

A Systematic Examination of Digital Technology Integration in English Language Teaching at Vocational High Schools: Challenges and Opportunities

Rahmaniar

niarmahmuddin@gmail.com

SMK Negeri 2 Polewali

Zulkifli Surahmat

zulkiflisurahmat9@gmail.com

IAI DDI Sidenreng Rappang

Emelia Fitri Limchio Sinaga

limchio84@gmail.com

UPT SPF SMP Negeri 2 Makassar

ABSTRACT

The use of various technologies in vocational high schools in response to the need for graduates to have digital and English skills have changed English instruction even more. This study attempts to analyze the issues and the possibilities that both educators and learners face as they use digital technologies in English teaching. This study is limited to five English teachers in vocational high schools in West Sulawesi, Indonesia. This case study employed qualitative methodology through in-depth interviews and ATLAS.ti 24 software was used for data analysis. Findings showed that the teachers face several issues including the lack of technology, poor and unreliable internet, limited assistance, and different amounts of digital skills students have. Nevertheless, the study also showed that teachers' use of different digital technologies and more varied methods of teaching English motivated students to become involved and participate in English learning more than they have in the past. In addition to this, more skilled teachers are better able to adapt their material to fit vocational contexts and therefore increase relevancy to students' future workplace outcomes, as this study has shown. The study adds to the knowledge base by showing that the successful application of digital technologies in vocational English education is not only a question of existing digital technologies and infrastructure, but also of ongoing professional digital pedagogical training and educational organizational support. The authors of the study are suggesting that digital infrastructures are available, that there are ongoing training efforts, and that there is a balanced provision of digital tools and resources for educators. These steps are required to take full advantage of digital technologies for teaching and learning English in vocational secondary education.

Keywords: Digital Technology; Vocational High Schools; English Teaching

INTRODUCTION

Digital technology's permeation across multiple sectors has brought about changes to educational models from all around the world. With the introduction of more interactive and technology-based approaches to the classroom, educators have had to adjust their teaching models to fit with this innovation rather than the traditional models of teaching (Qureshi et al, 2011). As a conglomeration of academic theory, practical competencies and work readiness, the learning and teaching of students in vocational high schools has had to adjust with the digital transformation the world is undergoing. With regards to the global marketplace, vocational graduates who need to gain work and career mobility have to demonstrate proficiency in the English language and digital skills (Latsha, 2022).

In Indonesia, vocational high schools (Sekolah Menengah Kejuruan / SMK) have essential roles in integrating students into specific sectors of the economy (Rahmawati, 2025). However, the lack of digitally skilled workers is a challenge the country is facing. databoks.co.id indicates a skills gap to be present as only 19% of Indonesia's workforce in 2021 were reported as digitally skilled. This has potential consequences for the country's competitiveness in the digital economy. This gap in the workforce skills highlights the need for improvements regarding English language vocational education.

Of all the skills vocational students need, perhaps the most important is English language proficiency, because it improves the ability to get jobs, participate in global information flows, and advance in the world of work in various technical professions (Sopandi, Arifin, & Mulyanto, 2021). Nonetheless, English language skills of vocational high school students in Indonesia are still very low, in part because of very little exposure to authentic language, limited resources, and learning opportunities. The use of digital technology in English language teaching may address the problem since it provides opportunities for interactive technology-based personalized learning in a variety of contexts and addresses students' vocational learning needs.

There are more obstacles than advantages in the use of digital technology for English teaching, and previous research has documented them in considerable detail, including lack of digital resources, unstable connectivity, and low digital skills of teachers and students (Al-Habsi, Al-Busaidi, and Al-Issa, 2022). Furthermore, the constant change in technology forces teachers to modify their teaching approaches to keep their pedagogical and technological skills up to date in order to engage students.

