A Meta-Analysis of the Effect of Interactive Technologies on Language Education

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ABSTRACT

With the enhancement of internet medium and development of science and technology, interactive technologies have gradually emerged in the field of language education. However, previous empirical studies and meta-analyses have focused on the impact of specific types of technologies. Therefore, this study aims to comprehensively synthesize the effect of overall interactive technologies on language education through meta-analysis. The results revealed that interactive technologies could exert a substantial influence on learning attitudes, self-efficacy, listening, reading, writing skills, vocabulary and grammar level, and overall learning outcomes. Additionally, numerous types of interactive technologies have demonstrated potential in language education, such as mobile apps, multimedia, technology-assisted tools, etc. In future research, educators should judiciously apply interactive technologies to different language educational processes according to their unique features, and researchers should expand their survey scope to ensure data validity.

KEYWORDS

Interactive Technologies, Language Education, Language Skills, Learning Outcomes, Meta-Analysis

INTRODUCTION

Definition of Interactive Technologies

Interactive technologies, via internet connection, establish digital interaction spaces. They excel at real-time user input and environmental sensing, vital for knowledge creation and engagement. Pifarré (2019) and Craft (2000) emphasized their role in bridging tech-human gaps. Interactive techs transformed learning environments, as per Säljö (1999). In language education, they offer authentic practice. They create simulated environments for learners to converse and collaborate, promoting fluency, accuracy, and cultural understanding. Educational research increasingly uses these techs to assess learner engagement with digital content and its impact on learning outcomes. Mercer et al.

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(2017) found that interactive techs enhanced language learning and creative dialogue in classrooms, fostering collaboration.

Backgrounds of Interactive Technologies Used in Language Education

Interactive technology-assisted education, compared to traditional face-to-face teaching in classrooms, can not only improve the efficiency of language learning but also enhance students' absorption and classroom participation (Means et al., 2009). With the continuous updates of information and communication technologies (ICTs), educators are gradually applying interactive technologies to improve language education, including online learning management systems (LMSs), online courses, more advanced applications of virtual reality, and augmented reality technologies (Zhou, 2023).

For interactive technologies, previous researchers have already demonstrated their positive impact on language education through various empirical studies. Interactive technologies could enhance language learners' learning attitudes (Karimova et al., 2023), motivation (Wei, 2023), self-efficacy (Dai et al., 2023), and achievements (Z. Wang, 2010). They could also improve students' listening (Mao, 2022), speaking (Dunn, 2012), reading (Shen, 2021), and writing skills (Y. Liang, 2021), as well as vocabulary (Rahimi et al., 2021) and grammar levels (R. Wang, 2022). Switching to another perspective, we could discover that different types of interactive technologies might exert a profound impact on language learning, such as flipped classroom models (C. Chen, 2015), games (Yan, 2019), and mobile applications (Tavassoli & Beyranvand, 2023). Though addressing positive potentials, the above studies cannot show us well-rounded results because they only focused on a specific aspect of language education or interactive technologies, thus we strongly need comprehensive meta-analysis tests to synthesize all the results.

However, the previous meta-analyses were also conducted considering the effect of certain types of interactive technologies on language education. The results of the meta-analysis by Means et al. (2009) indicated that individuals acquired better language skills under learning conditions based on online learning technologies. B. Chen et al. (2022) demonstrated through meta-analysis that language learners could achieve higher academic achievements and spark passion for language learning through immersive learning in interesting virtual spaces. On the contrary, based on Xie et al. (2021), some researchers believed that XR technology (an umbrella term encapsulating AR and VR) only had a significant impact on English language education and could not be applied to all languages. Additionally, rapidly introducing emerging technologies into language education often fails to achieve the goal of improving learning effectiveness, but instead could lead to a series of problems such as technological instability, safety risks, and physical discomfort for learners (J. Chen et al., 2022).

As a result, due to inconsistent meta-analysis results and the fact that many of them only focused on certain types of interactive technologies, it seems necessary to integrate interactive technologies to analyze their impact on language education. Therefore, by using meta-analysis testing, our study is dedicated to collecting, coding, and synthesizing previous studies and is designed to provide comprehensive and extensive quantitative research about interactive technologies in the field of language education.

Therefore, through the meta-analysis, this study aimed to answer these questions:

1. Do interactive technologies exert a great influence on language learners' learning attitudes, motivation, self-efficacy, and achievements?
2. Do interactive technologies improve learners' listening, speaking, reading, and writing skills, as well as vocabulary and grammar levels?
3. Do all types of interactive technologies, including flipped classroom models, games, mobile applications, multimedia, videos, interactive approaches, technology-assisted tools, and voice-assisted technologies, have positive impacts on language education?

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