

The Relation of AI Usage with Self-Efficacy: A Comparison Study between College-Going Boys and Girls

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ABSTRACT

The rapid advancements in artificial intelligence (AI) have significantly transformed various domains, including education. So, this study aims to examine the role of artificial intelligence in influencing self-efficacy while comparing gender differences. A quantitative research design was used. The participants consisted of 30 college-going girls and 30 boys between ages 18 to 25 years using AI on their mobile phones and laptops. Data was collected using the AI Conversational Support Usage Questionnaire (self-constructed), consisting of 10 questions, including the frequency of AI conversational support usage, and General Self-Efficacy scale (Schwarzer, R., & Jerusalem, M., 1995) measure of self-efficacy was used. The result of Pearson's correlation shows no relationship between AI chatbot usage and self-efficacy, as the p-value (0.086) was higher than 0.05, so it indicates that there is no statistically significant difference between AI chatbot usage and self-efficacy. With the help of the t-test for independent groups, the results indicate that the frequency of AI use of boys demonstrated a higher frequency of AI usage ($M=6.27$, $SD=1.01$) when compared to girls ($M=5.23$, $SD=1.47$) with $t=3.157$, $p=0.003$. There was no significant difference in the level of self-efficacy with $t = 1.422$, $p = 0.160$ when comparing boys ($M = 32.60$, $SD = 4.56$) and girls ($M = 30.93$, $SD = 4.51$). So, it concludes the comparison between the use of AI chatbots in males and females showcased statistically significant differences due to males' experimental interest and females' concern about privacy and ethical usage. Whereas, there was no significant difference between both genders' self-efficacy level because of the equal exposure towards academic training and support system in college.

Keywords: *Artificial Intelligence, Self-Efficacy, ChatGPT*

The transition from traditional learning and reading method to integration of artificial intelligence have significantly impacted the education sector; AI platforms such as ChatGPT, Gemini, Perplexity, etc., help in breaking down complex ideas into simpler words. Beyond Perplexity, Gemini, and ChatGPT, artificial intelligence in the education area includes virtual teaching assistants, efficient tutoring systems, and artificial intelligence-driven tools that prepare a personalized learning goal. These AI-powered tools mainly consist of intelligent tutoring systems, adaptive learning technology, and a generating AI platform, which is utilized to enhance students' learning experiences

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(Kuzminska et al., 2023; Frontiers in Education, 2024). Most of the AI platforms simplify complex concepts and let the learner set their own pace, which fits their learning style. Soon after the outburst of COVID-19 pandemic, the use of AI chatbot tools have increased significantly, mainly in education sector. During the phase of lockdown, a significant shift was observed from traditional classroom system to online classes and learning. Students and teachers started relying more on AI platform for learning, teaching and assessment. The sudden transition in education lead to adoption of AI tools which resulted in making of essential part of modern education system. Many studies witnessed the sudden transition from traditional education system to online learning-based platform and long-term dependency on AI driven systems (Rezapour and Elmshaeuser, 2022). These AI tools significantly enhanced numeracy skills and early literacy by providing personalized learning experiences. Although, some challenges were observed such as, educator becoming overly dependent on technology and risking students emotional and social development. Therefore, some studies focused on combining both the teaching methods for ensuring a balance between traditional teaching method and AI tools inclusion. The study highly supports the blend of both the approaches to attain a better educational environment. (Cha and Daud, 2025; International Journal of Academic Research in Business and Social Sciences). These AI tools are specialized in generating feedback, flexible learning opportunities, and immediate academic assistance, which positively impact students' psychological constructs. One such psychological factor is self-efficacy, an individual's belief in their capacity to execute behaviour necessary to achieve a specific performance goal (Bandura, 1997). Self-efficacy is influenced by how individual perform cognitive thinking, feel emotion, administrate behaviour and motivate themselves in various situation. According to Bandura's Social Cognitive Theory, higher self-efficacy leads to higher motivation and confidence in achieving desired outcomes, whereas lower self-efficacy results in reduced confidence and motivation. Individual with high self-efficacy tend to demonstrate high level of confidence, persistence and resilience while facing any set back or hurdles. The belief system of an individual shapes its cognitive process such as emotional response like confidence or anxiety, goal setting and behaviour which includes perseverance, effort, and decision making. Self-efficacy develops through experiences which includes observing others succeed, managing emotional state, receiving encouragement and mastering tasks. In Bandura's theory of social cognition there were three key components of self-efficacy; first is mastery experience which is considered as a major source of self-efficacy as it is based on individual personal experience of success and failure. Repetitive failure may weaken self-efficacy whereas in contrast success increase the level of self-efficacy. Another component is vicarious learning which refers to learning through observing others, especially individual who tend to share similar characteristics, which enhances their confidence and motivation. Lastly, verbal persuasion which involves feedback or encouragement from other. Also increases their level of confidence and self-motivation.