Thus far, there appears to be minimal research conducted within the nexus of technology and teaching English within the context of Indonesian vocational education in Indonesian higher education. However, there is research examining the use of technology in education within the broader higher education context (Puspaningrum, 2021). It is in these informational voids within existing literature

that this research aims to offer insights that are of value, grounded in the lived experiences of educators in the context of vocational education within a less economically developed region, and which may potentially influence policy, professional development of educators, and future research on the integration of technology in vocational education. Indeed, for many English language educators these tools, though researched, are still underutilized. For this reason, this research aims to meticulously document both the challenges and opportunities surrounding the use of technology in English language education in vocational education within South Sulawesi specifically, to adapt the informed theory to this context.

LITERATURE REVIEW

The Role and Benefits of Digital Technology in English Language Teaching

An in-depth understanding of pedagogy is fundamental in understanding how digital technology is seamlessly integrated into all aspects of English language teaching. This understanding also facilitates a more comprehensive approach to teaching English in a diverse range of settings. Technology redefines pedagogy and encourages students to go beyond classrooms. Technology allows learners to use authentic materials and resources available to them. Ventista (2023) explains how technology empowers learners to engage in self-directed, creative, and iterative activities as teachers demonstrate and use technology to foster language skills. They are guides who show learners how to navigate the digital landscape.

Facilitating active learners is what digital technology in ELT does best. Digital Technology is the best solution to the problems of passive learners as it facilitates real-time language activities in and outside the lesson. Language learners can engage in and have real-time conversations to practice their target language. Almayez and Kaur (2025) express the importance of Real-time language integrated communication as it provides the language learner with immediate feedback and allows them to continue the conversation without the constraints of the lesson. Language learners can also write in real-time and have their written language activities feedbacked instantly. And language learning software also provides adaptive feedback as a learner progresses through their target language. Technology in language learning also increases the opportunity of collaborating with other learners which in turn to increases their proficiency in the language. Digital Technology is the best tool for differentiating instruction as it provides opportunities to learners with different skills and different learning preferences. This is also true for learners with different learning speeds as technology is also the best means of accommodating learning for self-directed learners. This is what Rahmaniar et al. (2023) refer to as differentiated instruction. Rahmaniar reflects on technology in the differentiated instruction and teaching English as a foreign language setting. This sets a strong foundation for teaching English while using technology. Technology is also used to bridge the gap of diverse learner needs in the EFL teaching frameworks. This technology is also used to bridge the gaps of diverse learner needs with EFL teaching frameworks. The use of technology

provides skills beyond the ability to employ the language in question. Digital technologies allow learners to develop the digital skills; the ability to work cooperatively; and the ability to think critically and solve problems, which are highly sought after in the modern world. This further substantiates the argument that use of technology is imperative in the process of teaching languages.

Pedagogical Transformation and Challenges in Technology-Enhanced Learning

The integration of digital technologies into education requires a departure from teacher-centered and transactional models of pedagogy to more interactive models of teaching and learning (Ding 2024). Ding argues that teacher-centered models of pedagogy are outmoded and inadequate to address the programming and teaching of English in situations where learners need to become active participants in the classroom and develop classroom communicative competence. Pedagogy that incorporates technology encourages learners to engage in experiential learning of a constructivist nature where collaboration and language use are authentic and addresses the teaching of language in a communicative model (Liu 2024).

The integration of technology in education also requires a shift in pedagogy which is not without challenges. Most teachers are expected to work with new technologies to which they have not been properly trained. Digital literacy differences among teachers and learners can result in the ineffective use of technology leading to digital and subsequent educational inequities (Cebi 2022). Restricted access to educational technologies continues to be a major obstacle in education. The challenges brought about by the integration of technology in education can be mitigated when teachers are provided with ongoing training and professional guidance. Fredy L. D & Iskandar A. 2025 note that educators who work with technology in a pedagogical framework are more likely to develop higher order thinking skills and engage learners in creative and purposeful communication.

