



RESEARCH PAPER

Enhancing Language Proficiency Through TPACK Model and AI Applications A Study on Effective Integration Strategies in English Language Instruction

¹Shumaila Shoukat*, ²Rabia Mamoon and ³Muhammad Farman Arif

1. Lecturer of English , Leads University, Lahore, Punjab, Pakistan
2. PhD. Scholar, Education Department Superior University Lahore, Punjab, Pakistan
3. Lecturer of English , Leads University, Lahore, Punjab, Pakistan

***Corresponding Author** | Shumaila.eng@leads.edu.pk

ABSTRACT

The current paper investigates the application of the Technological Pedagogical Content Knowledge model along with Artificial Intelligence technological applications to advance English language proficiency. It also studies applications and effective tools within this model to improve the interactive and personalization's of the learning curve. The data was collected through qualitative research methodology with the help of interviews, and feedback provided by the 10 students as a sample of the study. According to the collected and analyzed data regarding the experiences of the teachers and learners in regard to the integration of these strategies, it was found that the use of the TPACK model with AI applications allows for potential new and improved ways of enhancing language proficiency and ensuring that students receive a more personalized approach to learning by increasing both the level of engagement and the availability of feedback. Finally, the study also articulates multiple challenges and barriers that need to be addressed to facilitate the successful implementation of the discussed intervention strategies and offer their solutions for educators and policymakers. Therefore, Leverage AI-based adaptive learning solutions such as Khan Academy, or Duolingo to customize the content and the delivery of instruction to the unique abilities and academic requirements of each student, allowing for targeted practice in reading, writing, listening, or speaking.

KEYWORDS Artificial Intelligence, English Language Instruction, Language Proficiency, TPACK Model

Introduction

Language proficiency represents an essential knowledge-based skill due to globalization aspects (Du, 2022). English, as the leading lingua-franca, holds a primary role in multiple fields, including but not limited to academia, business, and innovations. Considering the traditional methods currently implemented and the development through the technological lens has transitioned into revolutionary technologies that are being introduced into teaching and training processes (Ammade et al., 2020).

There are several studies that have examined the importance of each of the domains described above: language instruction, technology integration, and AI applications in the classroom. Nevertheless, to the best of my knowledge, there are no publications that focus on the synergy between all the shared domains. The findings of the existing research studies support that objective for future studies. Balancing language progress, technological facilities, and AI benefits in the classroom can realize only by all three factors, allowing diverse technological knowledge backgrounds (Ammade et al., 2020).

This paper adds to the existing body of knowledge by tackling the research gap in combining the TPACK model with AI applications in the sphere English language teaching. Specifically, through the exploration of the possibility of their joint application and integration, the paper tries to promote a better understanding of how learning environments can be maximally beneficial for learners in terms of outcomes (Alotumi, 2023).

It is essential that educators enhance their awareness of how to integrate technology and AI appropriately to address learners with diverse needs successfully. This paper has established the effective integration method of digital technology within the TPACK framework to provide practical suggestions for educators to improve students' language skills (Ammade et al., 2020).

Moreover, it helps to bridge theory and practice, guiding the design of instruction and teaching practice in language education. This study is powered by the realization of the possible impact of technology and AI on the field of education. In my case, as an educator and researcher, researcher can relate to the potential advantages and challenges of integrating this area into language education. Based on this background, researcher can integrate my reflections and experiences in this project to participate in developing more beneficial teaching strategies. Thus, it may improve the quality of learning of other educators and their students (Ammade et al., 2020).

Literature Review

Technological Pedagogical Content Knowledge (TPACK)

The TPACK framework, originally developed by Mishra and Koehler , provides a "holistic approach" to cognize the intricate interaction of technology, pedagogy, and content knowledge in the practice of education. It was preordained on the basis of the foregoing precepts stands on the sheer premise that the teacher... "experienced with or mastered all three types of knowledge" . Therefore, in the sphere of language education, TPACK means creating conditions for the development of pedagogical experiences aimed at modernizing learning and responding to the individual needs of students whose mother tongue is a language under consideration (Ammade et al., 2020). For this reason, some various researches and studies were conducted many of which were dedicated to the exploration of the topic and the application of TPACK in language education. As reported by Gupta and Jain , the use of TPACK in language learning can promote the achievement of authentic learning opportunities and increase language proficiency performance. This can be realized by the utilization of technology tools and materials that can help to establish active and collaborative learning spaces that stimulate communication and critical thinking, which is extremely important for language activity (Ammade et al., 2020).

