

## CHAPTER II

### LITERATURE REVIEW

#### 2.1 Learner Experience in Using Gemini

Research on learner experiences in higher education has been ongoing for several decades, with higher education institutions striving to enhance learner success. However, the concept of "learner experience" as something to be researched and managed by institutions could be traced back to the marketization of higher education, which began during the neoliberal reforms of the 1980s. This commodification gradually transformed higher education from something abstract, intangible, and relational into a process that was "visible, measurable, and driven by instruments" (Furedi, 2010). Measuring learner experiences, the associated quality control, and institutional performance rankings became central to this shift. In the UK, the introduction of learner tuition fees and government policies that defined learners as customers in the 1990s further solidified this transformation (Bunce, Baird, & Jones, 2016). Since then, the idea of "learners as consumers" gained traction, and the focus on learner experience, conceptualized as a form of "customer experience," became increasingly prevalent, as did the importance of learner satisfaction surveys as a measure of this experience. This phenomenon spread alongside similar developments in many parts of the world, where changes in funding policies increasingly placed the financial burden of higher education on learners. In this context, offering a good learner experience meant providing high-quality education that was perceived as value for money (Staddon & Standish, 2012).

The concept of "learner experience" became increasingly relevant in research on the use of chatbot technology, such as Google Gemini, in English language learning. This research examined how learners experienced using the Gemini chatbot in the context of language learning, focusing on how this technology could support and enrich their learning experience. Within this framework, it could be seen that learner experience was not only about their perceptions of the value and quality of their education, which could be measured

through a learner satisfaction survey but also about how this experience related to their learning goals (Baird & Gordon, 2009). Waghorne suggested that what was meant by "learner experience" depended on the current understanding of the meaning and role of the university, as well as the university's priorities in supporting learners. From the learners' perspective, the most important elements of the learner experience were those related to their goals, namely academic success and personal development.

In this context, the use of chatbots like Gemini was seen as part of learners' journeys toward achieving these goals. As a technology designed to support learning processes, this chatbot functioned as a tool that enriched learners' learning experiences, both through direct interaction and broader support in their learning process. As Temple et al. (2014) explained, learner experience included their interactions with the institution, both in academic and non-academic contexts. The academic experience, which included learners' interactions with technology like chatbots, became a central element in understanding how learners learned and developed in higher education. Therefore, the Gemini chatbot was seen as an integral part of the "learning experience," defined by Shah and Richardson (2016) as "the learning experience of learners at an institution that enriched their learning regardless of the mode of education delivery".

This study also considered the diversity of learner experiences in using the Gemini chatbot, recognizing that learners had diverse backgrounds and identities that influenced how they learned and interacted with this technology. For example, the experience of an international learner learning in an additional language might have differed significantly from that of a local learner, and this needed to be considered in the analysis of their experience using the Gemini chatbot. As Ainley (2008) pointed out, "a unified learner experience could only be said to exist in the narrowest normative sense", highlighting the importance of considering diverse experiences in this research.

## 2.2 The Role of Chatbots in Language Learning

Chatbots, an innovative technology from AI, refer to computer programs with artificial intelligence capable of conducting audio or text conversations (Haristiani, 2019). Many websites focusing on information and messaging programs (e.g., universities, libraries, and museums) now feature online chatbots (Fryer, et al, 2020). According to (Fryer, et al 2020) chatbots are not a novel concept; they have existed for decades. In the early 2000s, (Coniam, 2004) evaluated two chatbots as potential language-learning companions. One of them, Dave, developed by the ALICE Artificial Intelligence Foundation, was described as an ideal personal tutor (Coniam, 2004). However, interactions with Dave highlighted several syntactical errors and communication disruptions, despite demonstrating some natural conversational techniques. The second chatbot examined by Coniam was Lucy. Lucy offered initial assistance, where errors made by L2 learners were manually corrected, enabling Lucy to occasionally suggest corrections for specific grammatical mistakes. Both the potential users and the chatbots themselves have undergone significant changes since these early efforts to develop chatbots for facilitating language learning.