English Language Teaching in Vocational High Schools

Vocational high schools are geared toward teaching students skills that can be used in the workforce in combination with the skills needed for lifelong learning. In this way, students are coached in English for professional use as this improves the students' capabilities in acquiring jobs, communicating effectively in the workplace, and broadening the careers that can be pursued () issue. With the globalized workforce, vocational students are required to possess English proficiency in addition to other skills for the modern workplace. An aspects of the global workforce. Students are required, in most cases, to be able to speak English and use modern technologies for the workplace. In Indonesia, the Implementation of Vocational Education and Training is based on the National Education System Law Number 20 of 2003, Article 15 that underscores the preparatory implication for work in specific areas. Therefore, English Instruction in vocational high schools should be a direct function of the occupation and the industry. However, there are

a number of frustrations for students in these vocational streams with respect to competence in English and these are secondary to limited exposure, teaching materials that are poorly contextualized to the stream and the discipline, and lack of motivation. The use of digital technology can help bridge the gap, especially if learners can use industry-specific learning materials and work simulations. With the use of technology in teaching, vocational students can gain the English skills that are required in the workplace.

English for Specific Purposes (ESP) and Digital Pedagogical Models

English for Specific Purposes (ESP) is considered one of the most effective methodologies for teaching English with respect to vocational and professional settings. ESP is personalized toward students' needs and goals as well as their area of profession. Wu, Liao, and DeBacker (2016) argue that teaching ESP is particularly valuable in motivating learners for and preparing them for the workplace as it combines language skills with knowledge of particular fields. The use of digital technologies in ESP pedagogy makes it even more effective. Digital technologies facilitate the design of task-based activities, simulated and project-based learning which accurately portrays real world professional activities. For example, vocational students are properly equipped to take part in role-playing, simulated virtual workplaces, and peer collaborated projects on the web. Nguyen (2017) insists that the fusion of contemporary teaching methods with the principles of ESP pedagogy makes it possible to achieve satisfactory outcomes in learning that are aligned with the vocational skills required in the industry.

The impact of technology integrated ESP pedagogy on vocational learners is also positive, as several scholars have documented. Busran (2025) notes that digital game-based learning motivates and engages students while progressively building their English vocabulary. These findings reflect the fact that technology enhanced pedagogy fosters meaningful learning and joy in the process of learning for the ESP vocational learners. Digital technology has been shown to impact the teaching of English and its integration into various educational systems, such as English teaching in vocational high schools. With technology, students can be more engaged, lessons can be tailored to meet the needs of an individual, and the students learn the language that is relevant to their field of study. Since technology is this beneficial, it begs the question of what systems are in place to effectively make use of technology in the classroom. These systems include educational structure, teacher training, availability of the relevant technology, and administrative buy-in and encouragement.

To some extent there has been some research that speaks to the impacts, both positive and negative, of technology in the classroom. However there is little research into technology and English teaching, and in particular, English teaching for specific purposes (ESP) and English teaching in vocational schools, particularly in the developing world. There are gaps in context responsive research that takes into consideration the teacher's point of view that informs their classroom practice.

Closing these gaps is necessary to help inform educational technology policies, curricula, and teacher training practices targeted at improving the integration of technology in the teaching of English in vocational education.

METHOD

Design and Sample

This study employed a qualitative research design to describe and interpret human and social phenomena, particularly from the perspectives of participants within the educational context. Qualitative research allows researchers to explore and understand the meanings individuals or groups assign to social or educational issues (Creswell, 2009). This approach was considered appropriate for this study as it aimed to investigate the challenges and opportunities in the implementation of digital technologies in English language teaching. The study was conducted in several vocational high schools in West Sulawesi, Indonesia, that have begun integrating digital technologies into English instruction. The participants of this study consisted of English teachers and vocational high school students who were directly involved in technology-based English learning. A purposive sampling technique was applied to select participants who met specific criteria relevant to the research objectives.

The teacher participants were required to (1) teach English in a vocational high school and (2) have experience in using digital technologies in their teaching practices. Based on these criteria, five English teachers from different vocational schools were selected. In addition, 20 students from various majors were included in the study. These students were also selected purposively, focusing on those who had experienced English learning through digital technologies. The inclusion of both teachers and students aimed to provide data triangulation and enhance the validity of the findings.

Instruments and Procedures

The primary instrument in this study was the researcher, who played a central role in collecting, interpreting, and analyzing the data. Supporting instruments included interview guidelines, observation checklists, and documentation sheets. These instruments were used to ensure systematic and comprehensive data collection. Data were collected using three main techniques: interviews, observations, and documentation. Semi-structured interviews were conducted with both teachers and students to explore their experiences, perceptions, and challenges related to the use of digital technologies in English teaching and learning. Each interview lasted approximately 30 to 45 minutes and was audio-recorded with participants' consent to ensure accuracy.

