Influence Of Chatgpt On Student Learning Behavior In Higher Education

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Abstract

The rapid integration of artificial intelligence (AI) in the field of higher education has profoundly changed the learning process of students, especially with the implementation of generative AI tools like ChatGPT. However, little empirical evidence has been reported about the influence of AI tools on the learning behavior of students in developing countries like Nepal. The current study is aimed at exploring the influence of performance expectancy, effort expectancy, and social influence on the learning behavior of students with the help of the Unified Theory of Acceptance and Use of Technology (UTAUT) model. A quantitative research design was adopted, and the data were collected from 102 students of Nepal with the help of a structured questionnaire using a 5-point Likert scale. The results revealed that effort expectancy had a statistically significant positive impact on how students studied (β = 0.366, p 0.05). The results showed that this model could account for 64.1% of the significant variance in college students' learning behaviour ($R^2 = 0.641$). The results indicated that effort expectancy and social influence were generally more important to students in influencing their learning behavior compared with performance expectancy. This study has a number of crucial implications about how good AI tools can be successfully integrated into universities.

Keywords: ChatGPT in Higher Education, AI-Assisted Learning, Student Learning Behavior, UTAUT Model, Effort Expectancy, Social Influence, Nepal

Introduction

Artificial intelligence is transforming the world of higher education across the globe by completely transforming the way knowledge is created, accessed, and utilized. In the recent past, the development of artificial intelligence has created a paradigm shift in the education and learning of students, whereby artificial intelligent tools are used to help students solve problems and learn. One of the artificial intelligent tools developed is ChatGPT, developed by OpenAI, which has created a lot of attention in the field of education due to its ability to create conversations with humans, as noted by Brown et al. (2020), creating a revolution in education and learning whereby students are able to access knowledge instantly.

The use of AI tools, including ChatGPT, also resonates with the recent emphasis on student-centered learning in higher learning institutions. Modern learning theories focus on active learning, thinking, and the construction of knowledge, rather than the passive consumption of information. The use of AI tools, including ChatGPT, helps in the shift to modern learning theories through the provision of personalized learning assistance, which helps in the increased engagement of students (White et al., 2023). Therefore, the use of ChatGPT in the learning process should not be viewed as the mere provision of learning information but as an interactive learning tool that helps students in the exploration of learning concepts,

improved understanding, and increased learning engagement. Recent studies have also indicated that the use of generative AI tools, including ChatGPT, helps in the increased efficiency of the learning process (Kasneci et al., 2023; Dwivedi et al., 2023).

In spite of these promising benefits, the effect of ChatGPT on the learning behavior of students is an area of debate. Learning behavior has several dimensions, including motivation, engagement, self-regulated learning, curiosity, and the desire to explore knowledge independently (Garcia et al., 2021). Some studies have argued that the learning behavior of students is significantly affected by AI tools, as they not only engage students in learning but also help them develop an independent learning culture. However, some studies have highlighted the negative aspects of AI tools, including the overuse of technology, the lack of critical thinking ability, and ethical concerns about academic integrity (Clark & Chalmers, 2019; Anderson & Johnson, 2023). Recent studies have shown that the effect of generative AI tools on learning is not as straightforward as expected, as it depends on the interaction of students with these tools (Zhai, 2023).

In order to understand the variables that impact the adoption of AI technologies in the educational sector, the Unified Theory of Acceptance and Use of Technology (UTAUT) model has been widely used as a theoretical framework to understand the variables involved in the adoption of AI technologies in the educational sector. The UTAUT model indicates that performance expectancy, effort expectancy, and social influence are the three variables that impact user behavior (Venkatesh et al., 2003). In the context of the educational sector, performance expectancy indicates students' perception of the ability of the AI technology to improve performance, effort expectancy indicates students' perception of the ease of use of AI technologies, and social influence indicates the extent to which students are influenced by other entities in the adoption of AI technologies. Recent studies have validated the UTAUT model as a suitable model to understand the adoption of AI technologies in the educational sector (Faruk et al., 2023; Salloum et al., 2023).

