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# Internal and External Factors Shaping Motivation in AI-Based Language Education

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**Abstract:** *The rapid growth of AI has led to the integration of AI-powered educational tools, such as intelligent tutors and chatbots, enhancing student engagement through personalized learning experiences. These tools automate tasks like grading and feedback, adapt content to individual needs, and improve both motivation and academic performance. By addressing learning motivations, AI-based applications promote sustainable learning outcomes. Personal factors, such as arousal, beliefs, goals, and needs, significantly shape motivation, influencing both internal and external drivers. In foreign language learning, AI tools provide personalized feedback, interactive content, and real-time conversation opportunities to improve language acquisition, while AI-supported role-play exercises enhance fluency and pronunciation. Despite progress in AI-based education, a gap remains in understanding how various factors influence motivation within these tools. Existing literature lacks exploration of how factors like arousal, beliefs, goals, and needs shape motivation, particularly in AI-driven learning applications. This study aims to fill this gap by examining the internal and external factors that influence users' learning motivations in AI-based apps. Semi-structured interviews with 29 users were conducted, and data were analyzed descriptively, with key findings presented in tables and significant statements highlighted. The research results showed that both internal and external factors significantly influenced motivation. Participants were driven by the desire to improve their language skills, and the AI apps' personalized feedback and features like role-playing supported their motivation. Clear goals, the freedom to progress at their own pace, and a sense of competence were key motivators, while autonomy, competence, and relatedness were reinforced by the apps' positive feedback and tailored content.*

**Keywords:** *learning motivations, artificial intelligence, personal factors, AI-based learning apps.*

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## Introduction

The number of global artificial intelligence (AI) tool users is expected to rise significantly by 414.7 million (+131.91%) between 2024 and 2030, with AI-driven tools increasingly used in education, particularly in language learning. This swift growth of artificial intelligence has encouraged institutions to integrate digital technologies, including AI, to improve teaching and learning experiences. AI-powered educational tools, including intelligent tutors, chatbots, and machine learning algorithms, enhance student engagement by providing personalized learning experiences and insights. These tools automate tasks like grading and feedback while improving learning motivation processes. Expert systems and personalized learning systems further adapt content to individual needs, and AI-driven data visualization makes complex information more accessible. Especially chatbots, designed to interact through text, voice, or visuals, provide immediate feedback and personalized learning, while intelligent tutors use AI to adapt teaching methods and offer customized support, enhancing student engagement and academic performance.

Addressing users' learning motivations can lead to more enduring learning results when utilizing AI-based learning applications. Motivation is the internal force that drives individuals to pursue their goals and sustain their physical and psychological efforts. In the context of learning, highly motivated students are more engaged and likely to succeed. Motivation can be intrinsic, where the drive comes from personal satisfaction, or extrinsic, where external rewards influence the individual's efforts. Intrinsic motivation leads to sustained engagement and academic achievement, while extrinsic motivation may provide initial encouragement but can detract from skill development if relied on too heavily. As Eggen and Kauchak (1994) stated, personal factors such as arousal, beliefs, goals, and needs play a crucial role in shaping an individual's motivation to learn, much like internal and external motivation. These four factors are shaped by both internal and external influences, which in turn directly impact the learner's level of engagement and motivation. Arousal, beliefs, goals, and needs are key personal factors influencing learning motivation. Arousal is the physiological state that prepares individuals to respond to stimuli, and it fluctuates based on task difficulty, impacting motivation levels. Beliefs about one's abilities and outcomes, such as self-efficacy and attributions for success or failure, shape motivation by influencing how students approach tasks—goals, whether performance or mastery-oriented, guide behavior, persistence, and effort, influencing learning outcomes. Finally, needs such as achievement, belonging, and autonomy drive

students' motivation to engage in learning and persist in challenging tasks. The influence of personal factors on learning motivation emphasizes the need for personalized and responsive AI-driven educational approaches to enhance student engagement. AI-powered tools, such as chatbots, play a key role in boosting learning motivation by offering personalized feedback, emotional engagement, and real-time support. These tools not only promote positive emotions that increase motivation but also help students monitor and regulate their learning. Metacognitive feedback further strengthens learning motivation by encouraging students to reflect on their progress, leading to better engagement and improved academic outcomes. Nowadays, AI-driven tools are gaining traction in foreign language learning. These technologies deliver tailored feedback, engaging content, and live conversational opportunities, considerably boosting language acquisition. AI-supported role-play exercises enable learners to practice in realistic scenarios, enhancing both fluency and pronunciation.

Although initial research on this topic has been conducted, the direct link between motivation and AI-based education still requires further exploration. Recognizing the potential of AI technologies to inspire users and enhance their academic success can provide valuable insights for their practical use. When learning motivations are addressed, AI-based learning apps can lead to more sustainable and lasting outcomes. Despite some progress in studying the role of educational chatbots and their effect on learning motivation, a significant gap remains in understanding how various factors influence motivation within AI apps. A more holistic approach is needed to fully grasp the impact of AI on long-term learning. The current literature lacks research on the internal and external factors shaping users' motivation through the lens of dimensions such as arousal, beliefs, goals, and needs, particularly in AI-driven educational applications. This gap underscores the importance of the present study, which aims to address this crucial void and contribute to the understanding of AI's role in enhancing learning motivation. The study aims to explore the internal and external factors related to arousal, beliefs, goals, and needs that influence users' learning motivations in AI-based learning apps. Based on this aim, four research questions were formulated to investigate these factors in detail. A semi-structured interview method was employed with a sample of 29 users. The collected data were analyzed descriptively, with similar responses grouped together and presented in tables. Additionally, unique and significant statements were directly quoted for further insight.

## Literature review

### *AI applications used in education*

AI-powered educational tools enhance learning by increasing engagement and comprehension of entrepreneurial concepts (Zhu & Zhang, 2022). AI analyzes large datasets, offering insights into market trends, customer behaviors, and business strategies (Obschonka & Audretsch, 2020). It supports students through chatbots and personalized learning algorithms while automating tasks like grading and feedback. Additionally, AI uncovers patterns that inform educational strategies and policies. Many AI-driven tools are already successfully implemented in educational settings (Labadze et al., 2023).

Zhang & Aslan (2021) categorized AI applications into chatbots, expert systems, intelligent tutors, machine learning (ML), personalized learning systems, and visualization. Expert systems replicate expert decision-making using a knowledge base of accumulated experiences and rules. Effective expert systems are user-friendly, problem-specific, and capable of producing high-quality outputs while employing heuristics to assist decision-making (Gupta & Nagpal, 2020). Hwang et al. (2020a) found that expert systems adapted learning materials based on students' affective states, reducing math-related anxiety and cognitive load while improving learning outcomes. Machine learning, another AI application, is a data mining technique that clusters data using algorithms. It automates data analysis without human input, generating insights and predictions tailored to individual needs (August & Tsaima, 2021). With high-quality training data, ML supports accurate decision-making (Luan et al., 2020). Sanusi et al. (2023) highlighted the growing integration of ML in education, emphasizing the need for pedagogical strategies to teach it effectively. Personalized learning systems adapt instruction through natural language processing and learning analytics, offering tailored content, adaptive assessments, and personalized feedback (Katiyar et al., 2024). These systems enhance engagement, learning outcomes, and educational equity. Visualization, another AI application, converts raw data into graphical formats like charts and maps, improving data analysis and decision-making (Devineni, 2024). AI-enhanced visualization integrates ML and pattern recognition, enabling more efficient and accurate data interpretation.