In an educational and academic context, self-efficacy is the willingness of a student to tackle challenging tasks, take charge of their own learning decisions, and actively seek help when needed. Artificial intelligence fosters self-efficacy by providing supporting learning tasks, immediate feedback, and the ability for students to track their progress. Therefore, this will ultimately encourage a sense of competence and independence among students.

The literature review of the current research study examined various existing research by underline their key findings, trend, and research gap related to research topic. Some of the studies primarily focused on the agentic AI use have significantly enhanced participants'

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self-efficacy by promoting learner autonomy and self-regulation. The personalized feedback and adaptive AI system increase confidence in academic tasks. Therefore, an AI-supportive environment will improve motivation and persistence (Jeilani and Abubakar, 2025). Further studies highlight that AI is not only an academic tool but also a fully functioning psychological support system that enhances learner self-efficacy, autonomy, and self-regulation (Alqurni, 2026). Another study showcases a positive relationship between self-efficacy and AI usage, although curiosity doesn't predict the use of AI. Self-efficacy is a mediator between both curiosity and AI usage (Schutte and Li, 2025). One such study highlights that participants with higher use of AI are more confident and independent learners than those with less AI usage. Thus, the higher the AI literacy, the higher the self-efficacy (Kuzminska et al., 2024). Despite several studies supporting the positive impact of artificial intelligence on self-efficacy, there is limited research conducted to examine gender differences in this context. Some studies examined AI usage patterns as a comparative study between both genders (Rajki et al., 2025). Whereas some studies compared the AI acceptance between male and female (Jeilani and Abubakar, 2025). This concludes that there is limited study that focuses on the gender-related studies directly examining self-efficacy outcome across gender. There is an existing comparative study of the acceptance model rather than the measuring of self-efficacy among different genders. While previous research focused on the positive effect of AI usage on the self-efficacy of students, few of the studies recognize gender-based comparative studies on the acceptance and usage of the technology. There is a clear lack of research exploring how AI affects self-efficacy across genders. Addressing this gap is essential to ensure the creation of inclusive and equitable AI-driven education practices. Therefore, this study aims to examine the role of artificial intelligence in influencing self-efficacy while comparing gender differences.

METHODS

Aim- To study the relationship between AI usage and self-efficacy in college-going students and also compare its level between boys and girls.

Hypotheses

- **H₁** - There will be a significant relationship between AI usage and self-efficacy among college-going girls and boys.
- **H₂**- There will be a significant difference in the frequency of AI usage between college-going girls and boys.
- **H₃**- There will be a significant difference in level of self-efficacy between college-going girls and boys.

Sample

A total of 60 samples, out of which 30 were college-going girls and 30 were college-going boys between ages 18 to 25 years using AI on their mobile phones and laptops, were included. The purposive sampling technique was used for data collection in the present research.

Research design

A two-group research design was employed.