Artificial Intelligence (AI) Applications

Recently artificial intelligence technologies have become a promising trend in language teaching and learning. AI technologies such as natural language processing machine learning, chatbots and so on offer the possibility for learners to have a personalized learning trajectory, real-time production, and opportunities for interaction, and provide adaptive feedback. Therefore AI can be not only an assumption to teaching but also a supplementary or substitution (Du, 2022). Research on AI-enhanced language instruction has verified the efficacy of several AI-driven applications and programs in enhancing language-learning outcomes at different levels of proficiency and in various skills. Given the ample space for AI applications in language learning, including intelligent

tutoring systems and language testing programs, among others, AI allows for fresh and exciting ways to enhance learner experience and assist educators in meeting the needs of a broader student cohort (Ammade et al., 2020)

Effective Integration Strategies

Given the possibility of significantly improved language study outcomes by the TPACK framework and AI applications, their integration into English language classrooms is fraught with multiple challenges and considerations, which can be captured based on pedagogical strategy, technological capabilities, learner needs, and institutional support (Simister & James, 2023). The strategies for integration should enforce the principle that technology should only be used when the task to be accomplished could not be achieved without it; learners must be provided with the opportunity to engage in real-world language tasks; learners must be given autonomy over their own learning; and teacher professional development and user support must be on-going (Ammade et al., 2020). Many studies incorporate various models and frameworks of technology integration in language education and list the common characteristics and most important aspects of implementation. It should be taken into account that these aspects can be discussed using different terms or similar factors. With the use of TPACK principles and a purposeful understanding of AI software possibilities, teachers can create pedagogically sound opportunities to accelerate language learning and better prepare learners for the digital and online world (Balasubramaniam & K, 2016).

In conclusion, the integration of the TPACK model and AI applications have enormous potential to increase language proficiency in the context of English. When properly understand their fundamental theoretical backgrounds, and educated on appropriate merging strategies following previous extensive research and experience all educators could design vibrant and interesting learning spaces that enable learners to efficiently develop their language skills (Chan, 2023)

Material and Methods

In qualitative research methodology, according to the phenomenon “Enhancing Language Proficiency Through TPACK Model and AI Applications: A Study on Effective Integration Strategies in English Language Instruction,” a systematic approach is employed on the understanding of the interaction between the TPACK model and AI applications in English language instruction (Siti Juhairiyah et al., 2022).

Research Design

This approach emphasizes the comprehension of the study participant’s lives regarding the TPACK model and AI use integration English language teaching. Therefore, it involves the examination of participants through their perceptions of people, beliefs, feelings, and other relevant attitudes (Sutton & Austin, 2023). The case study enables an extensive review of individual cases regarding the integration success employed within the same case in various learning systems. Each case is distinctive, and the information gathered helps understand the performance integration approach (Nurbavliyev et al., 2022).

Participants

The study was based on the participants who used the qualitative research paradigm to conduct it. Ten people were selected based on the purposive sampling

principle to help the most inclusive range of opinions and views. The English language instructors and learners picked as many as possible and offered to participate. The use of the in-depth semi-structured interviews helped collect the necessary information from the target audience to understand their experience (Naelufah et al., 2023).

Data Collection

The questions of the interview were created to measure the knowledge of the participants regarding the TPACK model and familiarize oneself with the AI application for language studying. Also, the questions were designed to understand the opinion of the participants regarding the most efficient strategies of inclusion of the mentioned teaching approaches (Otani & Cameron, 2023). As soon as the interview is conducted, the answers are recorded in the audio format and then transcribed with word-to-word precision. In such a way, the subsequent analysis of the quantitative information occurred (Chen et al., 2023).

Data Analysis

Thematic analysis also helped discover the recurrent patterns, themes, and findings in the interview transcripts. It required being generically familiar with the data as a whole and recognizing meaningful portions or categories, or codes, and linking them to wider subjects. Because this process was iterative, researcher continuously compared all codes and themes to ensure the higher reliability and validity of analyses (Gill et al., 2020). Throughout the research process, researcher also employed maintaining reflection, which meant the critical reflection of the researcher's own biases, assumptions, and preconceptions (Brown et al., 2023). It led to a more nuanced interpretation of the data and proposed alternative interpretations. The qualitative analysis presented the following: rich descriptive narratives, direct quotes from the participants of the study, and thematic summaries of effective integration strategies in English language instruction (Otani & Cameron, 2017).