Despite the fact that the body of research on the application of ChatGPT and AI learning tools is rising tremendously across the globe, the majority of the research that has been conducted comes under the umbrella of the learning environments that are already developed and technologically advanced in the world. This is one of the major missing links when it comes to the learning behavior of students across the developing countries of the world. The country of Nepal is in the process of undergoing a digital revolution with the total trend of the rising availability of online resources and learning tools. However, when it comes to the empirical research that has been conducted on the total impact of AI learning tools such as ChatGPT on the learning behavior of students, the country of Nepal still lags behind, as described by Bista & Bishwakarma (2022). The total contextual scenario may play an important role in the learning behavior of students when it comes to the application of AI learning tools, as the scenario may not be aligned with the theoretical models of learning that are rising across the globe.

Furthermore, whereas past studies have investigated the adoption of AI tools in the field of learning, little research has explored the performance expectancy, effort expectancy, and social influence as predictors of learning behavior in an integrated approach. Most studies that exist focus on the acceptance of technology rather than the learning outcome, and this is an area that needs to be addressed in order to effectively understand the integration of AI tools in learning environments in an effective and productive way.

In this regard, the current study has been conducted with the objective of exploring the influence of ChatGPT on the learning behavior of students, specifically in the context of Nepal, with particular emphasis on some of the most important constructs of the UTAUT model of technology acceptance. The current study has been conducted with the objective of exploring the influence of ChatGPT on the learning behavior of students, specifically in the context of Nepal, with particular emphasis on some of the most important constructs of the UTAUT model of technology acceptance, namely performance expectancy, effort expectancy, and social influence, with the objective of providing insights into the influence of ChatGPT on the learning behavior of students, specifically in the context of Nepal, with the objective of contributing to the growing body of literature on the influence of ChatGPT on the learning behavior of students, specifically in the context of developing countries.

Literature Review

The use and adoption of emerging technology in education can be fully understood with the Unified Theory of Acceptance and Use of Technology (UTAUT), which is an integration of different technology acceptance models (Venkatesh et al., 2003). The theory argues that user behavior is driven by performance expectancy, effort expectancy, and social influence. These factors can be used as an overarching theory in understanding the behavior of students using ChatGPT in an educational setup.

On the other hand, performance expectancy is the extent to which an individual is of the view that the use of a particular technology has the capability of improving performance outcomes. In the context of education, this is the extent to which students perceive that the use of ChatGPT has the capability of improving academic outcomes as well as learning efficiency. On the other hand, effort expectancy is the ease of use of the particular technology, which is crucial in determining the continued use of the technology by the students. In addition, social influence is the extent to which an individual perceives that important others are influencing the use of the particular technology.

Recent studies have reaffirmed the applicability of UTAUT in the domain of AI-driven tools for education. For example, Faruk et al. (2023) showed that UTAUT constructs are significant in predicting the adoption of ChatGPT by students, while Salloum et al. (2023) emphasized the importance of effort expectancy and social influence in the context of AI-based tools for education.

Furthermore, artificial intelligence has become an increasingly integral aspect of the modern education system, allowing for an adaptive learning environment, personalized learning, and feedback, as discussed by Zawacki-Richter et al. (2020). The developments in the education system, especially after the shift towards digital learning globally, as observed after the pandemic, have led to the rise of AI tools as supporting technologies that improve the learning and teaching processes, as discussed by Karakose et al. (2023).

The introduction of ChatGPT, as an AI conversational tool, is an advanced form of natural language processing applications that have the ability to allow students to interact with technology in a dynamic way, as discussed by Kasneci et al. (2023), allowing students to obtain instant clarification of learning concepts, as discussed by Lu et al. (2021), creating an opportunity for students to engage in various learning activities, including writing, problem-solving, and idea generation, differentiating the tool from other digital learning tools, which makes it a revolutionary tool in the education system.