The two AI applications examined in this study are chatbots and intelligent tutors. A chatbot, derived from "chat" and "robot," is software designed to interact with humans through natural language (Able-Kader & Woods, 2015). (Abdul-Kader & Woods, 2015) It engages users via text, voice, or visuals, offering assistance and answering queries (Barış, 2020). Early

chatbots were text-based, but modern versions incorporate STT (speech-to-text) and TTS (text-to-speech) technologies. These advancements enable immediate feedback and personalized content, making chatbots valuable in language education. Examples include Duolingo, which facilitates real-time conversations, and Eggbun, which provides vocabulary and sentence structure feedback. Other language-focused chatbots include Alexa, Google Assistant, and Cleverbot (Um et al., 2024). Kuhail et al. (2023) found that chatbots enhance student engagement by providing immediate feedback and personalized learning. Studente et al. (2020) similarly linked chatbot use to improved study engagement and peer interaction. If AI chatbots are designed for teaching, they are referred to as teacher-bots or T-bots (Pillai et al., 2023). T-bots function as virtual teaching assistants, organizing information, providing instant responses, and monitoring student learning (Popenici & Kerr, 2017). Pillai et al. (2023) found that students perceive T-bots as credible and reliable due to their quick and accurate feedback. Senior authorities noted that their interactive and personalized features attract students. The anthropomorphic qualities of T-bots create a human-like presence, but their monotonous voices and lack of empathy may sometimes lead to frustration.

The other key AI application in this study is Intelligent Tutoring Systems (ITS), which use artificial intelligence, including natural language processing and machine learning, to replicate human tutoring. ITS provides personalized support and feedback, adapting in real-time to students' progress and needs. Recent advancements in big data and machine learning have improved learning analytics, student modeling, and customized learning strategies (Chen, 2024). ITS functions by presenting information, assigning tasks, providing feedback, answering inquiries, and encouraging cognitive and motivational engagement. It analyzes student responses to build a multidimensional model of their psychological states, including knowledge, learning strategies, and motivation (Ma et al., 2014). Unlike traditional education, ITS offers interactive, dynamic learning experiences and continuously adjusts content based on student progress (Kumar et al., 2023). A major advantage of ITS is its flexibility, allowing students to learn anytime and anywhere, overcoming geographic and scheduling constraints. This is especially beneficial for students with disabilities, part-time learners, or those in remote areas (Tatum & Lenel, 2012). Karacı et al. (2018) found that students using ITS achieved higher academic performance than those relying on traditional methods.

***Personal factors influencing learning motivation in AI education***

According to Schiefele (1991), motivation is the driving force within an individual that impels them to pursue their goals, and it encompasses all processes that initiate, direct, and sustain both physical and psychological activities (Gerrig & Zimbardo, 2012). Guerin et al. (2011) defined motivation as the psychological process that provides purpose and direction to behavior, driving actions such as drinking water to quench thirst or reading a book to acquire knowledge. Learning motivation is the psychological force that drives students to engage in learning activities. Highly motivated students are more energized to learn, while those lacking motivation struggle to perform optimally. Therefore, increasing learning motivation is crucial for improving academic outcomes, as it is a key determinant of success (Gagné, 1985). Learning motivation is crucial for students as it helps raise awareness from the beginning to the end of the learning process, provides insights into each student's learning efforts, offers encouragement, guides student activities during learning, and reminds students that there is also room for play and rest in the learning journey (Faiz, 2012). Several factors influence a student's learning motivation. A key factor is the student's belief in their ability to succeed, as this significantly boosts motivation. Additionally, if a learning activity or course is perceived as beneficial, the student is likely to value it more and put in the effort to succeed. Moreover, when the teacher guiding the student is enthusiastic, energetic, and committed, it can further enhance the student's motivation. Not only does student-centered education play a role in increasing motivation, but a positive classroom environment also contributes to this process (Ergün et al., 2002). Motivation can be classified into two categories: intrinsic and extrinsic motivation. Intrinsic motivation comes from within an individual, driving them to achieve goals for personal satisfaction, while extrinsic motivation is influenced by external factors, where an individual is motivated to reach a goal based on outside rewards. In the context of learning, intrinsically motivated students study to understand the material and find learning valuable, whereas extrinsically motivated students may focus on studying for a test in order to earn a good grade (Eggen & Kauchak, 1994). Deci and Ryan (1985) describe intrinsically motivated behaviors as actions undertaken for their own sake, driven by the pleasure and satisfaction derived from performing them. These activities are carried out voluntarily, without the influence of external rewards or pressures. Conversely, extrinsic motivation involves behaviors driven by goals beyond the activity itself, serving as a means to achieve an external outcome. According to Gopalan et al. (2017), intrinsic motivation involves engaging in activities for personal satisfaction without expecting external

rewards, driven by factors like challenge and curiosity. It fosters a positive attitude, enhances academic achievement, and sustains long-term knowledge. In contrast, extrinsic motivation, driven by rewards or pressure, can boost initial engagement but may not support lasting learning. Over-reliance on rewards may shift focus away from skill mastery.

Like internal and external motivation, personal factors such as arousal, beliefs, goals, and needs, shaped by both internal and external conditions, significantly impact an individual's learning motivation and outcomes (Eggen & Kauchak, 1994). Arousal, referring to physiological readiness triggered by the sympathetic nervous system, manifests through heightened heart rate, increased blood pressure, and pupil dilation (Romanczyk & Gillis, 2006). This state varies based on task difficulty perception (Eggen & Kauchak, 1994). Insufficient arousal can lead to distraction, while excessive arousal may cause panic, both hindering learning. Therefore, maintaining an optimal arousal level is crucial for student performance. Beliefs, defined as propositional attitudes about the world (Schwitzgebel, 2021), also shape motivation. Motivational beliefs foster self-regulation and encompass self-efficacy, task value, goal orientation, control beliefs, and test anxiety (Pintrich & De Groot, 1990). According to Kong (2009), students' positive beliefs about their abilities enhance motivation. The incremental view of ability suggests that skills can improve with effort, yet students' self-confidence fluctuates with feedback. Attribution theory (Weiner, 2005) explains that students attribute successes or failures to factors like effort, task difficulty, or luck, influencing motivation. Teachers can help students develop constructive attributions to enhance their motivation. Goals, internal representations of desired outcomes, play a fundamental role in learning motivation (Locke et al., 1981). Students adopt various goal orientations, such as performance goals (excelling academically), mastery goals (understanding material), social responsibility, and social affiliation (Ames, 1992). Effective goal-setting, emphasizing short-term, specific, and subject-related goals, enhances motivation (Akbaba, 2006). Goals influence motivation through four mechanisms: directing focus, adjusting effort, fostering persistence, and guiding strategy use (Dörnyei, 2001). Needs, as fundamental requirements for survival and well-being (Maslow, 1943), also affect learning motivation. Anxiety reduction is vital since excessive anxiety disrupts attention and cognitive function, impairing academic performance (Eccles & Wigfield, 2002; Eysenck et al., 2007). Belongingness, or feeling accepted within the classroom, significantly enhances motivation (Goodenow, 1993). The need for achievement, associated with striving for excellence, influences academic performance, with higher achievement-oriented individuals performing better (McClelland,

