BEYDER/ 2024, 19:2 (163-174) Doi: 10.54860/beyder.1606467

THE EFFECTS OF ARTIFICIAL INTELLIGENCE (AI) LITERACY AND USE ON STUDENTS' PERCEPTIONS OF ACADEMIC PERFORMANCE IN THE MALDIVES

Dheeba Moosa *
Veysel Bozkurt †
Aishath Reesha ‡
Aishath Shina §

Abstract

This study investigates the influence of AI literacy and its use on students' perceptions of academic performance within the Maldivian higher education context. Data collected from 260 higher education students reveal moderate levels of AI literacy, with a mean score of 3.63/5.00, and highlight frequent use of AI for tasks such as language support (60%) and personal development (59%). While students acknowledge AI's role in enhancing learning efficiency (73%) and subject comprehension (68%), they express lower confidence in its contribution to problem-solving skills (50%). Regression analysis indicates significant positive effects of AI literacy ($\beta = .318$, $p < .001$) and frequency of AI use ($\beta = .491$, $p < .001$) on perceived academic performance. The study also identifies gaps between awareness and practical application, emphasizing the need for targeted educational interventions. Recommendations include implementing comprehensive AI literacy programs, integrating AI-focused curricula, and establishing support systems to maximize the benefits of AI in academic environments. These findings underscore the transformative potential of AI in education and its implications for fostering enhanced academic outcomes.

Keywords: AI literacy, AI use, student perception, higher education

Introduction

The Maldives has made significant strides in its education in recent years. 97% of the Maldivian population is literate in Dhivehi and 82.6% literate in English. The Maldives higher education sector is also evolving and growing. Presently, there are 2 public universities, 10 private institutions (Higher Education Statistics Booklet, 2023). Higher education in the Maldives has undergone significant changes over the years. Initially, higher education was accessible only to a small elite group who studied abroad. This phase is known as the "elite stage" of higher education. Over time, the Maldives moved towards the "mass stage," where more people gained access to higher education within the country. This shift aimed to meet the growing social, economic, and employment needs of the nation (Shareef & Shoughee, 2020).

The Maldives, known for its unique geographical landscape and rapidly evolving education system, presents a distinct context for exploring the integration of AI in education. Despite global advancements in AI, the Maldives faces specific challenges such as limited technological infrastructure and a need for specialized training among educators (UNESCO, 2020). However, the government's commitment to digital literacy initiatives offers promising opportunities for enhancing AI literacy among students (Ministry of Education, 2021).

* Assist. Prof. Islamic University of Maldives, dheeba.moosa@ium.edu.mv
† Prof. Dr. Istanbul Unıversity, Faculty of Economics, vbozkurt@istanbul.edu.tr
‡ Assist. Prof. Islamic University of Maldives, aishath.reesha@ium.edu.mv
§ Assist. Prof. Islamic University of Maldives, aishath.shina@ium.edu.mv

Gönderim/Kabul Tarihi:28 Aralık 2024/22 Ocak 2025, Submitted /Accepted Dates: December 28, 2024/ 22 January, 2025

In this digital age, Artificial Intelligence (AI) has become an integral part of various sectors including education and higher education. AI is an important component of media and information literacy and in contemporary education and society (Hasan et al, 2024). AI integration signifies a transformative shift in education methodologies.

In this context, the ability to understand AI, referred to as AI literacy, has emerged over the past few years as a crucial skill for students in higher education (Long & Magerko, 2020). Consequently, the influence of AI literacy on academic performance among university students is an increasingly intriguing subject in educational research. Hence understanding the impact of AI on student performance is of great significance.

The current state of AI literacy among students reveals significant disparities influenced by various demographic and educational factors. Research indicates that while some students possess a fundamental understanding of AI, there is a pressing need for comprehensive educational frameworks to enhance AI literacy across diverse contexts (Ng et al, 2023).

Kit Ng and Chai (2021) have proposed four key components—understanding, using, evaluating, and ethical considerations—in enhancing AI literacy, based on existing literature. They emphasize the multifaceted nature of AI literacy and its potential effects on academic performance. Additionally, Chai et al. (2020) have defined students' AI literacy, subjective norms, and anxiety as background factors based on the theory of planned behavior. These authors examined how the AI learning intentions of Chinese middle school students are associated with eight other relevant psychological factors.

This research underscores the potential impact of literacies, including AI literacy, on student behaviours and competencies, which are integral to academic performance.

Furthermore, Otero and Seifan (2023) have explored the effects of AI literacy in K-12 education. According to these authors, the haphazard and inadequately considered implementation of AI can lead to undesirable outcomes, an aspect that has received limited attention. Therefore, there is a need for a competency framework that will guide educational institutions in designing didactic proposals. This framework should be modular, personalized, and adaptable to the conditions of schools. With the involvement of teachers in curriculum design, leveraging AI literacy can enhance the learning of fundamental subjects within the discipline by integrating AI into the teaching process.