Learning behavior of students is a multidimensional concept that includes motivation, engagement, self-regulation, and curiosity dimensions (Garcia et al., 2021). The integration of AI tools can transform the learning behavior of students by encouraging autonomous learning and accessing more information. However, there are also concerns regarding cognitive dependency and the lack of critical thinking skills due to overdependence on AI-generated content (Clark & Chalmers, 2019; Zhai, 2023). Therefore, the conceptual relationship between AI tools and learning behavior is significant to assess the impact of AI tools on learning.

The empirical evidence on the impact of AI tools on the outcome of learning is inconsistent. However, it is worth mentioning that such evidence provides valuable insights. For example, Smith and Jones (2022) reported that using conversational AI tools increases students' motivational levels. Moreover, another study carried out by Wang and Chen (2020) reported that using AI tools increases students' performance outcomes. It is therefore safe to suggest that AI tools have a significant impact on students' learning behavior.

Regarding the UTAUT constructs, performance expectancy is an essential factor in the adoption of technology by students. Castillo et al. (2023) reported that students with high performance expectancy tend to have high engagement with AI tools. However, Rudolph et al. (2023) argued that over-inflation of performance expectancy may not necessarily result in change in students' learning behavior.

In addition, effort expectancy has been identified as a strong determinant of technology adoption. For instance, Yilmaz et al. (2023) discovered that ease of use significantly influenced students' willingness to adopt AI chatbots. Similarly, Minhas et al. (2024) showed that user-friendly AI technologies improve students' learning experiences. This indicates the importance of usability in shaping students' learning behavior.

Social influence has similarly been identified as a strong determinant of technology adoption. For example, Ragheb et al. (2022) showed that peer influence significantly influenced chatbot adoption in the educational setting. Similarly, Lan and Tung (2023) demonstrated that instructor support improved students' intention to use AI technologies.

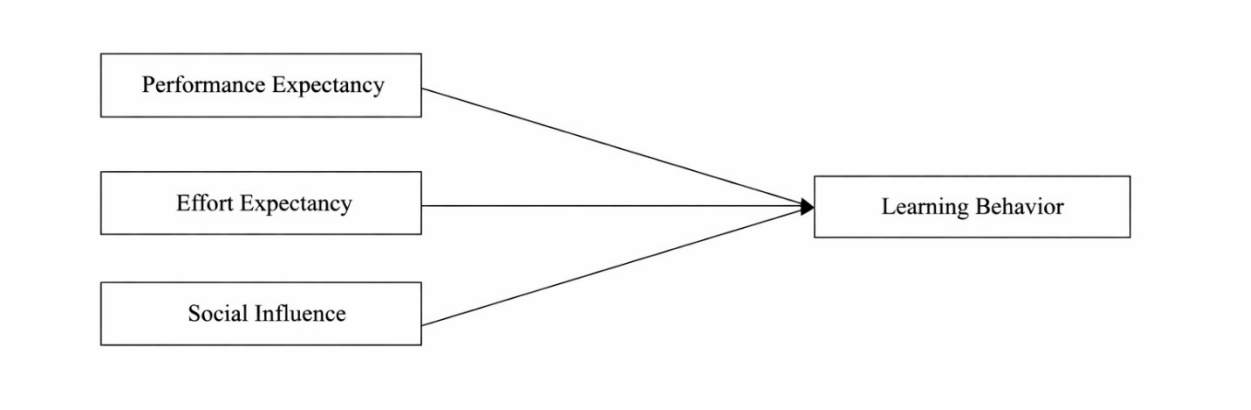
Despite the findings on the importance of various factors in AI adoption, empirical studies in developing countries such as Nepal are still limited. This indicates the need to carry out more localized studies to understand AI adoption and its impact on students' learning behavior.