Tools

1. AI conversational support usage Questionnaire (Self-constructed)—This measure has 10 questions, including the frequency of AI conversational support usage.

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2. General Self-Efficacy Scale (Schwarzer, R., & Jerusalem, M., 1995)—This measure of self-efficacy consisted of 10 items assessing an individual's belief in their ability to cope with difficult situations. It is a 4-point rating scale that ranges from 1 (not at all true) to 4 (exactly true). A higher score indicates a higher level of self-efficacy. Possible scores for these totals range from 10 to 40. It has a good internal consistency with Cronbach's alpha from 0.76 to 0.90.

Ethical considerations

1. Informed consent of the subject was taken.
2. Confidentiality of the subject was maintained.

Statistical analysis

The following statistical tools were employed:

1. Mean
2. SD
3. Correlation (Pearson's correlation)
4. t-test

Result Table

With the help of SPSS analysis, the frequency of AI chatbot usage was compared. Through a pie chart, it is seen that 38.3% use AI almost constantly or several times a day, 46.7% use it several times a week, 11.7% once a month. Whereas, when it was asked how long does one AI chatbot usage session last, 16.7% reported it more than 1 hour, 36.7% reported it more than 30 minutes, 31.7% reported it 5 to 30 minutes and 15% reported it less than 5 minutes.

Figure – 1 Shows how often do individua use AI chatbots

How often do you use AI chatbots?

60 responses

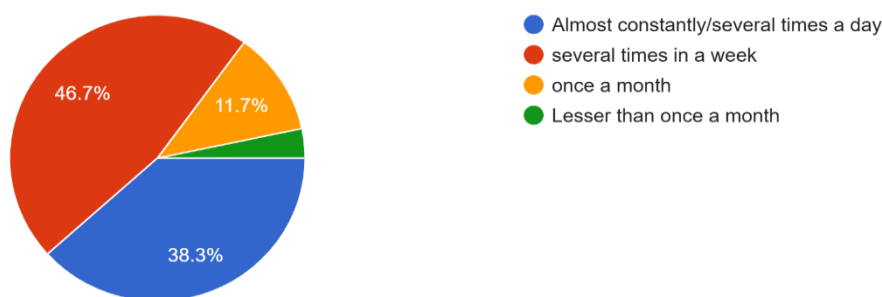
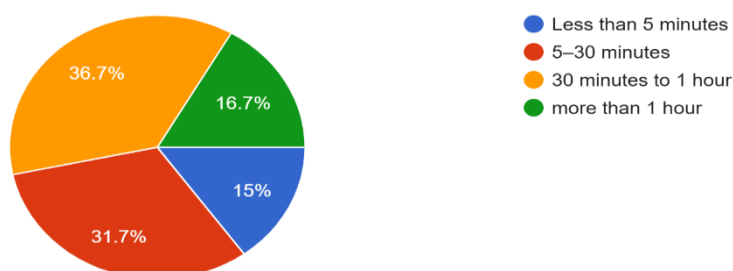


Figure – 2 Shows how long an individual AI chatbot usage session last

On average how long does one AI chatbot usage session last?

60 responses



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Table 1. Pearson Correlations Between Frequency of AI Chatbot Use and Self-Efficacy (N=60)

Variable	Frequency of usage of AI chatbots	Self-Efficacy
Frequency of usage of AI chatbots	1	.086
Self-Efficacy	.086	1

Table 2. shows the Mean, SD, and t-value of frequency of AI use and Self-Efficacy.