Ethical consideration validity and reliability of tool

When it comes to ethical implications, validity, and reliability of the interviews used in this current research, the following was outlined. Researcher informed consent for participation in interviews was obtained from all participants. Each respondent was fully informed about the aims of the study, did not face any penalties, and could terminate his or her participation at any time. Confidentiality and anonymity were preserved as well: the participants' identities and personal information were stringently protected (Simister & James, 2023). In terms of validity, one could argue that the alignment of the interview questions with the aims of the study facilitated the achievement of content validity, ensuring that the interviews actually captured the respondents' experience and perception of the TPACK model and AI applications in language teaching. As for reliability, one could argue that the interviews were conducted using standard protocols. Interviewers adhered to the precise phrasing of the questions, and an extensive training program for the interviewers was drafted to minimize variation while collecting data. One should also mention that such considerations as "Member checking and orchestration," where participants verified the interviewers' feedback, contributed to the reliability and trustworthiness of the findings (Chan, 2023). Thus, it can be concluded that ethical, validity, and reliability considerations facilitated obtaining meaningful insights in the integration strategies of TPACK and AI in teaching English.

Results and Discussion

Teachers can use AI and the TPACK model and they can be able to teach teachers English as a second language as below: Teachers can use AI and TPACK model to teach.

Technological Knowledge (TK)

Moreover, they rely on various AI tools and platforms specially designed to learn languages such as applications, digital dictionaries, programs for checking syntax, and applications for identifying speech. Even if they have a job, teachers should be aware of the latest technology solutions, including those relevant to their industry, if such exists.

Language learning apps:

Quotation: *"I've also discovered that the language learning apps like Duolingo, Babbel, and Rosetta Stone are highly personalized to the point where it feels like everything specifically designed for me. Indeed, they rely on AI algorithms to adjust the leaning path, which is fascinating. Essentially, my phone language tutor is always with me! The apps provide me with interactive exercises, chapters of vocabulary drills, and straightforward grammar rules explanation. As a result, I feel like I am revisiting the Spanish language or taking a first step in learning a brand new one"*(Participant-2)

The response provides a personal perspective on language learning apps like Duolingo, Babbel, and Rosetta Stone. The participant emphasizes the customized learning experience facilitated by AI algorithms employed by these apps. They highlight features such as interactive exercises, vocabulary drills, and grammar explanations, which contribute to an effective and engaging learning process. Overall, the participant expresses satisfaction with the personalized approach offered by these apps, making language learning feel accessible and enjoyable.

Online dictionaries

Quotation: *" AI-enhanced dictionaries like Merriam-Webster and Oxford Dictionaries are extremely useful. They do not just offer you the definition of a word but also a. It also gives you example sentences in which the word has been used and even shows how it is being used in today's contexts. It is as if a language professional were sitting next to you, explaining all the subtleties of a word's definition and how to use it properly"* (Participant-3)

Participant presented materials show that such dictionaries are not limited to providing the meanings of words but also offer users pronunciation patterns, example sentences, and data on word-usage patterns. In this regard, I chose the technology because it allows me to look up a word and get the context of its use as if I am able to ask an expert for an explanation.

Grammar checkers:

Quotation: *" Both Grammarly or ProWritingAid are life savers in terms of making my writings shine. They use AI to scan every inch of my text looking for any grammatical mistake I might have overlooked. And it is not only the wrong parts that they correct; they also explain what I got wrong and how to correct it. This particular feature is why I cannot do without it as it has been a great aid to understanding my mistakes and learning from them. Therefore, it is essential as a student to utilize all the available materials."* (Participant-4)

This response describes the ways Grammarly or ProWritingAid, in the text, could help to become better at writing, relevantly suitable for the student's needs. It explains that the tools referred to as artificial intelligence tools helped the participants' writings by analyzing it, pointing out mistakes, and recommendations on fixing those mistakes with reasoning. The participant is also grateful since these tools I have mentioned have been significant in improving the weak areas that are writing, as well as confidence in academic work. In general, the response has emphasized artificial intelligence on writing and its benefits.