1961). Strategies such as providing feedback, fostering competition, and rewarding effort can enhance motivation (Sardiman, 2000). Additionally, students with a strong need for achievement tend to embrace challenges, whereas those focused on failure avoidance often experience anxiety (Kong, 2009). Teachers can tailor their approach to support different student needs, thereby improving educational outcomes. Autonomy, the ability to control one's learning environment, enhances motivation when students are given responsibility (Akbaba, 2006). Lastly, approval from teachers and peers impacts motivation, as students seek validation through academic success (Panisoara et al., 2015). Understanding these personal factors underscores the importance of tailored, responsive teaching strategies, including AI-driven education, to enhance student motivation and performance.

Recent advancements in AI have led to the development of educational chatbots, which enhance learning motivation through personalized, interactive experiences. These chatbots engage learners by offering instant feedback, assistance, and instructional support (Kuhail et al., 2023). The effectiveness of AI education programs depends on their ability to evoke positive emotions, such as interest and curiosity, which improve motivation, retention, and problem-solving. Conversely, negative emotions like frustration and anxiety can hinder learning and lead to disengagement (Graesser & D'Mello, 2012). Feedback plays a crucial role in fostering motivation by supporting self-assessment, clarifying expectations, and detecting errors (Hattie & Timperley, 2007). Lee et al. (2022) found that AI-powered chatbots significantly improved student learning outcomes by providing immediate, personalized feedback, leading to increased academic performance and a more positive attitude toward education. This feedback, especially during post-class reviews, enhanced student engagement and motivation. Recent studies emphasize the importance of metacognitive feedback and emotional engagement in educational chatbots. Qu et al. (2022) demonstrated that users interacting with chatbots generally experienced more positive emotions, suggesting the design of chatbots with neutral and metacognitive elements fosters positive emotional interactions. Gkinko and Elbanna (2022) also noted that chatbots evoke positive emotions like excitement and enthusiasm, which signal engagement and satisfaction. However, they identified the need for further refinement in chatbot design to minimize confusion. Metacognitive feedback, which helps learners monitor and regulate their learning, is crucial for improving engagement and motivation. Karaoglan and Yilmaz (2022) showed that personalized metacognitive feedback boosts student engagement by encouraging active learning regulation, leading to better comprehension and recall.

### *AI based applications for language learning*

The number of global AI tool users in the 'AI Tool Users' segment is projected to increase by 414.7 million (+131.91%) between 2024 and 2030, reaching 729.11 million by 2030 (Statista, 2024a). AI is increasingly utilized in education and is expected to reach a market value of $53.11 billion by 2032. As AI continues to improve educational practices, it has attracted significant interest from investors in the education industry (Shahzad et al., 2024). One of the most popular areas for AI in education is language learning. AI language tools, preferred over face-to-face or online courses, are designed to offer interactive experiences. These tools, which include translation software, personalized tutoring systems, and language generation systems, use AI algorithms to enhance foreign language skills (Rebolledo & González, 2023). In recent years, AI has gained significant attention in English language teaching, providing tailored and flexible learning experiences. AI tools assist in language acquisition, communication, and learner feedback (Weng & Chiu, 2023). Language education programs primarily use AI technologies such as chatbots and intelligent tutoring systems. While tutoring systems provide real-time, personalized instruction, chatbots offer interactive, synchronous communication, empowering learners to control their educational experience. This engagement is a key factor in successful language learning outcomes (Winkler & Söllner, 2018). Research indicates that AI-based tools, which offer personalized feedback, gamified elements, and interactive content, enhance intrinsic motivation in learners. AI-powered language applications have shown to increase engagement and sustained interest in learning (Wang et al., 2024). Intrinsically motivated individuals engage in tasks for personal satisfaction, fostering creativity, engagement, and independence. Technology supports this motivation by offering interactive experiences that fulfil psychological needs. Online discussions boost confidence, team-based activities strengthen collaboration, and digital platforms reduce technical anxiety while enhancing self-efficacy (Mohamed et al., 2024). Role-play is a fundamental method in AI-driven language education, providing real-world practice and fostering critical thinking and collaboration. AI enhances role-play activities by offering personalized, interactive scenarios. For instance, AI-powered speaking apps allow students to practice situational dialogues, such as job interviews, improving linguistic skills like fluency and pronunciation (Darmawansah et al., 2025). Duolingo is one of the most recognized AI applications in language education, with 113 million monthly active users in 2024, leading the market in both downloads and revenue. In July 2024, Duolingo recorded over 14 million monthly downloads worldwide, while Lingutown and Buddy.ai had 1.98 million and 1.63 million, respectively.

Duolingo generated over 33 million USD in revenue during this period, with Babbel following with 5.4 million USD in revenue (Statista, 2024b). The Hazırlık Sınıfı (n.d.) platform, which has emerged as a popular educational resource in Turkey, highlights that language learning applications are among the most individually used tools in the field of AI-based learning. Numerous AI-supported language learning applications were utilized in 2024. These applications employ AI-driven chatbots and intelligent tutor systems in various ways. According to Hazırlık Sınıfı; Mondly, Duolingo, HelloTalk, and English Central offer AI-powered chatbots that allow users to engage in real-time conversation practice, while applications like Babbel, Busuu, Memrise, Open English, and Duolingo utilize intelligent tutor systems that analyze the learning process and adapt personalized lesson plans based on individual errors are mostly used. Rosetta Stone and EnglishCentral focus on pronunciation analysis to enhance users' speaking skills, whereas platforms like Italki, Cambly, and Open English prioritize interactions with human instructors over chatbots. However, these applications also use chatbots and intelligent tutors. Mondly combines both chatbot and intelligent tutor systems, providing a comprehensive learning experience.