Classroom observations were carried out to examine teaching strategies, the integration of digital tools, and student engagement during the learning process. An

observation checklist was used to guide the process, and detailed field notes were recorded to capture relevant classroom interactions. In addition, documentation was collected in the form of lesson plans, syllabi, digital learning materials, and institutional policies related to technology use. These documents provided additional context and supported the data obtained from interviews and observations.

Data Analysis

The data were analyzed using a thematic analysis approach conducted systematically through multiple stages to ensure rigor, reliability, and transparency. First, all data from interviews, observations, and documentation were transcribed and organized. The researcher carefully reviewed each dataset to gain a comprehensive understanding of the content. Next, open coding was conducted using ATLAS.ti 24. Meaningful units of data, such as statements related to challenges, opportunities, and teaching strategies, were identified and assigned initial codes. This coding process was iterative, allowing the researcher to refine, merge, and reorganize codes as patterns emerged. For instance, similar codes such as “technical difficulties” and “infrastructure limitations” were grouped into broader categories representing technical and infrastructure challenges.

After coding, the data were categorized into themes. ATLAS.ti 24 was utilized to organize codes and visualize relationships through network displays, which facilitated the identification of main and supporting themes. These themes were then aligned with the research questions, particularly focusing on the challenges and opportunities of integrating digital technologies in English teaching. Throughout the analysis process, the researcher maintained analytical rigor by writing memos and reflective notes to document interpretations, decisions, and coding justifications. This practice helped ensure transparency and minimized potential bias (Creswell, 2007). Finally, data triangulation was conducted by comparing findings from interviews, observations, and documentation to confirm consistency and strengthen the credibility of the results. This comprehensive analysis ensured that the participants’ perspectives were accurately represented and that key issues and opportunities in digital technology integration were clearly identified.

RESULT AND DISCUSSION

The following results were derived from qualitative data analysis using ATLAS.ti 24, based on interviews with vocational English teachers in West Sulawesi Province. The findings are presented in two main themes: challenges and opportunities in integrating digital technology into English language teaching. Each theme includes direct quotations from participants to illustrate the findings, followed by a discussion linking the results to previous research and implications for practice.

Theme 1. Challenges in Applying Digital Technology in English Teaching

Data analysis using the Code-Document Table revealed that challenges can be categorized into three main areas: technical and infrastructure issues, student-related challenges, and teacher-related challenges.

Technical and Infrastructure Issues

Unstable internet connections and inadequate school infrastructure were the most frequently cited challenges. HR stated:

“I sometimes encounter technical issues such as connection disruptions or inadequate hardware, which interrupt my lesson plans.”

Similarly, NH highlighted the lack of local technical support:

“Sometimes I have difficulty using some platforms and I need technical support to discuss with, but I didn’t find it in my area.”

These findings are consistent with previous studies (Al-Habsi, Al-Busaidi, & Al-Issa, 2022; Salam, Wahdini, Surmiyati, Riyanti, & Suthathothon, 2023), which highlight that insufficient technological infrastructure continues to be a significant barrier to effective integration of digital tools in educational settings, particularly in remote or under-resourced areas. Unstable internet connectivity, limited access to adequate hardware, and a lack of technical support constrain both teachers and students from fully leveraging digital technologies for learning (Ganji, 2024 and Mustafa, 2024). Such limitations not only disrupt lesson delivery but also exacerbate existing educational inequalities, as students in well-resourced schools benefit disproportionately compared to their peers in less-equipped institutions. Addressing these issues requires a comprehensive approach that includes investing in reliable internet access, providing sufficient and up-to-date devices, and establishing robust technical support systems. By doing so, schools can ensure that technology integration is sustainable, equitable, and capable of enhancing both teaching effectiveness and student learning outcomes.