Conceptual Framework

On the basis of the UTAUT model, this study has developed a conceptual framework, in which performance expectancy, effort expectancy, and social influence are treated as independent variables, while student learning behavior is treated as the dependent variable. The framework is based on the assumption that students' perceptions of the usefulness of the system, ease of use, and social influence could collectively influence their learning behavior with ChatGPT.

Figure 1

Conceptual framework



Source: Adapted from Venkatesh et al. (2003)

Based on the theoretical and empirical evidence discussed above, the following hypotheses are proposed:

H1: Performance expectancy has a significant impact on student learning behavior.
H2: Effort expectancy has a significant impact on student learning behavior.
H3: Social influence has a significant impact on student learning behavior.

Methodology

This study used a quantitative research methodology with a cross-sectional survey design in investigating the effect of ChatGPT on student learning behavior. This quantitative method was used

because it enables the objective measurement of the association between variables, as well as hypothesis testing. This method is commonly used in technology adoption studies and education research because it generates results that are reliable and generalizable (Creswell & Creswell, 2018).

The target population of the study consisted of students living in Mahendranagar, Nepal, and using ChatGPT for their studies. The students were at various levels of education, including college, bachelor, and master.

A total of 102 respondents were used in this study. This is an appropriate sample size for this study since, in multiple regression analysis, the minimum required sample size is given by the formula 50 + 8m, where m is the number of independent variables (Green, 1991). In this study, there are three independent variables, thus the minimum required sample size is 74, and the actual sample size used in the study, which is 102, is greater than the required minimum.

A non-probability judgmental sampling technique was utilized in selecting respondents with prior knowledge and experiences in using ChatGPT in academic-related activities. This technique is suitable in this study since it ensures that the selected respondents have prior knowledge and are in a position to provide valuable insights on the subject matter.

The use of judgmental sampling may be a limitation in that the sample may not be representative of the general student population. However, the technique is suitable in situations where specific respondents are targeted (Patton, 2002).

The data collection tool used in this study is a structured questionnaire with two parts. The first part of the questionnaire focused on collecting demographic data such as age, gender, and educational level. In the second part, the study variables and student learning behavior were measured. All constructs were operationally defined following the UTAUT framework (Venkatesh et al., 2003). The responses were collected using a five-point Likert scale with a range of 1 (strongly disagree) to 5 (strongly agree), facilitating quantitative analysis.

Before analysis, the collected data were coded, screened, and cleaned to ensure accuracy and completeness. The analysis was carried out using SPSS software.

Descriptive analysis using mean and standard deviation was used to analyze the perceptions of the respondents. Inferential analysis using Pearson correlation analysis was carried out to examine relationships between variables, while multiple regression analysis was conducted to examine predictive relationships involving independent variables on student learning behavior.

The analysis was found to be statistically significant at 0.05, as this is a widely accepted criterion to determine whether relationships are statistically significant (Field, 2018). The 0.05 criterion is essential to ensure that there is little chance of Type 1 errors, thereby ensuring that the results are reliable.

The multiple regression model used in this study is specified as follows:

$$SLB = \beta_0 + \beta_1(PE) + \beta_2(EE) + \beta_3(SI) + \epsilon$$

Where:

SLB = Student Learning Behavior

PE = Performance Expectancy

EE = Effort Expectancy

SI = Social Influence

β_0 = Intercept

β_1, β_2, β_3 = Regression coefficients

ε = Error term

This model helps in estimating the individual as well as combined influence of UTAUT constructs on student learning behavior.

Throughout the study, ethical standards were followed. The study was purely voluntary, and the subjects were made aware of the reason behind the study. The study was not harmful, and privacy was maintained by keeping the subjects anonymous, without any personal information recorded.

Results

This section presents the empirical findings of the study, which are derived from the quantitative data analysis of the data collected from 102 students who are using ChatGPT for their academic purposes. The presentation of the results is structured according to the objectives and hypotheses of the study, starting with the demographic characteristics of the respondents, then the descriptive statistics of the study variables, and finally the inferential statistical results.