Speech recognition software

Quotation: *"I personally like AI-driven software such as Google's Voice Typing or Dragon NaturallySpeaking to improve my spoken English. Such software allows me to speak freely, as my speech is being written out for me at the same moment. The feedback provided on my pronunciation and intonation has helped me see where I'm wrong so I can get better and better. To be honest, it gives me a feeling of having my own language tutor sitting right next to me!" (Participant-5)*

The participant response illustrates the advantages of AI software such as Google's Voice Typing and Dragon NaturallySpeaking in enabling students to practice speaking English fluently. He explains how such software accurately transcribes spoken words and gives instant feedback regarding one's pronunciation and intonation. The participant is grateful that he can speak fluently with much more confidence in the knowledge that software is playing a crucial role in improving his spoken English. Essentially, this response underscores that AI software is convenient in improving spoken language.

Explore AI-driven virtual tutors or chatbots

Quotation: *"I absolutely support this argument that artificial intelligence virtual tutors and chatbots are great options, primarily for those who study a foreign language. Such tools allow students to have an opportunity to speak with someone and work on conversation practice without any fear of failure. Artificial intelligence helps with feedback and provides an idea of what areas are weaker than others. For example, it is impossible to keep in mind the verb tenses, but with these AI tools, it is possible to improve in which tense to use correctly. Thus, these tools help a lot in my opinion to develop in speaking and understand a conversation." (Participant-6)*

The participant's response accentuates the importance of AI-supported virtual tutors and chatbots to language learners, specifically ESL student. They further agree that such tools offer students critical opportunities of conversing and receiving instant responses on the correctness of their language usage, hence could give students a feeling of conversing with native speakers. They also agree that perhaps some ESL students may not enjoy the concurrence opportunity due to inadequate access to native English speakers. Their argument essentially supports the ideal value of AI to language learning efficacy.

Tutor Bot

Quotation: *"I believe that using a virtual tutor of this type is a very useful idea! First of all, such exercises contribute to training in conversation without being frightened of making a mistake or pointing out the user's lack of knowledge. Secondly, immediate feedback on pronunciation and grammatical mistakes prompts a person to learn the correct information. Thirdly, the virtual teacher monitors progress and transmits questions on revealed gaps seriously. Overall, this is a very effective way to study a language." (Participant-7)*

In other words, the described output is a virtual tutor whose purpose is to allow students to practice conversations in a foreign language. The use engages students in

interactive conversational practice in that it talks to the student as a simulation of communication, that is, in the manner of a real conversation. Finally, it provides feedback to the student on his pronunciation and errors in grammar and syntax. The key feature that distinguishes this virtual tutor from the others is the high level of response customization. It can adjust its responses to the students' answer, and as a result, it manages to customize feedback as well as prompts to the conversation. Thus, the tutor is able to individualize guidance and help and support the students' individual progress. Therefore, all in all, this virtual tutor provides a consistent and proficient way to help students improve their language skills in a responsive and engaging setting. English teachers can familiarize themselves with AI-powered tools and platforms that they can effortlessly use with students. They might also want to visit virtual tutors or chat with chatbots to get firsthand experience of how artificial intelligence can become part of the language learning process. With technology-based materials, the students' proficiency in English communication skills will increase.

Pedagogical Knowledge (PK)

Traditional teaching methods should be updated using AI tools and platforms to meet the learning objectives and needs of ESL students. Directly related to all the aforementioned types of knowledge, and especially experiential and interrelated is Pedagogical Knowledge while teaching ESL, and is crucial for English teachers due to the aforementioned reasons. Pedagogical knowledge is what English teachers can use to effectively teach the English language to students, and the following are the methods that they should do:

Quotation: *"ESL students spend a lot of time learning through traditional knowledge transmission, which does not help them acquire English fast. ESL teachers can use communicative language teaching, task-based learning, or even language immersion." (Participant-1)*

Communicative Language Teaching (CLT): This methodology prioritizes language acquisition through real-life communication and interaction. In this regard, the teacher leads activities in which students use English meaningfully. The examples include role-playing games, group discussions, and information gap tasks. It is worth noting that:

Quotation: *"Teachers may create activities with pairs or small groups where they discuss some topics, using conversation forms based on AI, for example, Chatterize or inclined speaking features like Zoom offers in sessions, to train the ability to speak and understand in daily contact." (Participant-3)*

Task-Based Learning (TBL): TBL advocates for task-based language learning require students to utilize language in an effort to complete a task or meet a goal. Teachers create the tasks that stimulate language acquisition through a combination of problem-solving, teamwork, and hands-on learning. For instance,