Scholars have demonstrated the potential benefits of using chatbots in language learning. Research conducted by (Haristiani, 2019) indicates that chatbots hold great potential as language learning tools, both for self-study and as tutors for language practice. Furthermore, the study revealed that language learners are enthusiastic about using chatbots because they can be accessed anytime and anywhere. Learners found it more comfortable to learn a language through chatbots than through direct interaction with human tutors. A review study by (Huang, Hew, & Fryer, 2022) identified three key advantages of using chatbots for language learning: timeliness, ease of use, and personalization. The study also reported that chatbots help promote social presence among students through emotional, authentic, and coherent discourse.

The use of chatbots as learning assistants can be associated with several learning theories, such as constructivism, social constructivism, cognitive load

theory, and information processing theory. According to constructivist learning theory, learners can construct their own learning by actively engaging with new information and building their knowledge (Bruner, 1996). By offering personalized feedback and suggestions based on learners' needs and prior knowledge, chatbots can serve as assistants in the learning process. In terms of social constructivist learning, the role of social interaction and collaboration is crucial (Vygotsky, 1978). Chatbots can encourage social interaction by providing a conversational interface where learners can collaborate in a natural environment. On the other hand, cognitive load theory posits that, due to limited cognitive capacity, learning materials must be designed to balance the cognitive load on learners (Atkinson & Shiffrin, 1968). Therefore, as a combination of feedback delivery and conversational interface, chatbots can be beneficial tools for reducing unnecessary cognitive load while increasing the essential cognitive load necessary for enhancing effective learning, as claimed by cognitive load theory. Finally, information processing theory identifies several phases of learning until it becomes intake, which is the final version of learned knowledge (Simon, 1978). Chatbots can assist learners in this learning process by offering feedback and guidance tailored to the individual strengths, weaknesses, and learning styles of each learner.

### **2.3 Difficulties in Using AI Tools in English Language Learning**

Although AI's potential to transform education is clear, its implementation requires careful attention to possible drawbacks. This section explores these difficulties, divided into ethical, pedagogical, and technical aspects. Ethical considerations must be central to AI's role in education, focusing on potential issues. A major concern is bias, as AI algorithms may inherit and exacerbate existing prejudices from their training data, which could disadvantage diverse student populations (Abbas et al., 2023; McCardle, 2019). Addressing this requires ongoing efforts to identify and counteract biases, ensuring that AI serves to promote fairness rather than inequality. Additionally, the balance between personalized learning and student data privacy presents further ethical challenges. Effective data protection and clear communication are vital for building trust and preventing misuse (Wang, et al.,

2023). Moreover, the drive for efficiency through AI-driven assessments and customized learning paths must not diminish the essential role of educators. Finding the right balance between AI's capabilities and teacher autonomy, while preserving human interaction and creativity, is a key ethical consideration (Bittencourt et al., 2023; Pokriváková, 2022). Addressing these intertwined ethical issues is crucial for the responsible integration of AI in education, ensuring it enhances rather than diminishes the learning experience for all students.

From a pedagogical perspective, excessive reliance on personalized learning platforms could overshadow the irreplaceable human element that supports comprehensive development, critical thinking, and emotional guidance from educators (Rizvi, 2023). It is important to balance personalization with human interaction. Furthermore, while AI assessments are efficient, they may not always accurately reflect student understanding, especially for those with unconventional thinking styles (Abbas et al., 2023; Xu, 2020). Ensuring the validity and reliability of these assessments requires meticulous development and calibration. Additionally, the digital divide presents a significant challenge, exacerbating existing educational disparities (Papa & Jackson, 2021). Bridging this gap requires addressing infrastructure issues, resource inequalities, and digital literacy in various contexts to ensure that all students can benefit from AI-powered learning.

On the technical front, AI in education faces several hurdles. The lack of transparency in algorithms can undermine trust and obstruct understanding of decision-making processes, highlighting the need for improved explainability for ethical and pedagogical reasons (Xu, 2020). Although chatbots show potential for personalized support and feedback, their current limitations in providing nuanced content and effective assessments necessitate further development and investigation (Georgescu, 2018; Yang & Evans, 2019). Additionally, cultural and language barriers can pose extra challenges for international students, stressing the importance of culturally sensitive design and localization to ensure inclusive implementation (Wang, et al., 2023). These complex factors require a deeper exploration of AI's multifaceted impact on the motivation of EFL learners.