Demographic Characteristics of Respondents

The findings suggest that the majority of the participants belonged to the age group between 18 and 25 years. This suggests that the usage of ChatGPT is more common among younger students.

The demographic analysis of the participants suggests that the majority of the participants belonged to the young adult group. Most of the participants (82.35%) belonged to the age group between 18 and 25 years, whereas only 13.73% of the participants belonged to the next higher age group between 25 and 30 years. Only 3.92% of the participants belonged to the oldest category of the age group between 30 and above.

Regarding the gender distribution of the participants, the findings suggest that the participants were almost evenly distributed between female and male participants. Most of the female participants (50.98%) constituted the total participants, whereas the male participants formed only 49.02%.

Table 1

Demographic Characteristics of Respondents (n = 102)

Variable	Category	Frequency	Percentage
Age	18–25 years	84	82.35
	25–30 years	14	13.73
	30 years and above	4	3.92
Gender	Male	50	49.02
	Female	52	50.98
Education Level	College	22	21.57
	Bachelor's	61	59.80
	Master's	19	18.63

Source: SPSS

Regarding the participants' level of education, the findings suggest that the majority of the participants (59.80%) belonged to the bachelor level, whereas the participants at the college level and the master level formed only 21.57% and 18.63%, respectively. This suggests that the usage of ChatGPT is more prevalent among students at the undergraduate level.

Patterns of ChatGPT Usage

The results indicate that ChatGPT is popularly used by students in their learning activities. This is supported by the fact that a significant number of students claimed that they often use ChatGPT, with 39.22% indicating that they often use ChatGPT, and 16.67% indicating that they always use ChatGPT. Additionally, 32.35% claimed that they sometimes use ChatGPT, while a small percentage claimed that they occasionally use ChatGPT (10.78%) and that they never use ChatGPT (0.98%).

Regarding the contribution of ChatGPT in students' learning activities, the majority of the students (72.55%) claimed that ChatGPT helps them in their learning activities. However, 21.57% claimed that ChatGPT encourages passive learning, and 5.88% claimed that ChatGPT limits their exposure to different viewpoints.

Table 2

Frequency of ChatGPT Usage

Usage Frequency	Frequency	Percentage
Never	1	0.98
Occasionally	11	10.78
Sometimes	33	32.35
Often	40	39.22
Always	17	16.67

Source: SPSS

Descriptive Statistics of Study Variables

Descriptive analysis was carried out to measure students' perceptions of performance expectancy, effort expectancy, social influence, and learning behavior. From the results, it is evident that students have positive perceptions of all the constructs. Performance expectancy scored an average of 3.88. This implies that students perceive that ChatGPT is beneficial in enhancing their performance and understanding. Effort expectancy scored an average of 3.98. This suggests that students find ChatGPT easy to use and that it saves them time and effort in simplifying their learning process.

Table 3

Descriptive Statistics of Study Variables

Variable	Mean	Standard Deviation
Performance Expectancy	3.88	0.59
Effort Expectancy	3.98	0.56
Social Influence	3.41	0.63
Student Learning Behavior	3.82	0.58

Source: SPSS

Social influence scored an average of 3.41. This implies that students are moderately influenced by their peers and social experiences in using ChatGPT. Learning behavior scored an average of 3.82. This suggests that students have a strong tendency towards self-learning and are curious and enjoy learning on their own. From the results, it is evident that students have consistent perceptions of the constructs. This is supported by the low standard deviation scores.

Correlation Analysis

Pearson's correlation analysis was conducted to check relationship among the variables with 1 % level of significance

Table 4

Correlation Matrix

Variables	1	2	3	4
1. Performance Expectancy	1			
2. Effort Expectancy	.732**	1		
3. Social Influence	.681**	.694**	1	
4. Learning Behavior	.749**	.751**	.705**	1

Note. $p < .01$

Source: SPSS

Pearson correlation analysis was performed to examine the association between performance expectancy, effort expectancy, social influence, and learning behavior of students. The findings of the study indicate that the independent variables, i.e., performance expectancy, effort expectancy, and social influence, are highly correlated with the learning behavior of students, as indicated by the strong correlations between the variables.