Student-Related Challenges

Teachers reported that students’ digital literacy and access to technology varied widely. ZS noted:

“Some students find it difficult to use the technology effectively, which slows down the lesson and requires extra guidance.”

Limited access to devices and software reflects the socio-economic disparities among students, consistent with findings from Rahmani et al. (2024), who observed that unequal digital access can exacerbate learning gaps. Integrating digital literacy into the curriculum and providing equitable resources are necessary to mitigate these challenges.

Teacher-Related Challenges

Teachers themselves faced challenges in aligning teaching materials with digital platforms, managing technology use, and receiving adequate technical support. BA commented:

“Sometimes I struggle to find the right materials, so I often have to create my own content to align with the curriculum and meet students' needs.”

These findings suggest that vocational English teachers require ongoing professional development and technical assistance to build confidence and competence in using digital tools effectively. This supports previous research indicating that teacher training is a key factor in successful technology integration (Shi, Y. R. (2025)).

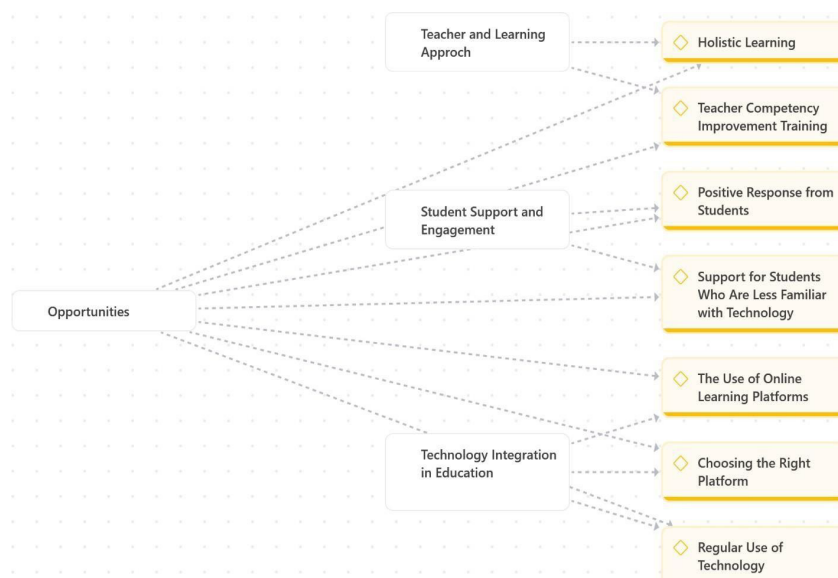


The table outlines three main areas of challenges: learning tools, students, and teachers. For learning tools, the primary issues are unstable internet connections and inadequate school infrastructure. Unstable internet and inadequate school infrastructure are major barriers to technology-enhanced learning, especially in remote areas. These issues limit participation in digital learning and worsen the digital divide. Addressing them requires investment in infrastructure, policy reforms, and partnerships with telecom providers to improve access. Therefore, school funding arrangements must take these factors into account for better education. Students face barriers such as insufficient access to needed infrastructure and tech utilization issues. The lacking access to devices and to certain types of software shows the socio-economic divide. The gap in fundamental digital competencies is another reason for disadvantage. Schools need to incorporate digital literacy into the function of the schools and equip schools with digital tech. Disadvantaged schools need to be first for tech equity.

Different from students, schools report teachers not having adequate levels of technical support, and insufficient control over technologies, in addition to the considerable task of coordinating educational content with educational technologies. Teachers encounter a structural absence of organizational skills to provide professional support. Schools have too little technical scaffolding to help teachers integrate new devices into their work. Educator technology integration is complicated by the absence of teaching learning materials that are designed to be used with digital technologies. Educators need continuous tech support as well as organizational skills of professional technical teaching for ease of mastery.

The barriers described by the participants of the study show the complexities of removing digital technologies from vocational English classrooms. The conclusions drawn from the foregoing are not different from earlier studies. Wu et al. 2016. Al-Habsi et al. 2022. These studies show that digital technologies cannot work for effective flexible learning in English unless digital equity, digital literacy, and continuous organizational technical pedagogy for teachers, is to be the goal.