Although studies on this topic have begun, the direct relationship between motivation and AI-based education still requires further investigation. By recognizing the importance of AI technologies in inspiring users and helping them succeed academically, valuable insights can be gained into their practical application. When users' learning motivations are addressed, more lasting learning outcomes can be achieved through AI-based learning apps (Huang et al., 2023; Mohamed et al., 2024). While research on educational chatbots and their impact on learning motivation has begun, there remains a significant gap in understanding the effect of various factors on learning motivation through AI apps (Yin et al., 2024). A more holistic perspective is needed to analyze the role of AI in education to fully understand its real consequences on long-term learning (Nigam et al., 2021). More review studies are needed to organize the literature, provide an overview of the AI education apps, and suggest future research directions (Chiu et al., 2023). To date, there is a lack of research in the literature exploring the internal and external factors influencing users' learning motivations through the lens of the four dimensions (arousal, beliefs, goals, and needs), especially within the context of AI-driven educational applications. In addition, there is no such study on this subject in Turkey or globally. This further underscores the significance of the current research, highlighting its contribution to filling a critical gap in the existing literature. Building on this gap in the literature, the aim of the study was established.

## Methodology

### *Aim of the study*

To fill the research gaps previously outlined, the study's aim was to determine the internal and external factors on arousal, beliefs, goals and needs that affect users' learning motivations, particularly in the context of their interactions with AI-based learning applications. Since the most commonly used AI-based learning applications are foreign language learning apps, the study employed a qualitative approach to gather data on these motivational factors in AI-based learning interactions within the context of foreign language learning apps. Consequently, 4 research questions are addressed:

Research Question 1: What are the internal and external factors related to arousal that affect users' learning motivations in AI-based learning apps?

Research Question 2: What are the internal and external factors related to beliefs that affect users' learning motivations in AI-based learning apps?

Research Question 3: What are the internal and external factors related to goals that affect users' learning motivations in AI-based learning apps?

Research Question 4: What are the internal and external factors related to needs that affect users' learning motivations in AI-based learning apps?

### *Research design and approach*

The research employed a qualitative methodology to identify the internal and external factors related to arousal, beliefs, goals, and needs that influence users' learning motivations, with a specific focus on their engagement with AI-driven learning applications. Qualitative research focuses on understanding the essence of phenomena, including their qualities, expressions, contexts, and the perspectives through which they are perceived, without addressing quantifiable aspects like frequency or causality (Philipsen & Vernooij-Dassen, 2007). It primarily generates narrative data rather than numerical values (Punch, 2013) and utilizes methods like observation, interviews, and document analysis within the interpretive paradigm. Qualitative interviews provide in-depth, context-rich insights into participants' beliefs, emotions, and experiences, shedding light on past events and hidden social contexts (Mikėnė et al., 2013). According to Merriam (2013), qualitative research seeks to understand how individuals make sense of their lives. For this study, semi-structured interviews were used, which allow flexibility in the order of topics and encourage interviewees to elaborate on their responses, focusing on areas of interest (Denscombe, 2007). This study uses only a qualitative research methodology.

### *Data collection and analysis*

The data collection process was carried out through semi-structured interviews, and the research was evaluated solely with qualitative analysis. The interview form consists of 8 questions developed based on the research questions. In preparing the questionnaire, items from existing scales related to learning motivations and personal factors (Malone et al., 2012; Deci & Ryan, 1985; Martin, 2001; Deci et al., 1991) were reviewed and adjusted to align with the qualitative nature of this study. While the questionnaire was adapted for the specific context of the study, the data collection primarily involved conducting interviews to gain deeper insights into the participants' perspectives. Given that these scales are widely recognized for their high validity and reliability in the literature, incorporating them into the questionnaire enhanced the overall validity and reliability of the research. The semi-structured questionnaire was reviewed by 5 field experts before the final version was finalized. As noted by Aung et al. (2021), it is advisable to refine a questionnaire based on feedback from qualitative experts who suggest modifications to ambiguous questions and eliminate redundant information, followed by a pilot interview. This approach further enhances the reliability of the research. Subsequently, a pilot interview was conducted with 6 participants, during which any issues regarding unclear meanings and wording were addressed. The data collection for the study took place between 07.10.2024 and 21.01.2025.

### *Sampling method*

This study focuses on widely used AI-based language learning applications that incorporate intelligent tutoring systems and AI-powered chatbots. The selection of these apps was based on their popularity, frequent use in Turkey, and AI features like personalized feedback, role-playing, and real-time conversation tools. Applications such as Duolingo, Babbel, Mondly, HelloTalk, and English Central were chosen due to their large user base and comprehensive AI functionalities. Given the wide range of AI-based educational apps, the study specifically targets language learning apps, a highly active sub-category in Turkey and globally. A purposeful sampling method was used to select this category, as language learning apps feature key motivational elements like gamification, real-time feedback, and autonomy-supportive tasks. The study examines user experiences across multiple popular apps to capture a broader view of motivation in AI-based language learning.

Snowball sampling technique was used in the research. Snowball sampling is utilized when accessing a target population is challenging or when its size and characteristics are unclear. The process starts by identifying key individuals with relevant knowledge and asking them to recommend others. This chain-like method allows researchers to reach more participants and continues

until data saturation is achieved (Baltacı, 2018). Snowball sampling was used in this study to get users of AI-based language learning applications, as this specific population is not easily identifiable through conventional sampling methods. Since there is no centralized database of such users, initial participants were identified, and they helped recruit others with similar experiences. This approach ensured access to diverse users actively engaging with AI-driven learning tools, ultimately leading to more prosperous and relevant data.

Research data were collected through in-depth interviews and e-mail interview techniques (Hunt & McHale, 2007). Through the snowball sampling method, in-depth face-to-face interviews were conducted with some participants. In contrast, others received the interview form via email, and interviews were conducted over the phone. With the participants' consent, the semi-structured interviews were audio-recorded. Each interview lasted approximately 25 to 30 minutes. The participants' responses were transcribed verbatim, and the recorded data were subsequently analyzed. To maintain consistency, the interview transcripts were reviewed to ensure a uniform language across all texts. Since the participants were reached through snowball sampling, the gender and age distribution could not be balanced.

### *Sample characteristics*

The study sample consisted of 29 participants (N = 29), with a gender distribution of 19 males (65.5%) and 10 females (34.5%). The participants' ages ranged from 23 to 41 years, with a mean age of 31.3 years. Regarding age groups, 10.3% were between 20 and 25 years, 31.0% were between 26 and 30 years, 34.5% were between 31 and 35 years, 17.2% were between 36 and 40 years, and 6.9% were 41 years or older. The characteristics of the 29 participants included in the study are presented in Table 1. The prerequisite for participation was identified as "to use an AI-based foreign language learning application and utilizing chatbots and intelligent tutoring services." Prior to the interviews, participants were provided with detailed information about the purpose and procedures of the study, as well as their rights, including confidentiality and the right to withdraw at any time. Written and/or verbal informed consent was obtained from all participants. Data were collected using a semi-structured interview format, which allowed participants to freely express their thoughts. During the interviews, the interviewer facilitated a deeper exploration of participants' perspectives by asking follow-up questions based on the natural flow of the conversation.

