate interactive multimedia resources such as educational videos, online simulations, and language learning apps into my lessons. These resources not only engage students but also provide opportunities for self-directed exploration and practice." (T2)

Excerpt from Students' Interview:

"I like when our teacher uses interactive apps and videos in class. It makes learning more interesting, and we can practice English on our own using those apps later." (S18)

The integration of interactive multimedia resources fosters a dynamic and engaging learning environment by enabling teachers to provide diverse materials for EFL instruction. Tools such as educational videos, online simulations, and language learning apps empower students to explore language autonomously at their own pace. Teachers reported that using such resources enhances students' engagement and facilitates independent learning. For instance, one teacher noted how integrating interactive multimedia helped students practice English independently, aligning with their preferences and interests. Similarly, students expressed appreciation for the use of apps and videos,

highlighting how these resources made learning more enjoyable and accessible for self-directed practice.

While this approach supports learner autonomy, a critical analysis reveals that the successful integration of multimedia resources requires teachers' proficiency in selecting and utilizing appropriate tools. Furthermore, disparities in access to these resources due to infrastructural or financial limitations may widen the gap between students with differing levels of access to technology. Addressing these challenges requires targeted teacher training and institutional support to ensure equitable access to interactive multimedia resources across diverse learning contexts.

3.2.2 Theme 2: Utilization of Online Collaborative Platforms

The utilization of online collaborative platforms enables teachers to facilitate collaborative learning experiences and empower students to take control of their learning. By setting up group activities and discussions on platforms like Google Classroom, teachers promote peer interaction, idea sharing, and collaborative problem-solving. Students actively participate in group tasks, exchange feedback, and collaborate with peers, enhancing their autonomy by engaging in collaborative learning processes facilitated by technology.

Excerpt from Teachers' Interview:

"I use Google Classroom to set up group projects where students can work together on presentations or research assignments. For example, I recently had them create group presentations on different English literature topics. They used Google Slides to collaborate in real-time, adding their content and commenting on each other's work. This not only helps them learn the material but also teaches them how to give and receive feedback." (T5)

Excerpt from Students' Interview:

"We had a project where we had to create a presentation with our group members using Google Slides. It was great because we could work on it together, even outside of school hours." (S1)

Online collaborative platforms such as Google Classroom and Google Slides have become valuable tools for facilitating group work and fostering student autonomy. Teachers leverage these platforms to promote peer interaction, collaborative problem-solving, and the development of teamwork skills. Through real-time collaboration on group assignments, students actively engage in exchanging feedback and managing their contributions, which enhances their sense of responsibility and autonomy. For example, a teacher shared their experience of using collaborative platforms to assign group presentations on English literature, enabling students to work together effectively both inside and outside of class.

Despite these benefits, the broader implications for classroom dynamics and students' technological readiness must be considered. The reliance on collaborative platforms may disadvantage students with limited internet connectivity or insufficient digital literacy. Policies aimed at improving digital infrastructure and providing training in collaborative technologies are essential to address these systemic barriers, ensuring all students can benefit equally from technology-mediated collaborative learning.

3.2.3 Theme 3: Personalized Learning Pathways

The implementation of personalized learning pathways empowers teachers to tailor instruction to students' individual needs and preferences. Teachers can create individualized learning experiences that meet the specific learning styles, interests, and competence levels of their students by utilizing specific learning tools and adaptive learning platforms. Meanwhile, the students can learn at their own speed, take charge of their learning, and gain independence in choosing and using individualized learning paths due to this personalization.

Excerpt from Teachers' Interview:

"I assign different Duolingo activities based on each student's progress and use Quizlet to create custom flashcard sets that match their individual vocabulary needs. This way, students can focus on areas where they need improvement and move ahead when they're ready." (T3)

Excerpt from Students' Interview:

"I really like using Quizlet because I can create my own flashcards or use ones that match my learning needs. This feels different from my classmates since I can focus on the words and grammar points I struggle with the most, and I can see my progress clearly." (T16)

Personalized learning pathways allow teachers to tailor instruction to individual students' needs, preferences, and skill levels. By utilizing adaptive learning platforms like Duolingo and Quizlet, teachers create customized activities that align with each student's progress. Students benefit from this personalization by focusing on specific areas for improvement and independently managing their learning pace. One student noted the advantages of using personalized flashcards to address their unique challenges, emphasizing how this approach helped them monitor their progress effectively.

However, implementing personalized learning pathways requires considerable planning and resources. Teachers must dedicate time to designing individualized tasks while balancing diverse classroom needs. Furthermore, the unequal distribution of adaptive learning technologies may hinder widespread adoption. To overcome these limitations, educational institutions should invest in teacher training, provide access to adaptive tools, and explore scalable methods for personalization in diverse classroom settings.