The study findings reveal that performance expectancy is highly correlated with learning behavior, as indicated by the strong correlation between the two variables, i.e., $r = 0.749$, $p < .01$, suggesting that students who believe that ChatGPT is beneficial for their academic performance tend to develop better learning behaviors.

Effort expectancy was also found to have a strong association with learning behavior, as indicated by the strong correlation between the two variables, i.e., $r = 0.751$, $p < .01$, suggesting that ease of use plays a crucial role in developing learning behaviors in students.

Similarly, the study findings reveal that social influence is highly correlated with learning behavior, as indicated by the strong correlation between the two variables, i.e., $r = 0.705$, $p < .01$, suggesting that social influence plays an important role in developing learning behaviors in students.

Regression Analysis

The regression results are interpreted based on the specified model, where student learning behavior is predicted by performance expectancy, effort expectancy, and social influence.

Table 5

Regression Results Predicting Student Learning Behavior

Predictor	B	t	p
Performance Expectancy	0.219	1.68	.097
Effort Expectancy	0.366	3.19	.002
Social Influence	0.287	2.98	.003

Source: SPSS

To ensure that performance expectancy, effort expectancy, and social influence are significant predictors of student learning behavior, multiple regression analysis was carried out. From the results, it is evident that the regression model is significant, ($F = 58.390$, $p < .001$), and that 64.1% of variance is explained in student learning behavior. Therefore, it is confirmed that the independent variables are effective in predicting student learning behavior in ChatGPT.

Besides, effort expectancy emerged as a significant predictor of student learning behavior, ($\beta = 0.366$, $p = .002$), which confirms that students who believe that ChatGPT is easy to use are more likely to exhibit positive learning behavior. Moreover, social influence emerged as a significant predictor of student learning behavior, ($\beta = 0.287$, $p = .003$), which suggests that social influence is significant in predicting student learning behavior. Performance expectancy, which is positively related to student learning behavior, ($\beta = 0.219$), failed to achieve statistical significance, ($p = .097$).

Based on the regression analysis findings, two of the three hypotheses were supported. The findings confirmed that effort expectancy and social influence have significant impacts on student learning behavior, supporting hypotheses 2 and 3, respectively. However, the findings did not reveal a statistically significant effect of performance expectancy, which led to the rejection of hypothesis 1. The findings suggest that ease of use plays a more critical role in influencing learning behavior than the performance benefits of the system.

Discussion

The aim of this study was to assess the impact of ChatGPT on student learning behavior by examining the performance expectancy, effort expectancy, and social influence constructs within the UTAUT framework. The results of this study are significant as they provide valuable insights regarding the learning behavior of students in Nepal with regards to the usage of AI-based chatbots in the context of learning. All the independent variables had positive correlations with the learning behavior of the students; however, the regression analysis indicated that the effort expectancy and social influence constructs are significant predictors of learning behavior, but performance expectancy was not found to

be significant in this context. It is essential to note that correlation is not the same as prediction, and the relative importance of the variables also plays a significant role in determining the actual outcomes.

The findings indicate that effort expectancy has a significant influence on students' learning behavior. Therefore, Hypothesis 2 is accepted. This indicates that students are likely to use ChatGPT if they find it easy to use and user-friendly. This is in line with the findings of the literature reviewed in the above paragraphs, i.e., Yilmaz et al. (2023) and Minhas et al. (2024), which indicate that ease of use is an important factor in the continued use of AI-based learning tools by students. However, this may even be more applicable in the Nepalese context, as students may have different levels of digital literacy and exposure to technology. If the students find the learning tool easy to use, saving their effort, they are likely to use the learning tool in their regular academic activities, hence improving their learning behavior. From the above findings, it is implied that AI is likely to be effective if it is user-friendly, i.e., students are aware of the AI learning tools.