Table 1. Characteristics of the Participants

| Participants | Sex | Age |
|---|---|---|

| | | |
|---|---|---|
| P1 | Female | 35 |
| P2 | Female | 29 |
| P3 | Male | 27 |
| P4 | Female | 23 |
| P5 | Male | 28 |
| P6 | Male | 31 |
| P7 | Female | 38 |
| P8 | Male | 32 |
| P9 | Female | 28 |
| P10 | Male | 35 |
| P11 | Male | 27 |
| P12 | Male | 29 |
| P13 | Male | 40 |
| P14 | Female | 37 |
| P15 | Female | 33 |
| P16 | Male | 29 |
| P17 | Male | 31 |
| P18 | Male | 36 |
| P19 | Male | 24 |
| P20 | Female | 35 |
| P21 | Male | 32 |
| P22 | Male | 41 |
| P23 | Male | 33 |
| P24 | Male | 38 |
| P25 | Male | 29 |
| P26 | Female | 30 |
| P27 | Female | 35 |
| P28 | Female | 29 |
| P29 | Female | 24 |
| **TOTAL P:29** | | |

## Findings

The following section analyzes the responses from the open-ended questionnaire, focusing on key themes and personal factors influencing learning motivation. Participants were labeled as "P1, P2," and so on to ensure anonymity. Each participant answered all 9 questions, with similar responses grouped and distinct answers tabulated. Noteworthy statements are quoted directly. Given the open-ended nature of the questions, the number of responses exceeds the number of participants. Personal factors such as

arousal, beliefs, goals, needs and emotions are also categorized in this section. Each finding is provided under the corresponding research question.

**Research Question 1:** What are the internal and external factors related to arousal that affect users' learning motivations in AI-based learning apps?

The detailed responses concerning the internal factors related to arousal that affect users' learning motivations in AI-based learning apps are provided below in Table 2 and the related text.

Table 2. The Internal Factors Related To Arousal

| | Number of Responses |
|---|---|
| Striving to talk/learn foreign language | 20 |
| Interest/curiosity/ | 15 |

Most students highlighted that a key factor motivating them to use an AI-based learning app was their strong desire to enhance their foreign language skills or become more proficient in speaking. The app's ability to adjust the difficulty level of personalized tasks neither too hard nor too easy has been considered an important factor in the path to success by the participants. In this regard, the statement from P21 is particularly significant.

P21: *"I've always wanted to get better at speaking English. Using an AI app lets me practice every day, and it feels more interactive and less intimidating than regular classes. The app adjusts the tasks so well that if I'm not feeling great that day, it adjusts the difficulty level accordingly, and if I'm feeling good, it adjusts the difficulty level accordingly as well.."*

A large majority of the participants expressed a strong curiosity about how language learning would unfold through an AI app, how interactions would take place, and whether chatbots and intelligent tutors would appear as real as human counterparts. P3's response summarizes the views of the other participants.

P3: *"I've always heard about AI apps for language learning, but I was super curious about how the conversations would actually work. Like, would it feel like talking to a robot or something? I really wondered what the whole experience would be like."*

Table 3 and the accompanying text present detailed insights into the external factors related to arousal that affect users' learning motivations in AI-based learning apps.

Table 3. The External Factors Related To Arousal

| | Number of Responses |
|---|---|
| Engagement/personalized feedback | 24 |
| Enjoyment/joy | 15 |
| Boredom/Disengagement | 7 |

The majority of participants noted that activities focused on task completion, personalized feedback, and content tailored to individual needs, along with relaxation techniques, foster positive engagement in AI-based language learning apps. P9's response summarizes the views of the other participants.

P9*: "I think AI-based language learning app that I use is much more effective when the focus is on completing tasks and receiving personalized feedback for my questions. Also, having content tailored to me or getting little relaxation tips here and there really helps. It makes the app more enjoyable and motivates me more. I feel more adapted to it."*

Nearly half of the participants stated that they and found the learning process highly enjoyable. This was influenced by factors such as the visual appeal of the app, the creative and entertaining nature of activities like role-playing, P26's statement can be summary of the category.

P26: *"Role-playing is so much fun! It honestly felt like I was in a simulation game. Plus, the feedback I get after every dialogue and activity is tailored just for me, which makes me even more engaged and motivated to keep going.*

Some participants reported experiencing boredom and disengagement during the AI-based language learning process. Specifically**,** repetitive and monotonous exercises**,** mechanical and emotionless chatbot feedback**,** and long, overly complex tasks were identified as key factors contributing to mental disengagement. The statement of P12 serves as an example of the responses categorized under this category.

P12: *"The dialogues are super boring, it's like the same thing every time. The replies are so robotic and lifeless, it really started to get on my nerves. I just couldn't get into it because it felt like talking to a machine, not something that would keep me engaged".*

**Research Question 2:** What are the internal and external factors related to beliefs that affect users' learning motivations in AI-based learning apps?

The answers given to the research question about internal factors related to beliefs affecting learning motivation of the users in the process of using AI apps are categorized below at Table 4.

Table 4. The Internal Factors Related To Beliefs

| | Number of Responses |
|---|---|
| Feeling comfortable | 18 |
| Self Confidence | 15 |
| Lack of self-efficacy | 9 |
| Cost | 6 |

Most users have stated that they believe learning in the comfort of their homes, in relaxed clothing, with the freedom to eat and drink as they wish, leads to a much more productive learning process. In this regard, the statement from P15 is particularly significant.

P15: *"Learning at home, in sweatpants, and with the freedom to eat and drink whatever I want makes the process much more productive. When I'm in a stuffy office-like environment, I can't think as clearly, but at home, I feel completely at ease. I'm drinking my coffee, relaxing, and this comfort helps me focus better and engage more in the learning process."*

Nearly half of the participants trusted a system like AI greatly, particularly in its ability to provide personalized feedback, track their progress, and offer instant responses. This level of reliability and adaptability made them feel more confident in their learning journey, positively influencing their belief in their ability to succeed. The statement of P19 serves as an example of the responses categorized under this category.

P19: "*I really trust the AI app because I can always get feedback and progress at my own pace. It helps me correct my mistakes right away, which gives me a lot of confidence. This process has also boosted my self-confidence. Now, I'm progressing more boldly, and I'm sure by this time next year, I'll be speaking English really well."*

A small portion of participants feel and believe that they will fail and will not be able to learn this way. Those participants who expressed a belief and fear of not being able to utilize the technology fully highlighted this belief as a process they define as a lack of self-efficacy. P14's statement can be a summary of the category.

P14: "I honestly feel like I might fail with this app. Sometimes, I get stuck not knowing which button to press or if the mic is working right. I'm worried I won't be able to use all the features fully and that makes me doubt whether I can actually learn this way."

A small number of users believe that paying a subscription fee for these AI apps is relatively more affordable than taking face-to-face private lessons, and this creates a belief that they are benefiting from a smarter, higher-quality system at a lower cost, which can positively impact their motivation. In this regard, the statement from P9 is particularly significant.