3.2.4 Theme 4: Providing Constructive Feedback

The provision of timely feedback and support through technology enables teachers to scaffold students' learning experiences and foster self-regulated learning skills. Constructive feedback can help students to reflect on their performance and identify areas for improvement. The realization of the feedback enables them to take initiative for learning.

Excerpt from Teachers' Interview:

"I use Google Classroom to provide feedback on assignments. After students submit their essays, I leave detailed comments on their strengths and areas for improvement directly in the document." (T5)

Excerpt from Students' Interview:

"One time, I got feedback on my essay directly after submitting it, and I was able to rewrite it and get a better grade. It made me feel like I was really improving and in control of my learning." (S8)

The use of technology for providing timely and constructive feedback plays a pivotal role in fostering self-regulated learning. Teachers shared how platforms like Google Classroom enable them to leave detailed comments on students' assignments, helping them identify strengths and areas for improvement. This immediate feedback encourages students to reflect on their learning and take initiative to revise and enhance their work. Students appreciated the personalized feedback, citing instances where it directly contributed to improved performance and increased confidence in managing their learning process.

While constructive feedback is valuable, its effectiveness depends on the clarity and specificity of the comments. Additionally, students may require guidance on how to act on feedback to achieve meaningful improvement. Institutions should provide professional development for teachers to refine feedback strategies and equip students with metacognitive tools to utilize feedback effectively.

3.2.5 Theme 5: Facilitating Self-Regulated Learning

The facilitation of self-regulated learning through technology empowers teachers to support students in developing metacognitive awareness, goal-setting skills, and effective learning strategies. By scaffolding tasks, modeling effective learning behaviors, and providing tools for goal-setting and progress monitoring, teachers foster self-regulated learning skills essential for autonomy.

Excerpt from Teacher's interview:

"I encourage students to set their own learning goals using apps like Trello, where they can create boards for each language skill they want to improve. For instance, they can set weekly goals for vocabulary acquisition or grammar practice and track their progress." (T1)

Excerpt from Student's interview:

"I have a board for new vocabulary where I set a goal to learn 20 new words each week. I also use Google Classroom to write reflections on what I've learned and what I need to improve" (S23)

Facilitating self-regulated learning through technology empowers students to set goals, monitor progress, and adopt effective learning strategies. Teachers model these behaviors by using tools like Trello to help students organize their learning objectives and track achievements. For instance, a teacher described encouraging students to create language-specific boards and set weekly goals, which enhanced their metacognitive awareness and autonomous learning skills. Similarly, students reported setting goals for vocabulary acquisition and reflecting on their learning through platforms like Google Classroom.

Despite its potential, self-regulated learning via technology requires substantial guidance and scaffolding from teachers, particularly for students unfamiliar with these approaches. Additionally, disparities in access to goal-setting tools and technical expertise may hinder some students' ability to benefit from self-regulated learning strategies. Policymakers and educators should focus on integrating these practices into the curriculum, ensuring that all learners receive adequate support to develop self-regulation skills.

Discussion

The findings from the analysis of interviews with teachers and students reveal several key themes that describe the role of technology in promoting autonomous learning in English as a foreign language (EFL) education in Indonesian high schools. Technology enhances accessibility and flexibility in learning, as highlighted by students, by allowing them to access learning materials independently. By providing flexible learning opportunities, students can tailor their learning to meet their individual needs (Golonka et al., 2014). The accessibility of technology also supports learner autonomy by enabling students to take control of their learning schedules and environments, aligning with the concept of learner autonomy that emphasizes self-directed learning (Holec, 1981). For example, students can use tools like Google Calendar or learning management systems (LMS) to organize their study time, which encourages time management, a critical aspect of learner autonomy.

Moreover, technology facilitates personalized learning experiences. Various digital tools, such as Duolingo, allow teachers to tailor instruction to individual student needs, enhancing personalized learning. Bakar (2007) also emphasized the importance of structured tasks that promote independent learning, while personalized learning tools empower students to focus on their specific learning needs and allow them to take responsibility for their learning progress (Reinders, 2011). These tools foster autonomy by helping students set their own learning goals and manage their time effectively. For instance, learning platforms can provide adaptive feedback based on individual performance, allowing students to set realistic and achievable goals and adjust their study plans accordingly (Mejeh et al., 2024).

Technology also fosters collaborative learning and peer interaction (Altinay, 2016). Online platforms like Google Classroom and collaborative tools enable students to work together on projects and assignments, facilitating peer learning and support. This aligns with Lee's (2006) findings on the benefits of online language exchange communities in promoting authentic communication and collaboration. The ability to collaborate with peers asynchronously or synchronously helps students develop skills in independent teamwork, which is another facet of autonomous learning. However, the ability to balance collaboration with self-regulation and individual learning remains a critical challenge that warrants further investigation.