Theme 2. Opportunities for Enhancing English Teaching with Digital Technology



The analysis revealed several opportunities for improving English language learning through digital technology, grouped into three categories: teaching and learning approaches, student support and engagement, and technology integration.

Teaching and Learning Approaches

Teachers reported that digital technology supports holistic learning and encourages innovative teaching strategies. HR shared:

“Using online platforms allows me to create interactive lessons that engage students more than traditional methods.”

Professional development programs focused on digital teaching competencies were also highlighted as a critical opportunity. As BA stated:

“Participating in digital literacy workshops has helped me integrate technology more effectively in my lessons.”

These findings are consistent with Salam et al. (2023), who emphasized that teacher training is crucial for maximizing the benefits of digital tools in language instruction.

Student Support and Engagement

Teachers observed that technology enhanced student engagement and provided avenues for personalized learning. ZS mentioned:

“Students enjoy using learning apps, and it motivates them to practice English outside the classroom.”

However, teachers also noted the need to support students less familiar with technology to prevent disparities in learning outcomes. This aligns with Rahmaniar et al. (2024), highlighting the importance of scaffolding for digitally inexperienced learners.

Technology Integration

Participants emphasized the strategic selection and regular use of digital platforms to enhance learning. NH commented:

“Choosing the right platform that aligns with the curriculum is crucial; otherwise, students may become distracted or the lesson loses its focus.”

This underscores that effective integration requires thoughtful planning and instructional alignment, echoing findings from Wu et al. (2016) and Nguyen (2017).

This study examined the challenges in integrating digital technologies in vocational English classrooms. Previous studies have identified challenges such as poor infrastructure, gaps in digital competencies, and even the absence of educational digital tools which have been cited as key challenges (Al-Habsi, Al-Busaidi and Al-Issa, 2022; SLAm, Wahdini, Surmiyati, Riyanti and Suthathothon, 2023). The ongoing interconnected study shows that the absence of teacher training makes it difficult, if not impossible, for the teachers to be able to guide the learners to achieve experiential, collaborative, and meaningful learning outcomes that the use of educational technologies provides (Liu, 2024; Li et al. 2025). As Costley (2014) states, it is the educational processes that have to be put in place to use digital technologies that make the tools pedagogically useful. Without systemic supports in place, the tools also become less useful since there is a risk of underutilizing the tools.

The attention given to the teacher, in the form of professional development and coaching, addresses the study’s concerns that relate to the alignment of the

curriculum with digital content. The findings support the focus given to teacher training in recent literature in which it has been established that teacher training and teacher competence have a positive and significant influence on the enhancement of technology integrated instruction, improved student engagement and improved learning outcomes (Ventista, 2023; Shi, 2025). Meeting the basic educational technology needs of students is also in line with Maslow's hierarchy of needs. Similar to the training for teachers, adequate training, the provision of sustained infrastructure, and dependable access to digital technology also reflects the hierarchy of needs with respect to educational technology stating that meaningful engagement of students depends on a prior fulfillment of basic access required for meaningful engagement.

This study also highlights the need for context-sensitive deployment of what has been termed as ESP-oriented vocational curriculum. Weaving together relevant digital resources and workplace-focused language tasks enables language teachers to advance learners' language proficiency while attending to their employability needs. This adds to the growing body of task-based and ESP model pedagogy literature (Wu et. al. 2016; Nguyen 2017). The findings also point to the fact that technology integration is of the highest utility when such integration is devoid of the piecemeal or cobbled- together approach.

From a policy point of view, there is an urgent need to remove the digital divide within the framework of the study by acting to ensure purposeful digital infrastructure, equal opportunity access, and training teachers to enhance their pedagogical skills. This has been posited in the literature as a critical area of investment to realize the potential of technology in education (Rahmaniar et al. 2024). For the future, it would be useful to study the long-range impact of technology- based English learning on vocational students' career pathways and digital skills to assess its impact and value over time, particularly in disparate urban and rural schooling contexts. Vocational education in Indonesia has an empirical vacuum which such work will remedy, and it will also provide a basis for helping to shape the purposeful, the evidence grounded, for technology in ESP models education curriculum.