P9: *"For me, paying for AI apps is way cheaper than face-to-face lessons. I feel like I'm getting a smarter, higher-quality system at a better price, almost like a smart deal. I feel like I've gotten something really high-quality on sale. And that really motivates me. It's definitely a more affordable and efficient option"*

The responses to the research question regarding external factors related to beliefs that influence users' learning motivation while using AI apps are organized in Table 5 below.

Table 5 The External Factors Related to Beliefs

| | Number of Responses |
|---|---|
| Encouragement | 24 |
| Rewards | 12 |

Most participants express that the encouraging feedback and motivational messages received during chatbot or intelligent tutor interactions while using the app reinforced their belief that they would improve their English speaking and understanding skills. P28's statement can be a summary of the category.

P28: *"My intelligent tutor really boosts my motivation. Every time I get an answer right, it says things like 'Great job!' or 'You nailed those words!' Honestly, I'm always waiting for it to say stuff like that. It really makes me happy and motivates me to keep working harder. It also keeps saying things like 'I know you can do this, you just need a bit more practice!' and that really boosts my belief in myself and that I can succeed."*

A portion of the participants stated that the rewards such as points, badges, new content, and virtual currency provided by the AI app during the language learning process enhance their belief that they will succeed, which motivates them to improve further. An example of this situation can be seen in the statement of P6.

P6: *"Getting points and badges is really fun! Earning them at the end of each lesson motivates me to keep working harder. As new content unlocks, I start learning more, and it feels like I always want to take one more step forward. Plus, the free content is a great bonus"*

**Research Question 3:** What are the internal and external factors related to goals that affect users' learning motivations in AI-based learning apps?

Table 6 presents the categorized responses to the research question regarding internal goal-related factors influencing users' learning motivation while using AI applications.

Table 6. The Internal Factors Related to Goals

| | Number of Responses |
|---|---|
| Finding a job / Job interview | 25 |
| Preparing for a foreign language exam | 19 |
| Moving to a higher position at work | 13 |
| Moving abroad / Working abroad | 9 |

Most participants stated that their primary goal in using these language learning applications was to find a job or to succeed in a foreign language job interview. P11's response summarizes this situation.

P11: *"Nowadays, everyone knows at least one foreign language, so I thought I should learn at least one too. Many companies are conducting job interviews in English, and I need to pass those interviews to find a job. Otherwise, landing a good position will become even harder."*

A large number of participants stated that their goal in using these applications was to prepare for exams like TOEFL/IELTS, which include the English-speaking section. P4's statement can be a summary of the category.

P4: *"I wanted to practice English to pass the speaking sections of TOEFL and IELTS exams. The speaking part in these exams are really hard, and responding either face-to-face or speaking into a computer is a different experience. So, I aimed to do some more preparation to get through this section more comfortably."*

A few participants indicated that they planned to move abroad and, recognizing that their English wasn't adequate for studying or working there, their goal was to reach a sufficient level of proficiency to live in those countries. The statement of P17 serves as an example of the responses categorized under this theme.

P17: "*I want to build a life for myself abroad, but my English was almost nonexistent before I started using this app. It's been quite a while now, and I can speak enough to express myself."*

Table 7 displays the categorized answers to the research question concerning external goal-related factors that impact users' learning motivation during their use of AI applications.

Table 7. The External Factors Related to Goals

| | Number of Responses |
|---|---|
| Personalized tasks | 22 |
| Role-Playing | 13 |
| Failing to see contribution | 5 |

Most participants stated that AI provides personalized tasks based on the user's language level, learning style, and personal goals, making the learning process more efficient and allowing them to practice for real-life situations, all aimed at their language learning objectives. P19's statement can be summary of the category.

P19: *"My goal is to improve my English speaking, and the app gave me speaking exercises suitable for my level. Since my goal is to prepare for a job interview, for instance, AI started asking me questions related to job interviews so I could practice for real-life situations. Since this is my area of interest, it works like a targeted practice for me"*

Some participants indicated that the app didn't significantly contribute toward their goals. The statement of P29 serves as an example of the responses categorized under this category.

P29: *"I think it's probably because my app is a low-cost one; that's why it doesn't ask me any personalized questions related to my goals. Sometimes, it even feels way too difficult for me, I'm not at that level yet. Some of my friends have premium memberships, and they say those are really good".*

In this regard, the internal and external factors related to goals that affect users' learning motivations in AI-based learning apps can be summarized as follows. The majority of participants reported using language learning applications to find a job, succeed in foreign language job interviews, or prepare for exams like TOEFL/IELTS, particularly the speaking sections. A few aimed to improve their English for living, studying, or working abroad, while others sought advancement to higher positions in their current workplaces. Most participants found the AI's personalized tasks, tailored to their language level, learning style, and goals, efficient and relevant for real-life situations. Additionally, the role-playing feature was noted as helpful in achieving language learning objectives. However, some participants felt the app did not significantly contribute to reaching their goals.

**Research Question 4:** What are the internal and external factors related to needs that affect users' learning motivations in AI-based learning apps?

Table 8 presents the categorized responses to the research question regarding internal factors related to needs that influence users' learning motivation while using AI applications.

Table 8. The Internal Factors Related To Needs

| | Number of Responses |
|---|---|
| Achievement | 27 |
| Autonomy | 17 |
| Explore | 5 |

Many participants stated that they could select personalized content according to their need for autonomy, set personal goals, and progress independently through a flexible learning process, experiencing a learning experience free from authority-based interventions. P5's statement can be summary of the category.

P6*: "If someone tells me, 'You have to do this, do it like this,' I just lose interest, but with this app, I can do things at my own pace and choose what I want to focus on. I can work on the stuff I need and skip the rest. It's like I'm in control and really like that."*

A few participants stated that they were curious about how the AI application works. While exploring the app, they often navigated through various features and learning materials, noticing personalization options and new tools. An example of the need can be seen in the statement of P6.

P6: *"I was kinda curious about how the app works, so I just started clicking around, checking out different features and stuff. Like, I found some speaking practice tools and a spot where I could see how I'm doing. I also noticed ways to customize the lessons to match what I need. It was pretty cool stumbling on new things I didn't expect while just messing around."*

Table 9 displays the categorized responses to the research question about the external need-related factors that impact users' learning motivation during their use of AI applications.

Table 9. The External Factors Related To Needs

| | Number of Responses |
|---|---|
| Approval | 23 |
| Minimizing anxiety | 14 |
| Belongingness | 12 |
| Security | 9 |

The majority of participants stated that thanks to the AI application, they received appreciation primarily from their colleagues and superiors at

work for their improved English skills. They also received recognition from their family and friends in social settings, and such compliments and approval made them feel more important. The statement of P7 serves as an example of the responses categorized under this theme.