Another crucial benefit of technology is the provision of immediate feedback, facilitated by learning apps and platforms, which supports students' continuous improvement. Tools like Grammarly and plagiarism checkers offer instant feedback on students' work, allowing students to make corrections and learn from their mistakes in real time. Van Campenhout et al. (2015) emphasized the importance of immediate feedback in language learning, noting that it enhances clarity and performance. This instant feedback also promotes self-regulation, helping students reflect on their learning, set goals, and improve independently. By developing metacognitive skills, students can manage their own learning process more effectively, which is essential for fostering learner autonomy (Pang, 2003).

In terms of the strategies teachers use to integrate technology into EFL instruction, the findings highlight the frequent use of interactive multimedia resources such as videos, simulations, and language learning apps to create engaging instructional materials. Interactive multimedia-rich environments, as Warschauer and Healey (1998) argued, play a key role in enhancing learner engagement and comprehension. Similarly, Golonka et al. (2014) underscore the effectiveness of interactive apps in language acquisition. These tools not only make learning more engaging but also allow students to learn at their own pace, contributing to a more autonomous learning experience.

In addition to multimedia resources, the use of online collaborative platforms, such as Google Classroom, promotes peer interaction and collaborative problem-solving, which are crucial for autonomous learning (Altinay, 2016). Lee's (2006) study also supports this, demonstrating how online communities facilitate communication. However, the ability to balance group work with independent learning activities remains an area that requires further exploration. Teachers also enable personalized learning pathways by tailoring instruction through adaptive learning platforms, which adjust to each student's proficiency level and learning pace (Bakar, 2007). These platforms provide personalized feedback and resources, encouraging students to take ownership of their learning journey. One specific area where technology has a direct impact on learner autonomy is in goal-setting (Nguyen et al. 2024; Tang et al., 2024). Digital platforms like Trello allow students to set learning objectives, monitor their progress, and reflect on their achievements, helping them take control of their learning. By supporting students in creating individualized learning plans, teachers help students build goal-setting and time management skills, both of which are crucial to autonomy (Ponomariovienė & Jakavonytė-Staškuvienė, 2024).

However, despite the benefits of technology in EFL instruction, the findings also reveal several technical challenges, such as inconsistent Wi-Fi and limited access to devices, which can hinder its full integration in the classroom. To address these issues, schools could encourage students to use their personal devices for learning, thereby minimizing the need for school-provided technology. For students who lack personal devices, schools could establish lending programs or provide access to shared devices during class hours. Additionally, policymakers could focus on improving technological infrastructure in schools by ensuring reliable internet access and providing subsidies for schools in under-resourced areas to acquire necessary tools. Partnerships with technology companies could also be explored to provide affordable or donated devices to students in need. Furthermore, ongoing professional development opportunities for teachers should be prioritized, ensuring they are kept up to date with the latest technological tools and pedagogical strategies. For example, training could include workshops on using learning management systems (LMS) to monitor student progress and offer tailored guidance, as well as sessions on implementing interactive multimedia resources to enhance student engagement.

The results of this study can be applied to various educational contexts and settings outside of the specific context of Indonesian high schools. The same technological tools and autonomy-promoting tactics, for instance, may be used at higher education institutions to help university students manage their study more independently. Technology could be utilized to encourage self-directed learning in adult education as it allows students to balance their studies with work and personal commitments.

The research findings are also applicable outside of Indonesia as the issue of enhancing learner autonomy through technology is relevant globally.

4. CONCLUSION

This study underscores the important role of technology in fostering autonomous learning in English as a foreign language (EFL) instruction in Indonesian high schools. Technology enhances access to learning materials, supports personalized and flexible learning, encourages collaboration through online platforms, and provides immediate feedback, all of which contribute to learner autonomy. Teachers employ strategies like using multimedia tools, online collaboration platforms, and timely feedback to support independent learning.

However, challenges such as limited infrastructure, inconsistent device access, and varying digital literacy levels hinder effective integration. Addressing these challenges requires investments in digital infrastructure, equitable device access, and professional development for teachers on using technology effectively.

The study's limitations include a small sample size and a focus on a specific region, which may not reflect Indonesia's diverse educational contexts, particularly differences between urban and rural schools. Relying solely on interviews, while offering detailed qualitative insights, may not capture the full range of experiences or broader trends.

Future research should include a larger, more diverse sample across urban and rural areas to explore regional differences in technology access and its impact on learning. Comparative studies could examine effective strategies in different contexts, and mixed-methods research could provide a more comprehensive understanding of technology's role. Longitudinal studies would also help assess the long-term effects of technology integration on EFL teaching and learning outcomes.

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