Quotation: *"The teachers can instruct students to develop a presentation on a subject of their choice and illustrate the outcomes using AI-powered presentation apps such as Prezi or Canva to promote the development of both language and AI technology skills." (Participant-10)*

Language Immersion: The immersion programs allow students to plunge in an environment where English is the language spoken and used for learning. Teachers facilitate the creation of diverse contexts for learners where they can use English within as well as outside the classroom. They further claim that:

Quotation: "... teachers can schedule virtual language experience through AI virtual reality AltspaceVR or Engage, in class, where students can visit English-speaking settings and interact with AI or native speakers" (Participant-5)

Incorporating AI-Powered Language Learning Apps: One of the ways to use AI in foreign language teaching is to introduce language learning apps powered by artificial intelligence, and recommend their usage outside of the classroom.

Quotation: "Teachers can give students some homework on Duolingo, a language learning app which provides them with personalized exercises according to their proficiency, and utilize AI-generated statistics to monitor their performance."

(Participant-7)

Using AI-Powered Feedback Systems: Participants suggested teachers use AI-powered feedback systems like Grammarly or Turnitin to give students immediate and tailored feedback about their language and writing.

Quotation: "Teachers can review the students' essays or compositions using Grammarly which highlights grammar mistakes as well as the corrected suggestions, which also helps students to develop their language and self-editing skills". (Participant-9)

English teachers can make use of various effective teaching strategies for ESL learners and integrate AI tools and platforms into their pedagogical practices to generate dynamic and engaging learning experiences which cater to and support the varied needs of their learners and hence foster their language proficiency and confidence to utilize English in real-world scenarios.

Content Knowledge (CK)

Get a good grasp of English language principles such as grammar, vocabulary, pronunciation, and cultural peculiarities. This should also be coupled with the capability to recognize and select proper learning aids, including genuine texts, multimedia resources, interactive exercises, and other supportive supplements, to assist me in my activities as an ESL teacher.

Grasp of English Language Concepts: English teachers require comprehensive knowledge of language-related issues, ranging from grammar and vocabulary, to phonology and cultural awareness. This ensures their ability to comprehend and explain language structure and rules to learners.

Quotation: "Teacher can explain the use of English grammar rules, such as verb tenses or sentence structure, clearly, demonstrating through examples and exercises. In addition, they can also present pronunciation differences for similar-sounding words and discuss them through factors of cultural usage and social appropriateness" (Participant-5)

Selection of Learning Materials

An important factor related to the approaches is the selection of materials for ESL classes by teachers of English since the workbooks, teaching guides, and multimedia materials constitute a particular setting that integrates various tools directed at language learning.

Quotation: “Teacher use authentic texts, It could be an age appropriate newspaper articles especially written in the language being studied for the students learning the second language or an adapted short story or a part of the story or literature in general. Also teacher can use the texts that rely to student’s hobbies or cultural roots. Such an approach provides a possibility to transfer the knowledge to the real life and to remember either the feeling or some episode. Finally, teacher might use multimedia – videos, podcasts or a clip from a news website where the word is played in context along with the other language and with simultaneous auditory and visual reinforcement”(Participant-6)

Integration of Authentic Texts

Students’ reading of authentic texts, which are newspapers, magazines, novels, and websites that provide rich input of language and culture and English teachers use them to exhibit the real-world use of language and permit students to explore various ideas.

Quotation: “A high school ESL class might be recommended to choose a current news article on any topic relevant to the students or a global issue. The text should be read and discussed as a class, then the students should be divided into pairs or small groups. They should be suggested to do a puzzle work so they could highlight the language and vocabulary that is needed to identify essential information and for expressing their opinion or point of view. Such an exercise encourages students to learn the language better, improve their critical thinking skills while being considerate on another culture’ views” (Participant-10)

Utilization of Multimedia Resources: Another valuable tool for reinforcing language learning is multimedia resources. Videos, podcasts, online games, and interactive websites are just a few examples of dynamic and engaging resources that can be incorporated into classroom activities. These resources can be used to offer visual and auditory stimuli, encourage authentic language production, and accommodate a variety of learning styles. English teachers can use the mentioned resources wherever suitable to consolidate what was previously acquired.