Social influence was also observed to have a significant positive influence on student learning behavior, thus supporting Hypothesis 3. This suggests that students' learning behavior is also significantly affected by their peers' encouragement and support from their instructors. This finding is consistent with previous research findings presented in the literature review section, such as those of Ragheb et al. (2022) and Lan and Tung (2023). The influence of social influence could be particularly significant for students from collectivist educational environments such as Nepal. This suggests that students' adoption and utilization of ChatGPT could be more significant when students see their peers using it or get support from their instructors. This finding also suggests that promoting collaborative learning environments and encouraging instructors to use AI tools could be more beneficial for their utilization.

On the other hand, performance expectancy was not statistically significant in influencing student learning behavior, which led to the rejection of Hypothesis 1. Even though the variable was highly correlated with learning behavior, the lack of significance in the regression analysis indicates that the perceived usefulness of the system is not sufficient in influencing behavioral outcomes when other variables are controlled. The results of this study disagree with the findings of Castillo et al. (2023), which indicated that the perceived usefulness of the system is a strong predictor of student engagement, although they agree with the findings of Rudolph et al. (2023), which indicated that the expectations of the capabilities of AI may not necessarily influence actual behavioral outcomes.

This may be due to the possibility that students may perceive ChatGPT as a supplement, not the main source of their success, as well as the lack of clear guidelines on the effective use of ChatGPT, which may limit the perceived usefulness of the system in influencing behavioral outcomes.

Overall, the results support the proposed UTAUT framework, as both effort expectancy and social influence were identified as significant predictors, while performance expectancy was not. This also implies that traditional technology adoption models may need to be adapted for specific contexts when

used for AI-based learning environments. In contrast to traditional technologies, AI tools such as ChatGPT allow for interactive and generative features that may affect user behavior. In addition, other contextual factors such as digital literacy, support, and learning practices may be more critical for shaping technology adoption in developing countries. The results further support the need for extending and/or modifying existing theory for better understanding of AI adoption for educational purposes.

In comparison with the global studies, the results of the present research are largely consistent in terms of the significance of ease of use and social influence in technology adoption (Faruk et al., 2023; Salloum et al., 2023). At the same time, the insignificant role of performance expectancy indicates that, in the context of developing countries, students may be willing to accept AI technology for the sake of accessibility and social validation rather than for its potential to improve their performance.

Conclusion

This study aimed to assess the role of ChatGPT in affecting student learning behavior in the context of Nepal, using the Unified Theory of Acceptance and Use of Technology (UTAUT) theory, specifically in terms of performance expectancy, effort expectancy, and social influence. The results showed that effort expectancy and social influence are significant factors in affecting student learning behavior, implying that ease of use and social factors are crucial in affecting student learning behavior in terms of AI technology. On the other hand, although performance expectancy was found to have a positive correlation with student learning behavior, it was not found to be significant, implying that although AI technology is useful, it is not enough in affecting student learning behavior without the right circumstances. This study partially supports the UTAUT theory, particularly in the context of AI technology in the educational setting, especially in developing countries such as Nepal. This study, on a practical note, emphasizes the importance of using user-friendly AI technology, digital literacy, and social factors in affecting student learning behavior in terms of AI technology, particularly in the context of developing countries such as Nepal.

It is also essential that the educational institutions not only promote the usage of AI tools but also provide guidance on the effective usage of such tools. Keeping the limitations of the study in consideration, the study can be considered to have some limitations, such as the small sample size and the usage of non-probability sampling. Future studies can also include other variables such as the ethical awareness of the students, the importance of academic integrity, and the instructor's readiness to provide a more comprehensive understanding of the role of AI in the context of learning. Keeping the limitations of the study in consideration, the study can be considered to have made significant contributions to the literature by offering insights and guidance on the effective usage of the ChatGPT tool in the context of higher education institutions.

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