CONCLUSION

Overcoming the problems posed by the incorporation of modern technology into vocational English classrooms should center on both the physical infrastructure as the Internet connectivity and the changing the digital skills of pupils and teachers required for target outcomes. On this level, teachers should receive digital pedagogy training focusing on the integration of technology into English lesson, preparing and implementing digitally- differentiated interactive activities- for various technology skill levels of the learners. Policymakers should also make sure that schools have adequate levels of reliable devices, programs, and training and support of policies that provide for continuous professional development of teachers and provide of digital education. For digital education to fully be

productive in target language for vocational education, participatory pedagogy should be incorporated in the use of selected educational technology in the English for Specific Purposes curriculum. There should be for less technologically proficient learners.

It would be advisable to carry out longitudinal studies in order to evaluate the lasting impacts that the use of digital technologies may have on students' English skills, digital competencies, and job marketability; attempt to make experimental or quasi-experimental comparisons involving various digital tools during the learning of English for specific purposes (ESP); analyze the effects of purposeful teacher professional development on teaching practices and students' performance; and consider the variations, in relation to infrastructure, students' digital competencies, and teachers' readiness, of rural and urban vocational high schools in order to design place-specific interventions. This set of research ideas will serve as the foundation for teachers and policymakers to formulate responsive, equitable, and sustainable technology-enhanced English-taught vocational high school programs.

REFERENCES

- Al-Habsi, T., Al-Busaidi, S., & Al-Issa, A. (2022). Integrating technology in English language teaching through a community of practice in the Sultanate of Oman: Implications for policy implementation. *Educational Research and Policy Practices*, 21, 43–68. <https://doi.org/10.1007/s10671-021-09291-z>
- Almayez, M. A., Al Khresheh, M. H., Al Qadri, A. H., & Alkhateeb, I. A. (2025). Motivation and English self-efficacy in online learning applications among Saudi EFL learners: Exploring the mediating role of self-regulated learning strategies. *Acta Psychologica*, 254, 104796. <https://doi.org/10.1016/j.actpsy.2025.104796>
- Antonietti, C., & Cattaneo, A. (2022). Can teachers' digital competence influence technology acceptance in vocational education? *Computers in Human Behavior*, 135, 107266. <https://doi.org/10.1016/j.chb.2022.107266>
- Bui, T. H. (2022). English teachers' integration of digital technologies in the classroom. *International Journal of Educational Research Open*, 3, 100204. <https://doi.org/10.1016/j.ijedro.2022.100204>
- Busran, N. S., Surahmat, Z., Rahmiani, R., Jamaliah, M. N., & Majid, A. R. (2025). The effect of digital game-based learning on English vocabulary acquisition in vocational high schools. *Al-Irsyad: Journal of Education Science*, 4(1), 61–72.
- Çebi, A., Bahçekapılı Özdemir, T., Reisoğlu, İ., & Çolak, C. (2022). From digital competences to technology integration: Re-formation of pre-service teachers' knowledge and understanding. *International Journal of Educational Research*, 113, 101965. <https://doi.org/10.1016/j.ijer.2022.101965>
- Creswell, J. W. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches* (3rd ed.). SAGE Publications.