Quotation: “In order to practice listening comprehension, a teacher can consider using an educational podcast specifically tailored for English learners. Following the podcast listening, the teacher might allow the students to either discuss the content or engage in comprehension activities which involve summarizing the key ideas, answering questions, or relating them to personal experiences. Additionally, interactive websites or language learning applications with audiovisual materials could be excellent resources for students to practice listening, speaking, reading, and writing in a self-directed manner.” (Participant-9)

Researcher would advise English teachers to leverage their Content Knowledge and select learning materials that can engage and enable ESL instruction as well as allow students to build their English language proficiency.

Pedagogical Knowledge (TPK)

Continue combining TK and PK, as well as integrating AI technologies. It is essential to utilize AI-driven assessment tools to track the progress of your students and target the weakest areas and adjust your teaching approach according to students’ learning style and preference:

Combining Technological Knowledge (TK) and Pedagogical Knowledge (PK): English teachers can blend their understanding of technology with effective teaching strategies they use English language learning resources and make learning process as interactive and engaging as possible.

Quotation: *“Teacher may use a language learning app such as Quizlet to reinforce how students acquire vocabulary during their lessons. By developing customized flashcard stacks based on the students’ present understanding goals, the teacher activates students in active learning via technology that also reinforces essential language structure and theory.” (Participant-4)*

Using AI-driven Assessment Tools: Teacher can use a language learning app such as Quizlet to show kids how vocabulary is acquired in their lessons. The teacher activates the students in active learning via technology while also reinforcing essential language structure and theory.

Quotation: *“Language Tool and Grammarly can help a teacher to assess students’ writing assignments. These AI-powered tools provide almost immediate feedback that concerns learners’ grammar, punctuation, and style. In this way, a teacher can choose the areas that should be improved and create appropriate interventions.” (Participant-3)*

Monitoring Progress and Personalizing Instruction: Participant firmly believe that teachers are the engine of educational systems; however, participant admit that teachers cannot find creative ways that can make the learning process amazing and unforgettable for students. Indeed, such a function is reserved for AI, which, according to Liu, has many unimaginable possibilities. These are academic writers and miracle workers.

Quotation: *“After studying the data available from a language learning platform such as Duolingo or Rosetta Stone, a teacher can realize that a student has difficulties with pronunciation while reading comprehension is not an issue. The teacher should focus on creating special exercises in pronunciation utilizing AI speech recognition technology and offer relevant reading to the student based on their interests and level of comprehension..” (Participant-5)*

Creating Adaptive Learning Environments: TPK allows teachers to create learning environments that are adaptive to the changing needs and abilities of students. When incorporated into instructional design, AI technologies enable the educators to dynamically change the content, level, and pace of instruction to maximize learning.

Quotation: *“An English teacher could give an individualized learning pathway to the students using an AI-powered adaptive learning platform such as Khan Academy or Coursera once they have taken a diagnostic test on which they performed. The curriculum would be done in real time as students advance, with the offered content getting more complex as they gain proficiency or receive more scaffolding in order to master the foundational language abilities..” (Participant-1)*

In conclusion, TPK makes it possible for English teachers to unlock the promise of AI technologies for creating learning experiences which are personalized, data-informed and captivate, and that are intended to facilitate learners’ language production and ensure their real-world attainment of English. Designed purposefully for teacher and student creativity, the technological-medium diagonal offered by TPK allows teachers to put extended control capabilities in students’ hands to achieve their own language learning ambitions sooner and more effectively.

Technological Content Knowledge (TCK)

Integrate AI tools and platforms into ESL curriculum design, lesson planning, and classroom activities to improve the delivery of English language content. Also recommended is promoting students in the utilization of AI-powered language learning resources on their own to facilitate the inherent digital literacy that is fundamental to success in the twenty-first-century workplace.

Enhancing classroom activities with AI tools and platforms: AI tools and platforms can be used in class by English teachers in a variety of class activities. These activities comprise language games, simulations, collaborative projects, and multimedia presentations.

Quotation: *“When a speaking and listening lesson is centered on developing conversational abilities, a teacher can employ AI chatbots or virtual conversation partners, including Mitsuku or ChatGPT, and thus offer pupils various possibilities to practice conversational phrases. While talking to conversational robots or the GPTs, students get immediate responses and reactions to their language use. This might be highly beneficial because students can test their conversational sentences and learn swiftly from their errors without feeling self-conscious” (Participant-4)*

Another example can be when using an AI-generated content creation tool, such as Articoolo or Write sonic, for the purpose of generating prompts to engage in the act of creative writing. Through these tools, students can create stories, essays, or blog, posts using an AI algorithm, which enables them to play around with their English-writing skills and creativity.