P7*: "Honestly, I never expected this, but ever since I improved my English with the app, my manager and colleagues started noticing and complimenting me. It feels really good to be acknowledged at work. I've even started seriously helping my child with their English lessons. It's like I'm finally being taken more seriously"*

Some participants stated that using the AI application in the privacy of their own homes made them feel safer, as they could practice without anyone seeing or hearing them, reducing their anxiety even when making mistakes. On the other hand, some participants mentioned that they decided to use these applications with their colleagues at work, and learning a language as a group through these apps strengthened their sense of belonging in the workplace. P20's comment is critical as it encompasses both of these categories.

P20: *"We decided to join the language app together with my colleagues at work, and we became like a group that shares our experiences and improves ourselves at the workplace. Also, if the whole group had gone to an in-person course, I would have hesitated to do speaking practice in front of them, wondering if I would embarrass myself. But at home, who am I going to be embarrassed in front of? The AI? I just keep progressing by making mistakes."*

A small number of users are concerned about entering their credit card information for language learning apps, especially if the platform is insecure or lacks sufficient safeguards, and they also worry about personal data being misused or shared with third parties, as well as the risk of their information being stolen or used without consent. P14's statement can be summary of the category.

P14: *"As for me, it hasn't happened, but the other day, a friend of mine who subscribed to the app had a suspicious transaction on their credit card. We were scared, wondering if they stole the information from the details they entered into the app. I'm starting to wonder if attending an in-person course might be safer."*

In this context, the internal and external factors affecting users' needs regarding AI-based learning apps can be summarized as follows. Many participants highlighted that the AI-based learning app allowed them to select personalized content, set personal goals, and progress independently, catering to their need for autonomy and achievement. A few participants were curious about how the app worked, often exploring various features and tools. Most participants reported receiving appreciation from colleagues and superiors at work for their improved English skills and recognition from family and

friends, which made them feel more important. Some felt safer practicing at home, reducing anxiety about making mistakes, while others used the app in groups with colleagues, strengthening their sense of belonging at work. However, a few users expressed concerns about the security of their personal and financial information, particularly regarding the risk of misuse or theft.

**Discussion and conclusion**

The rapid advancement of AI has transformed education by integrating AI-powered tools like intelligent tutors, chatbots, and machine learning algorithms, which enhance teaching and learning. These tools provide personalized learning experiences, automate grading, and improve student motivation by addressing personal factors such as arousal, beliefs, goals, and needs. Chatbots offer immediate feedback, while intelligent tutors adapt teaching methods to individual needs, boosting student engagement and performance. Both intrinsic and extrinsic motivation play key roles in learning outcomes, with inherent motivation fostering sustained engagement. AI-driven tools improve motivation by offering emotional engagement and metacognitive feedback. However, a clear understanding of motivation and AI learning remains underexplored. This study investigates how internal and external factors like arousal, beliefs, goals, and needs influence motivation in AI-based education.

The first research question investigates internal and external factors related to arousal influencing learning motivation in AI-based apps. Participants were motivated by a desire to improve language skills and fluency, with the app's ability to adjust task difficulty being crucial. Curiosity about AI's simulation of human interactions also played a key role in motivation. These factors contributed to internal arousal, aligning with Eggen and Kauchak's (1994) findings that motivational arousal fluctuates with task difficulty. Easy tasks lower arousal, while complex tasks increase it. AI apps could enhance motivation by adjusting arousal levels. Personalized feedback, task-focused activities, and relaxing content shaped external arousal. Research by Kuhail et al. (2023) and Lee et al. (2022) highlighted the importance of feedback in enhancing engagement. Hattie and Timperley (2007) emphasized feedback's role in supporting self-assessment, clarifying expectations, detecting errors, and boosting motivation. Nearly half of the participants found the learning process enjoyable, with emotions influenced by visual appeal and creative activities like role-playing. Graesser and D'Mello (2012) found positive emotions like interest and curiosity linked to higher motivation and retention. Conversely, negative emotions, such as frustration, hinder learning. Similarly, Qu et al. (2022) found that participants interacting with chatbots experienced

more positive than negative emotions. However, some disengaged due to repetitive tasks, emotionless chatbot responses, and complex exercises, leading to boredom and reduced motivation. Pillai et al. (2023) also noted that while AI chatbots are perceived as reliable, monotone voices and lack of empathy can cause frustration.

The second research question explored internal and external factors related to beliefs that affect learning motivation in AI-based apps. The study found that learning at home, with comfort and freedom to eat and drink, increased motivation. Weiner (2005) explains that beliefs shape how individuals perceive the causes of their successes or failures, influencing motivation. Participants believed learning at home enhanced their success and motivation. Comfort in AI-assisted home learning was seen as a factor in boosting motivation. Nearly half of the participants trusted AI for personalized feedback, progress tracking, and quick responses, reinforcing positive beliefs about their abilities. Kong (2009) found that students' positive beliefs about their learning ability increase motivation. AI applications were believed to strengthen users' self-confidence, thus enhancing motivation. However, some users worried about their ability to fully utilize the technology, reflecting a lack of self-efficacy. As Pillai et al. (2023) noted, AI provides instant responses and feedback, making it feel lifelike and boosting motivation. Participants saw AI apps as a more affordable alternative to private lessons. Additionally, positive encouragement from chatbots and rewards like points and badges further motivated participants, reinforcing their beliefs in improving their English skills. Deci and Ryan (1985) defined extrinsic motivation as being driven by external rewards, a concept reflected in the study. Gopalan et al. (2017) and Sardiman (2000) highlighted that rewards and grading based on outcomes boost motivation, confirming the role of rewards in AI learning apps.

The third research question examined internal and external factors related to goals influencing learning motivation in AI-based applications. Results showed most participants used language apps to find jobs, succeed in foreign language interviews, or prepare for exams like TOEFL/IELTS, particularly the speaking sections. Some aimed to improve their English to live or work abroad, while others sought career advancement. These findings suggest clear, achievable goals increase motivation, aligning with Akbaba (2006), who highlighted that motivation is influenced by appropriate goals. Unrealistic goals hinder motivation, supporting the importance of goal-setting in AI-based learning apps. External factors related to goals were also found to influence motivation. Most participants found the AI's personalized tasks, tailored to their language level, learning style, and goals, efficient and relevant

for real-life situations. This aligns with the literature, as AI-powered educational applications enhance learning through personalization by adjusting content based on individual strengths and weaknesses (Murtaza et al., 2022). These systems provide tailored assessments and feedback, ensuring each student's needs are met (Owan et al., 2023). Personalized learning guidance improves engagement and promotes better outcomes (Hwang et al., 2020b). AI chatbots offer immediate, customized feedback in language education, enhancing learning efficiency (Rodrigues et al., 2019; Um et al., 2024). AI-driven role-playing applications provide significant benefits by offering personalized, context-specific practice that enhances language skills such as fluency and pronunciation. These apps allow students to engage in realistic scenarios, like job interviews, which support the development of their communication skills through interactive, AI-supported role play (Darmawansah et al., 2025). In line with this, participants in the current study also found that role-playing features were beneficial in achieving their language learning goals, further emphasizing the value of this approach in practical language education. Some participants felt the app did not significantly contribute to reaching their goals, with one participant explaining that the low-cost nature of the app was a likely reason, as it lacked personalized questions tailored to their goals. They also mentioned that some tasks felt too complex for their current level, in contrast to friends with premium memberships who reported a better experience. This feedback aligns with the findings of Gkinko and Elbanna (2022), who pointed out that while AI-driven systems can engage learners effectively, they might introduce minor confusion or ambiguity, pointing to the need for refinement in their design. These limitations, such as needing more personalized guidance, impact the app's effectiveness in achieving learning goals.

