PROBLEM-BASED LEARNING AND ARTIFICIAL INTELLIGENCE: NEW OPPORTUNITIES FOR EFL TEACHING

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ABSTRACT. The article describes how AI-powered tools such as conversational chatbots, intelligent tutoring systems, speech recognition software, adaptive learning platforms, and generative AI technologies can enhance problem-solving activities and facilitate language acquisition. A review of recent literature indicates that the integration of AI and PBL contributes to increased student engagement, improved communicative competence, enhanced learner autonomy, and the development of higher-order thinking skills. Furthermore, AI technologies provide personalized feedback, adaptive learning pathways, and authentic communication opportunities that support language development within problem-solving environments. The article also discusses challenges related to teacher preparedness, technological accessibility, ethical considerations, and the responsible use of AI in education. The findings suggest that AI-supported PBL can significantly improve the effectiveness of EFL instruction and prepare learners for participation in digitally mediated global communication environments.

Keywords: Problem-Based Learning, Artificial Intelligence, EFL Teaching, Language Learning, Critical Thinking, Learner Autonomy, Digital Pedagogy, Educational Technology, Communicative Competence.

Introduction

The twenty-first century has witnessed significant changes in educational paradigms due to rapid technological advancements, globalization, and evolving workforce demands. Modern educational systems increasingly emphasize the development of critical thinking, problem-solving, communication, collaboration, and digital literacy skills. Consequently, traditional teacher-centered approaches are gradually being replaced by learner-centered methodologies that promote active engagement and meaningful learning experiences.

In English as a Foreign Language (EFL) education, the need for innovative teaching approaches has become particularly important. Despite years of formal instruction, many learners struggle to use English effectively in real-life communication situations. Traditional language teaching methods often focus on grammar rules, vocabulary memorization, and textbook-based exercises, providing limited opportunities for authentic language use and communicative interaction. As a result, students frequently demonstrate insufficient communicative competence, low confidence, and limited ability to apply language knowledge in practical contexts.

Problem-Based Learning (PBL) has gained considerable attention as an instructional approach capable of addressing these challenges. PBL encourages learners to acquire knowledge and skills through the investigation and resolution of authentic, complex problems.

Rather than passively receiving information, students actively engage in inquiry, collaboration, critical thinking, and self-directed learning. Within EFL classrooms, PBL creates meaningful contexts for language use and promotes communicative competence through purposeful interaction.

Simultaneously, Artificial Intelligence (AI) has emerged as a transformative force in education. AI technologies have evolved from simple automated systems to sophisticated platforms capable of understanding natural language, providing personalized feedback, generating educational content, and supporting adaptive learning experiences. Applications such as ChatGPT, Duolingo Max, Google Gemini, ELSA Speak, and various intelligent tutoring systems have demonstrated substantial potential for enhancing language learning.

The convergence of PBL and AI represents a significant opportunity for language educators. While PBL provides authentic contexts for communication and problem-solving, AI offers personalized guidance, instant feedback, adaptive learning support, and access to extensive information resources. Together, these approaches create dynamic learning environments that foster both linguistic competence and twenty-first-century skills.

Literature Review

The rapid advancement of Artificial Intelligence (AI) has transformed educational practices worldwide, creating new opportunities for innovative and learner-centered language instruction. At the same time, Problem-Based Learning (PBL) has emerged as one of the most effective pedagogical approaches for developing critical thinking, collaboration, creativity, and autonomous learning skills. The integration of AI technologies with PBL offers a promising framework for English as a Foreign Language (EFL) teaching by combining authentic problem-solving activities with intelligent digital support. Problem-Based Learning originated in medical education during the 1960s through the work of Barrows and Tamblyn (1980). The approach is grounded in constructivist learning theory, which emphasizes that learners actively construct knowledge through interaction with their environment rather than passively receiving information from instructors.

Constructivist theorists such as Piaget and Vygotsky argue that meaningful learning occurs when individuals engage in authentic activities that require analysis, reflection, and social interaction. Within PBL environments, learners encounter complex problems that mirror real-world situations. These problems serve as catalysts for investigation, discussion, and knowledge construction.

According to Savery (2006), effective PBL environments contain several key characteristics:

- Learning is centered around authentic problems.
- Students assume responsibility for their learning.
- Teachers act as facilitators rather than knowledge transmitters.
- Collaborative learning is emphasized.
- Reflection and self-assessment are integral components.

Research consistently demonstrates that PBL contributes to the development of critical thinking, problem-solving abilities, collaborative skills, and learner autonomy.

The application of PBL in language education has gained increasing recognition over the past two decades. In EFL classrooms, PBL shifts the instructional focus from language forms to language use. Students engage in meaningful communication while investigating and solving problems relevant to their academic, social, or professional contexts.

Hmelo-Silver (2004) argues that PBL facilitates deeper learning because students actively process information, negotiate meaning, and apply knowledge in authentic situations. These characteristics align closely with communicative language teaching principles.

Several studies have demonstrated positive outcomes associated with PBL implementation in EFL contexts. Learners participating in PBL activities often exhibit:

- Improved speaking fluency.
- Enhanced vocabulary acquisition.
- Greater communicative confidence.
- Stronger collaboration skills.
- Increased motivation and engagement.

Furthermore, PBL encourages the integration of language skills, enabling learners to read, write, listen, and speak while working toward meaningful objectives.

Artificial Intelligence refers to computer systems capable of performing tasks traditionally associated with human intelligence, including learning, reasoning, decision-making, and language processing. Recent advances in machine learning and natural language processing have expanded the educational applications of AI significantly.

According to Holmes et al. (2019), AI technologies offer numerous benefits for educational environments, including personalization, adaptive instruction, automated assessment, and intelligent feedback systems.

In language education, AI applications include:

Conclusion

The integration of Problem-Based Learning and Artificial Intelligence represents a powerful innovation in EFL education. By combining authentic problem-solving experiences with intelligent technological support, educators can create highly engaging, learner-centered environments that promote both language acquisition and twenty-first-century competencies.

The literature suggests that AI-supported PBL enhances communicative competence, critical thinking, learner autonomy, collaboration, and motivation. AI technologies provide personalized feedback, adaptive learning pathways, and authentic communication opportunities that strengthen language learning outcomes.

However, successful implementation requires adequate teacher preparation, technological infrastructure, and ethical guidelines. AI should be viewed as a pedagogical partner that enriches learning experiences rather than replacing human interaction and instructional expertise.

As AI technologies continue to evolve, their integration into Problem-Based Learning environments is likely to become an increasingly important component of innovative EFL teaching practices. Future research should explore long-term impacts on language proficiency, learner autonomy, and digital literacy development across diverse educational settings.

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