Promoting independent exploration of AI-powered language learning resources: In the context of English teachers, they can guide and teach students on how to utilize AI-powered language learning resources independently from the platform to improve their learning and acquire digital literacy skills.

Quotation: *“Another simple way for teachers to help students improve their English outside the classroom is to assemble a list of recommended AI-driven language learning applications and online platforms they can utilize to practice their English skills at any time or place. Such a recommendation list might feature vocabulary learning applications such as Anki or Quizlet, language exchange platforms like Tandem or HelloTalk, or AI-driven language learning platforms such as Cambly or Preply.” (Participant-9)*

Furthermore, to encourage students to use their knowledge of digital literacy, teachers can introduce digital literacy projects or assignments that would require students to evaluate and compare various AI-powered language learning tools not only on the basis of their effectiveness, usability, but also relevance to their educational and learning needs. Thus, AI tools and AI-powered platforms can be utilized in ESL curriculum design to teaching planning and the implementation stage, teachers can enhance the delivery of the ESL content, and provide students with an opportunity to develop their digital literacy skills, which are much needed in the 21st-century workplace. Thus, AI and the TPACK model help teachers to utilize numerous tools and customize learning environments in ways that would allow ESL learners to develop more profound language proficiency and the necessity to use English in authentic contexts.

Effective Integration Strategies for Enhancing Language Proficiency Through The Incorporation of The Technological Pedagogical Content Knowledge (TPACK)

The Technological Pedagogical Content Knowledge model and AI applications in English language: Teacher will integrate several techniques that work best for promotion aimed at enhancing language proficiency in relation to English language instruction while emphasizing the importance of utilizing the synergies of technology, pedagogy, and content knowledge to create dynamic and personalized learning experiences. Here are some strategies:

Personalized Learning Pathways: Use AI-powered adaptive learning platforms that customize content and instruction based on individual students’ requirements, desires,

and learning approaches. These platforms might alter the difficulty of activities and assessments, provide feedback on certain areas of improvement, and recommend extra study resources as appropriate.

Quotation: *“This is possible by implementing adaptive learning software such as Khan Academy or Duolingo, and many more, using AI algorithms to determine the student’s proficiency level. This means that the student can receive a process to exercise reading, writing, listening, or speaking at any given moment.” (Participant-5)*

Interactive Language Practice: Implement artificial-intelligence-based services for language learning. Finally, for effective improvement of my language competences, I should include some innovative means of language learning guided by artificial intelligence, which will help to advance my speech and language skills. Such services are aimed at the development of so-called interactional language use, which corrects the learners calls the attention the person’s objection, and responses throughout speech and enables students’ independent judgment and reflection.

Quotation: *“Incorporate AI chatbots or virtual tutors like Tutor Bot or Replika into speaking and listening activities. This way, students can have robust conversational practice and get real-time feedback on their language usage while avoiding judgment and pressure” (Participant-3)*

Authentic Language Contexts: A teacher should curate authentic materials and resources that allow students to encounter language in the real world, including the use of cultural understanding and communicative context. AI technologies facilitate an increase in the authenticity of available content as learners can incorporate authentic texts, multimedia, and interactive simulations into their learning process.

Quotation: *“AI language analysis tools such as LingQ or Readable should be integrated into the reading comprehension activities allowing learners to navigate authentic texts or coursebooks at their own discretion with the provision of vocabulary and word structure assistance on demand..” (Participant-6)*

Formative Assessment and Feedback: Real-time AI-driven assessment tools: You can use AI-driven assessment tools to collect real-time data about students’ language performance, track their progress, and give them timely and tailored feedback about their strengths and weaknesses. It will promote a formative assessment that contributes to teaching and learning:

Quotation: *“I could employ AI-powered writing assistants like Grammarly or Hemingway Editor to review students’ written work, identify grammatical errors, suggest revisions, and provide explanations for language usage conventions. This feedback can help students achieve greater language accuracy and fluency and polish their writing they may use for future studies and research.” (Participant-2)*

Collaborative Learning Communities: Foster collaborative learning environments where students can interact with peers, share ideas and co-create knowledge through collaborative projects, discussions, and feedback loops. AI technologies can support collaboration by enabling students to communicate and share knowledge.