- Departemen Pendidikan Nasional. (2003). *Undang-undang sistem pendidikan nasional*. Departemen Pendidikan Nasional.
- Ding, Y. (2024). Research on teaching practice of English for science and technology based on multimedia technology. *Procedia Computer Science*, 217, 79–86.
- Fredy, L. D., & Iskandar, A. (2025). Pedagogical mediation with ICT for the development of critical thinking: A study of instructional practices. *Thinking Skills and Creativity*, 58, 101123. <https://doi.org/10.1016/j.tsc.2025.101123>
- Ganji, M. F., Jafari Malvajerd, A., Moradi, A., Amanollahi, A., Ansari Moghaddam, A., & Basir Ghafouri, H. (2024). Teachers' and managers' experiences of virtual learning during the COVID-19 pandemic: A qualitative study. *Heliyon*, 10(2), e24118. <https://doi.org/10.1016/j.heliyon.2024.e24118>
- Kaur, P. (2023). Technology-assisted language learning adaptive systems: Trends and developments. In *Technology-assisted language learning adaptive systems* (pp. 41–67). <https://doi.org/10.1016/j.tall.2023.100030>
- Katadata. (2024). Ini talenta digital yang paling dibutuhkan di pasar kerja global. *Databoks*. <https://databoks.katadata.co.id/teknologi-telekomunikasi/statistik/daa47f0aee45277/ini-talenta-digital-yang-paling-dibutuhkan-di-pasar-kerja-global>
- Keengwe, J. (2018). Globalization, digital technology, and teacher education in the United States. In *Oxford research encyclopedia of education*.
- Latsha, A. (2022). Digital competencies and employability of vocational graduates in the global labor market. *Journal of Technical and Vocational Education*, 6(1), 15–29.
- Li, F. (2025). AI-enhanced curriculum design and deep learning instructional frameworks for personalized and adaptive instruction. In *AI-enhanced curriculum design and deep learning instructional frameworks* (pp. 1–21). <https://doi.org/10.1016/j.1550187625000125>
- Liu, Y., Thurston, A., & Ye, X. (2024). Technology-enhanced cooperative language learning: A systematic review. *International Journal of Educational Research*, 124, 102314. <https://doi.org/10.1016/j.ijer.2024.102314>
- Mustafa, F., Nguyen, H. T. M., & Gao, X. (2024). The challenges and solutions of technology integration in rural schools: A systematic literature review. *International Journal of Educational Research*, 126, 102380. <https://doi.org/10.1016/j.ijer.2024.102380>
- Nguyen, T. C. N. (2017). *Aligning English for specific purposes (ESP) curriculum with industry needs: Language practices for Vietnam's globalised workplaces* (Doctoral dissertation, Queensland University of Technology).
- Qureshi, M. I., Khan, N., Raza, H., Imran, A., & Ismail, F. (2021). Digital technologies in education 4.0: Does it enhance the effectiveness of learning? UniKL Business School.
- Rahmaniar, R., Surahmat, Z., Sardi, A., & Nurnaifah, I. I. (2024). Challenges and opportunities: A qualitative exploration of junior high school English language educators' perspectives on implementing differentiated instruction. *JELITA*, 5(1), 28–40. <https://doi.org/10.56185/jelita.v5i1.597>

- Rahmawati, S. (2025). Unpacking the digital competence challenge in vocational education: Implications for workforce readiness. *International Journal of Educational Research Open*, 3, 100204. <https://doi.org/10.1016/j.ijedro.2022.100204>
- Safira, L., & Azzahra, N. F. (2022). Meningkatkan kesiapan kerja lulusan SMK melalui perbaikan kurikulum bahasa Inggris. CIPS.
- Salam, U., Wahdini, Surmiyati, Y. S. R., Riyanti, D., & Suthathothon, P. (2023). Teachers' challenges and strategies in using digital media in teaching English. *Journal of English Language Teaching Innovations and Materials*, 5(1), 49–68.
- Shi, Y. R. (2025). Teacher professional development of digital pedagogy for inclusive education in the post-pandemic era: Effects on teacher competence, self-efficacy, and work well-being. *Teaching and Teacher Education*, 112, 104910. <https://doi.org/10.1016/j.tate.2022.104910>
- Sopandi, A., Arifin, D., & Mulyanto, A. (2021). Implementation of strategic management in increasing the absorbability of vocational school graduates in the world of work. *Journal of Islamicate Studies*, 4(2), 94–106. <https://doi.org/10.32506/jois.v4i2.736>
- Ventista, O. M. (2023). Teachers' professional learning and its impact on students' learning outcomes in digital environments. *Computers & Education*, 189, 104607. <https://doi.org/10.1016/j.compedu.2022.104607>
- Wu, X., Liao, L., & DeBacker, T. K. (2016). Implementing task-based instruction in ESP class: An empirical study in marine engineering English. *Journal of Language Teaching and Research*, 7(5), 936. <https://doi.org/10.17507/jltr.0705.14>