Variable	Group	Mean	SD	t-Value	Sig. Level
Frequency of usage of AI chatbots	Boys	6.27	1.01	3.157	0.003
	Girls	5.23	1.47		
Self-Efficacy	Boys	32.60	4.56	1.422	0.160
	Girls	30.93	4.51		

The result of Pearson's correlation shows no relationship between AI chatbot usage and self-efficacy, as the p-value (0.086) was higher than 0.05, so it indicates that there is no statistically significant difference between AI chatbot usage and self-efficacy. With the help of the t-test for independent groups, the results indicate that the frequency of AI use of boys demonstrated a higher frequency of AI usage (M=6.27, SD=1.01) when compared to girls (M=5.23, SD=1.47) with $t=3.157$, $p=0.003$. There was no significant difference in level of self-efficacy with $t = 1.422$, $p = 0.160$ when comparing boys (M = 32.60, SD = 4.56) and girls (M = 30.93, SD = 4.51).

DISCUSSION

The aim of the study is to assess the relationship between the use of artificial intelligence and self-efficacy in college-going students and compare its level between boys and girls. The result of person correlation indicates that there is a weak positive correlation between AI chatbot usage and self-efficacy, as the p-value was higher than 0.05, so it indicates that there is no statistically significant difference between AI chatbot usage and self-efficacy. Thus, it means that the use of AI chatbots is not significantly associated with students' level of self-efficacy. According to social cognitive theory (Albert Bandura, 1997), self-efficacy is built through social learning and individual experience. The major factors contributing to the development of self-efficacy are vicarious experience, mastery experience, and verbal persuasion. Also, this study is in support of previous research (Holmes et al., 2019), which suggests that though AI tools like ChatGPT, Gemini, Perplexity, QuillBot, etc., can enhance students' learning efficacy, their effect on psychological variables like self-efficacy depends on how effectively an individual is using technology in their learning environment. The possible explanation of the above result might be that self-efficacy is primarily built through mastery experience which is one of the factor of self-efficacy as an individual build self-belief when they individually solve their problem and achieve success on their own whereas AI chatbot mainly provides assistance by not replacing persons effort and practice. Another reason which can be highlighted is AI chatbot serves as a supportive tool rather than substitute of learning. AI chatbot provide reasons, information, doubt clarity and mostly provide guidance, but the actual implementation of these information's is still in the hands of the students. Thus, AI chatbot act as an external support system and self-efficacy is linked with the performance of the students. Although variation in usage pattern also proves the minimum effect on student's self-efficacy. In this research only one of sixth person use AI chatbot for more than 1 hour which reduces the inconsistency of AI usage effect on self-efficacy. Lack of personal and emotional connection can be included as one of the reasons,

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unlike parents and teachers AI chatbot lack personalized motivation and emotional encouragement. Verbal persuasion another factor of self-efficacy is missing which is a trusted source of individual level of motivation. Other possible reasons might be the role of environment as classroom teaching method impacts more deeply as compared to AI chatbot teaching as there is passive involvement which results in less self-efficacy development.

The result of the t-test when comparing boys and girls in the usage of AI chatbots indicates that boys have a higher score in AI usage than girls. The result is consistent with previous research (Rajki et al., 2025), which states that there was a statistical significance between male and female AI chatbot usage patterns, as females engaged in less usage than males. The possible explanation for the above result might be because of difference in usage pattern, preference and interest; boys tend to be show more interest towards technology-oriented activities such as coding, gaming, and new experiments with digital tools. Thus, this exposure towards technology lead boys be more prone for technical problem solving, and exploration. On the other hand, girls may use AI chatbot for conversation, academic assistance or for creating creative work purpose which will create variation in usage pattern. Another important reason can be related to digital exposure and confidence in using technical skills. It is seen that boys receive early exposure as compared to girls, and exposure as well as familiarity plays a vital role in boosting individuals' level of confidence and self-esteem. Social and cultural factors (like societal pressure and demands) also plays equal and important role in the above result as gender stereotype still exists in society which is deeply associated with STEM fields like engineering or science in which the number of boys is more as compared to girls. Such gender-based perception influences level of interest, access to technological tools and encouragement thereby effect AI chatbot usage like ChatGPT, Gemini, Perplexity, etc. Other underlying reasons could be educational support and parental guidance which create difference in providing equal opportunities to boys and girls. By various researches it is observed that parents and teachers consciously or unconsciously encourage boys to explore more about technology whereas guiding girls towards other activities. Thus, there is lack of equal encouragement which results in the gender difference of AI usage. Girls are more dependent on support system whereas boys by taking help of technology shows higher level of independence.