## 2.4 Gemini Features

Gemini, GenAI's most advanced tool, boasts a diverse array of features that distinguish it in the AI landscape. It excels in general capabilities across various modalities and demonstrates cutting-edge performance in understanding and reasoning across different domains (Team, et al., 2024)

One of Gemini's most remarkable features is its ability to handle different data types, such as text, images, audio, PDFs, and videos. This versatility allows Gemini to generate comprehensive answers that fit the context, making it valuable for various tasks and applications. Gemini is seen as a potential source of educational technology advancement and practical applications beyond its theoretical framework (Lee, Latif, Shi, & Zhai, 2023; Lee, et al., 2023). Unlike ChatGPT, Google Gemini is not confined to text-based tasks; it can process various inputs, including audio, visual, and video data, and generate output based on these inputs (Portakal, 2023; Koubaa et al., 2023).

The Gemini 1.0 Ultra model is notable for its exceptional performance across domains. Its multimodal capabilities are particularly beneficial for those with limited access to digital learning tools, allowing interaction with diverse and rich learning environments. Users can benefit from language learning, object recognition, responses supported by multiple input options, and engaging in real-time conversations on any topic (Nyaaba, 2023). Gemini excels in tasks such as text analysis, programming assistance, logical reasoning, reading comprehension, solving mathematical problems, and code generation. According to a Google report, Gemini is trained to mitigate the risks of generating harmful responses. The Google DeepMind Team has identified around twenty types of harmful cues and phrases, such as dangerous behavior suggestions, hate speech, security issues, and medical advice, ensuring that Gemini's responses are based on a dataset free from potentially harmful inputs and queries (Team et al., 2023).

Gemini, powered by GenAI, is a compelling AI model that excels at generating new content based on the input it receives. It can create various data



types, including text, code, and images, making it an excellent tool for creative tasks, content creation, and problem-solving. Unlike previous models trained on static datasets, Gemini can access Google Search to acquire and process real-world information (Portakal, 2023). This enables Gemini to tailor its responses to current events, ensuring they reflect the latest developments.

Gemini's ability to handle different communication tasks and styles is another noteworthy feature. It can adapt its responses to be informative, comprehensive, or even casual and engaging, depending on the need and situation. It also offers interactive simulations and learning environments, combining audio, video, image, and text to create immersive educational experiences that bring abstract concepts to life (Team et al., 2023). Among its competitors (such as Bing Chat, Claude 2.0, Ernie, and ChatGPT), Gemini stands out due to its ability to understand and interpret various input data, making it a powerful tool for personalized, accessible, and dynamic learning experiences. This adaptability necessitates innovative solutions in the educational landscape (Perera & Lankathilake, 2023). Furthermore, Gemini provides personalized feedback and explanations for various tasks and prompts (Saeidnia, 2023). It can analyze students' responses and offer tailored feedback, including explanations through visualized concepts, natural responses, and relevant examples.

Gemini uses its advanced understanding of language and logic for systematic assessment, offering efficient and consistent feedback and grading of coded and written assignments and tasks (Team et al., 2023). It benefits educators, learners, and professionals alike. For educators, Gemini can generate thought-provoking prompts and scenarios, encouraging students to think critically, analyze logically, develop hypotheses, and explore solutions. According to (Saeidna, 2023), Google Gemini facilitates knowledge exchange and communication across diverse learning communities, promoting a collaborative learning environment. This technology is designed to provide a contextualized conversational experience for personalized, accurate, and relevant responses in a user-friendly manner.

Gemini 1.5 Pro is trained to perform sophisticated reasoning tasks across different modalities. According to (Nyaaba, 2023), Gemini provides a more elaborate and informed view of scientific concepts than other large language models like ChatGPT. This enables Gemini to help understand complex, multidimensional, and evolving scientific theories, methods, approaches, and knowledge, aligning with the latest scientific understandings (Knight, 2023; Nyaaba, 2023). In learning and instruction, Gemini emphasizes systematic inquiry and evidence-based reasoning. This capability makes it versatile among competitors in providing clear and concise comparisons among various responses on subjects such as science, religion, and philosophy. It can break down experimental components and discuss research-based priorities and methodologies (Nyaaba, 2023).

Gemini 1.5 Pro is designed to handle problem-solving tasks involving larger blocks of code. As reported by the Google Team (Team et al., 2023), it can reason across 100,000 lines of code, providing helpful solutions, modifications, and explanations. Moreover, Gemini is the first model to outperform human experts in Massive Multitask Language Understanding (MMLU), a popular method for testing the knowledge and problem-solving abilities of AI models.



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