The fourth research question explored internal and external factors related to users' needs affecting motivation in AI-based learning apps. Katiyar et al. (2024) highlighted that AI systems personalize instruction using techniques like natural language processing and learning analytics, enhancing autonomy and engagement. Similarly, the study found participants appreciated personalized content and goals, aligning with the benefits of personalized learning in promoting motivation. Kumar et al. (2023) noted that intelligent tutors engage learners by adjusting teaching strategies and supporting students' needs. Participants also reported recognition from colleagues and family, fulfilling their need for competence and social connection. However, some users expressed security concerns.

In conclusion, the research underscores that various internal and external factors are crucial in shaping learning motivation in AI-based

language learning apps. Internally, participants were motivated by the desire to improve their language skills, with the personalized difficulty levels of tasks and the novelty of AI-driven interactions enhancing their arousal and engagement. The AI apps' ability to offer customized feedback, tailored tasks, and rewarding features like role-playing supported motivation by addressing external factors. The study also revealed that learning in a comfortable home environment, with the freedom to progress at their own pace, helped participants feel more motivated. At the same time, the sense of competence and achievement was further strengthened by the app's ability to provide personalized content. In terms of goals, participants reported that clear, achievable objectives helped sustain their motivation. At the same time, beliefs about their ability to succeed, supported by the app's feedback and rewards, boosted their confidence. The need for autonomy, competence, and relatedness was also pivotal, as participants valued their control over their learning and the positive reinforcement they received from the app. Overall, the study highlights how factors such as arousal, goal-setting, beliefs, and needs are interconnected and crucial in enhancing learning motivation through AI-powered educational tools.

Considering the findings of this study, there are several practical implications for developers of AI-based language learning applications and educators in language education. Although this study focuses on language learning, the factors identified could apply to other subjects using AI-based applications. Personalized feedback, task difficulty, and autonomy-supportive features may be relevant across various domains, particularly in AI-driven education. Based on these findings, the following practical suggestions can be applied to both language learning and broader educational contexts. Developers and educators must prioritize personalization to enhance learning motivation. By offering tailored tasks, adaptive assessments, and immediate feedback, AI applications can address users' diverse needs, boosting engagement. It's crucial to adjust content and difficulty based on progress, creating an interactive learning environment with role-playing. Developers should also focus on positive, emotionally engaging experiences, reducing frustration and anxiety. Providing autonomy and clear goals helps sustain motivation, allowing learners to feel in control. Finally, integrating motivating features like rewards and social recognition can enhance learners' sense of competence, promoting sustained progress.

This study has several limitations that should be considered when interpreting the results. An important area for future research is examining the sustainability of AI-based learning applications and their long-term impact on user motivation. While this study highlights immediate motivation factors

like personalized tasks, rewards, and autonomy, it is crucial to understand how these factors influence motivation over time. The sustainability of engagement and the long-term effectiveness of AI-driven educational tools remain underexplored. Future studies could assess how prolonged use affects learning outcomes and whether initial motivation is maintained, diminished, or transformed. Investigating learners' attitudes, engagement, and academic progress over time would provide deeper insights into the long-term efficacy of these tools. One limitation is the small sample size (29 participants), which may not fully capture the diversity of AI-based language learning users. While this allowed for in-depth exploration, it limits the generalizability of the findings. The use of snowball sampling also introduces selection bias, as participants were recruited through referrals, potentially leading to an unrepresentative sample. Additionally, the sample had an unbalanced gender and age distribution, with more male participants and a concentration of users aged 26-35, which could have influenced motivations. The study's reliance on self-reported data introduces response biases, such as social desirability and inaccurate self-assessment. Finally, the qualitative nature of the study limits generalizability, and the study did not explore the effectiveness of different AI applications or specific features, which may impact learning motivations. Future research could address these limitations by using a more diverse sample and examining app features.

Future research should address these limitations by incorporating a larger and more diverse sample**.** This study was conducted in Turkey, and while cultural differences were not explicitly addressed, it is acknowledged that cultural context plays a significant role in shaping learning motivations. As such, future research could expand this study to include cross-cultural comparisons, exploring how cultural values and contextual factors influence the interaction with AI-based learning applications in different regions and settings. Increasing sample size and demographic diversity would provide a more comprehensive understanding of how characteristics like age, gender, education, and proficiency impact motivation in AI learning environments. A comparative study across different AI-based language learning applications is also recommended, focusing on how features like chatbots and intelligent tutors influence motivation. Employing a mixed-methods approach, with surveys and qualitative interviews, would offer deeper insights into motivation drivers. Future studies should also explore the sustainability of motivation over time, assessing whether prolonged use of AI tools affects learning outcomes and user engagement. Lastly, examining specific AI features would help determine which elements contribute most to sustained user progress.

Ethical implications related to data privacy and participants' consent are crucial in studies involving AI-based language learning applications. Concerns about data privacy and security could influence individuals' willingness to participate. If users fear misuse of their personal data or inadequate privacy protection, their motivation to engage with AI applications may decline. Clear communication about data collection, storage, and usage, along with obtaining informed consent and ensuring confidentiality, is vital for ethical research. Addressing privacy concerns can also attract a more diverse group of participants, enhancing insights into user motivation. In this study, all participants were informed about the research's purpose, and their consent was obtained before participation. Semi-structured interviews were recorded with their consent, and confidentiality was ensured. The study adhered to ethical standards by informing participants of their right to withdraw without consequences.

This study contributes to the growing body of international research on AI-based learning applications, particularly in language learning. By exploring internal and external factors, such as arousal, beliefs, goals, and needs, that influence motivation in AI-driven educational tools, it provides a fresh perspective beyond current literature. The findings highlight the importance of personalized AI approaches that cater to individual needs, enhancing both intrinsic and extrinsic motivation. This research not only builds on existing literature but also offers insights into the long-term effectiveness and sustainability of AI tools in education. The authors critically examine how these technologies can improve learner engagement and academic outcomes, addressing a gap in the literature on AI's sustainability in education. The study offers a nuanced understanding of AI's potential to drive lasting motivation, inviting further research into optimizing AI applications for lasting educational impact worldwide.

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