The result of an independent sample t-test when comparing the level of self-efficacy between boys and girls indicates that there is no statistically significant difference, which states that gender doesn't have any effect on the level of self-efficacy. This score is consistent with previous research by Debnath and Saikia (2024) on 12th-class students. The possible explanation of the above result is equal access to education. In this modern era, boys and girls are provided with similar educational opportunity, exposure and resources. In college they have equal participation in sports, co-curricular and academics. Thus, when both the genders experience same exposure in training and opportunity their mastery experience becomes equal. Another reason is changing social attitude towards gender roles. Traditional stereotypes are undergoing in change seeing girls as less competent than boys. Modern society now encourage both the gender to pursue career in technology, education, and leadership. This shift from gender-based stereotype to equal opportunity builds confidence and belief system of both boys and girls. Now there is a standardize educational system and evaluation system. Both boys and girls are evaluated in same examination, same performance and same criteria standard eliminating all social and academic biases. Feedback and recognition of achievements are equal which ensures both the groups are similar with no favour and discouragement. In addition, both the gender has equal exposure towards

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choosing their role models through exposure towards media, education and societal image of successful people from both the gender- male and female in different fields. Girls take inspiration from famous and successful women whereas boys competing with their peer group this increase vicarious experience. This encourages confidence building. Other possible reasons are upbringings, parental support and peer influence. Today's modern family encourages both the gender and have equal expectation, same level of emotional support, and resources to explore their abilities. Peer influence and social environment are similar; both gender interacts in same classroom share same experiences and learn with collaboration. Furthermore, government initiative and programs have played significant role in promoting equal opportunities, reducing discrimination and enhancing confidence in girls and boys.

CONCLUSION

Present-day use of AI is being seen in every major sector; one of these is the education sector. AI chatbots like ChatGPT, Gemini, Perplexity, etc., break down complex study materials into simpler ones according to the individual level of understanding. AI is seen affecting various psychological variables; one of such is self-efficacy, an ability to execute behaviour necessary for performance attainment. Thus, the results showcase a weak positive correlation between AI chatbot usage and self-efficacy because AI chatbot aids learning but does not affect self-efficacy cause it's a psychological variable which includes self-belief which is primarily developed through human interaction, personal effort and direct experiences. Therefore, development of self-efficacy largely depends on students' real-life achievements and engagement. Later, the comparison between the use of AI chatbots in males and females showcased a statistically significant difference due to opportunity difference, variations in exposure, social influence, and interest of an individual. Increasing awareness, encouragement, and equal exposure towards technology or access towards technology, can create differences by reducing gap of AI usage between both the genders over time, which will lead to more inclusive usage of AI tools. But on the other hand, there was no significant difference between both genders' self-efficacy level because of the equal exposure, equal opportunity, societal change in attitude, and more supportive environment, resulted in creation of a balanced structure of self-efficacy. Thus, due to gender equality, the difference in self-belief is decreasing, allowing both genders to develop confidence based on their ability rather than their gender identity.

Limitations

1. Small sample size, which can act as a hindrance in generalizing the finding.
2. The population was saturated with college-going students.
3. The self-efficacy scale and AI chatbot usage scales were self-report scale which can undergo social desirability.

Future Directions

The suggestion for future research can be the inclusion of different sample groups, like school students or working professionals, or it can be applied to different age groups. One can also increase the sample size and minimize social desirability. The use of AI can be studied in more detail with the inclusion of other working areas rather than educational areas. Lastly, researchers can examine it with other psychological variables for much better understanding or can take more independent and dependent variables.

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Conflict of Interest

The author(s) declared no conflict of interest.

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