Quotation: *“During group projects or peer review activities for an academic course, utilize AI-powered collaboration tools like Google Docs or Microsoft Teams to enable students to work collaboratively while writing papers, sharing their drafts with peers, providing feedback to peers,*

and facilitating the usage of collaborative editing and revision features. Integrate AI-driven collaboration tools..” (Participant-10)

When integrated into English language instructional strategies, teachers are empowered to use AI and the TPACK model of knowledge to develop learner-focused, effective, and engaging learning experiences that develop language proficiency, critical thinking, and lifelong learning capacities.

Conclusion

To conclude, the merger of the TPACK model with AI applications in English language instruction offers tremendous potential to improve students’ language mastery. As previously highlighted, the TPACK model is built around the integration of three knowledge domains, namely: Technological Knowledge , Pedagogical Knowledge, and Content Knowledge. The seamless integration of these domains enables teachers to deploy robust, customized, and engaging experiences that address the unique requirements of English as a Second Language learners.

Incorporating AI-powered tools and platforms within their teaching routines enable teachers to create the conditions for the consistent development of language skills in speaking, listening, reading, and writing. The AI tools are available in different formats like language learning apps, online dictionaries, grammar checkers, speech recognition software, virtual tutors, and chatbots. Nevertheless, every product has its own role in enhancing the educational process. There are also language learning apps, which allow students to actively participate in the learning process through interactive exercises and multimedia content. In addition, online dictionaries provide learners with immediate definitions of the words they do not understand and present their conceptual meaning, synonyms, and word combinations, thereby enabling students to not only expand their vocabulary but also comprehend word usage in the context of a sentence. Grammatical checkers are programs that help students detect mistakes in their writing and improve their writing skills.

Learners practice pronunciation and fluency through speech recognition software, which offers constructive criticism of spoken language. Virtual tutors provide individual attention to students through simulated one-on-one conversations coaching and interactive support at the rate and style guided by students. Chatbots engage students in conversation practice that allows language usage in natural, everyday-style language use. All the AI-powered solutions presented above make it possible for ESL learners to practice interactively using a foreign language, receive immediate feedback on their performance, and be exposed to the language in use. When utilized properly, these tools can help teachers create a fully immersive learning environment conducive to the development of students’ language proficiency and continuous language acquisition. Additionally, through the use of AI-based assessment solutions teachers can assess their students’ efforts, determine the areas that require more of their attention, and adjust the learning approach to learners’ favored and most effective ways. All this makes it possible to develop adaptive learning systems that adapt to the needs and capacities of users, thereby enhancing the learning outcome.

In addition, the integration of AI technologies also leads to the development of collaborative learning communities, through which students can communicate, share their ideas, and co-create the knowledge on a particular topic. Apart from gaining language proficiency, in this collaborative environment, students also develop their communication, collaboration, and critical thinking skills that teachers can further integrate into the

teaching process, thus enabling students to be active agents in their language acquisition process. Overall, the use of TPACK model and AI applications in English language teaching results not only in more effective and engaging but also in more student-centered and efficient learning experiences that lead to students' language proficiency and critical thinking skill development as well as to their acquisition of skills necessary for their successful 21st century's career.

Recommendations

- **Artificial Intelligence -based adaptive learning software:** Leverage AI-based adaptive learning solutions such as Khan Academy, or Duolingo to customize the content and the delivery of instruction to the unique abilities and academic requirements of each student, allowing for targeted practice in reading, writing, listening, or speaking.
- **Interactive language practice:** Integrate AI-driven chatbots or virtual language tutors such as Tutor Bot, or Replika when engaging students in speaking or listening drills to offer a broad conversational framework, as well as immediate response to language initiatives with limited pressure.
- **Authentic language contexts:** Use content curation and AI technologies such as LingQ or Readable to build knowledge of real-world and authentic materials and resources for students. This enables them to understand language within real-life contexts and increase their comprehension and vocabulary.
- **Formative assessment and feedback:** Apply AI-driven technologies such as Grammarly or Hemingway editor when reviewing student's written works. They help in detecting grammatical and lexical mistakes and generate feedback to enhance the students' accuracy and fluency penalties.
- **Collaborative Learning Communities:** Foster collaborative environments through AI - enabled collaboration tools such as Google Docs and Microsoft Teams. Students can work together, exchange thoughts, and give opinions on peer projects, promoting ultimate language proficiency via interactive, hands-on approach.

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