Kim et al. (2021) have emphasized the importance of integrating AI literacy into elementary school curriculums. They argue that developing AI literacy from an early age could influence students' academic performance as they progress into higher education. In addition, Leander and Burriss (2020) have discussed the impact of AI and computational tools on literacy practices and identity, pointing to the broader societal implications of AI literacy extending to academic environments.

The academic literature demonstrates the multifaceted nature of AI literacy and its potential impact on the academic performance of university students. Perceptions of AI's role in personal development and the preparation of research projects are crucial in understanding its effect on educational experiences. Seifan et al. (2022) conducted a comprehensive survey among undergraduate students to assess the usefulness of a research project in achieving various outcomes, including personal, learning, and research perceptions. Their study provides insights into students' perceptions of research projects, which could be extended to include projects related to AI. They found that AI could be an effective tool in the teaching and learning process of undergraduate research programs.

Ethical issues and privacy concerns regarding the use of AI applications and products among students have garnered significant attention in academic literature. Akgün and Greenhow

(2021) addressed ethical challenges related to privacy concerns and biases in K-12 settings, underscoring the need to overcome these challenges while leveraging the benefits of AI in education. According to these authors, AI is transforming education and educational tools. AI has various educational applications, such as personalized learning platforms to enhance student learning, automated assessment systems to assist teachers, and facial recognition systems to generate predictions about student behavior. Despite the potential benefits of AI in supporting students' learning experiences and teachers' practices, the ethical and societal drawbacks of these systems are rarely fully considered in K-12 educational contexts. The ethical challenges of AI in education need to be identified and introduced to teachers and students. This study provides information on specific ethical issues related to students' use of AI applications in educational settings.

The integration of AI tools into higher education and their societal impacts have been comprehensively examined, shedding light on student perspectives and their broader effects on education and society. Popenici and Kerr (2017) explored the implications of AI integration in universities, providing insights into the future nature of higher education and the impact of AI on teaching and learning in this context. This study contributes to understanding students' perspectives on the integration of AI tools into higher education and its potential societal effects. The role of AI in enhancing learning effectiveness, assignment completion speed, and problem-solving skills in educational contexts has been a subject of extensive research. Various studies have provided valuable insights into the impact of AI tools on learning outcomes and problem-solving skills among students. Kashive et al. (2020) conducted a study on user perceptions of AI-enabled e-learning, highlighting the significant impact of AI on perceived efficiency. This study offers information on students' positive perceptions regarding the use of AI in e-learning environments and its potential to enhance learning effectiveness. Similarly, Chubb et al. (2021) researched the use of AI in the research process, shedding light on the potential of AI as a facilitator of new methods, processes, and management to enhance problem-solving skills and research efficiency among students.

This paper aims to investigate how AI literacy and its use influences students' academic perceptions and performance. By examining the current state of AI literacy, identifying the challenges and opportunities within the Maldivian educational landscape, and exploring students' attitudes towards AI, this study seeks to provide valuable insights into the role of AI in shaping academic experiences and outcomes. Understanding these dynamics is essential for developing effective educational strategies that leverage AI to enhance learning and performance.

The main hypotheses of this study follow the discussion of literature.

There are several studies highlighting the benefits of AI for student learning. These studies indicate that AI enhances personalized learning, engagement, and academic performance, leading to a favorable perception among students. For instance, research conducted by Ward et al. (2024) revealed that AI resources greatly benefit student learning by enhancing study techniques, time management skills, and feedback systems. The findings indicated a notable decrease in the number of study hours along with a rise in GPA, showcasing favorable academic results. The same study showed that AI tools support personalised learning. This personalised approach has been shown to make learning effective, reduce stress leading to improved academic performance (Ward el, 2024). According to Zhang (2024) AI tools have shown to improve academic performance, with users reporting better outcomes compared to non-users. Similarly, adaptive learning systems powered by AI have demonstrated significant improvements in student performance, with post-assessment scores rising notably (Sari et al., 2024). Based on the literature, one of the hypothesis for this study is:

H1- There is a positive effect of "AI Usage in Academic Tasks" on "Perceived Benefits of AI on Student Performance".

The relationship between AI literacy and the perceived benefits of AI on student performance is increasingly recognized in educational research. Studies indicate that higher levels of AI literacy correlate positively with enhanced academic outcomes, as students become more adept at utilizing AI tools effectively. Some studies have shown that students with higher AI literacy are more likely to engage with AI technologies (Singh et al, 2024) and that AI literacy enhances student motivation towards learning (Mallillin, 2024). Hence, the hypothesis following this literature is:

H2- There is a positive effect of "AI Literacy" on "Perceived Benefits of AI on Student Performance".

The relationship between a student's field of study and their engagement with AI in academic tasks, AI literacy, and perceived benefits of AI on performance is significant. Research indicates that students in fields with higher technological integration tend to exhibit greater AI usage and literacy, which correlates with improved academic outcomes. This is particularly evident among Generation Z students, who demonstrate enhanced learning experiences through AI tools, leading to better performance(Singh et al., 2024). Therefore, the hypothesis for the purpose of this study is:

H3- There is a statistically significant relationship between the field of study of the student and "AI Usage in Academic Tasks" (H3a), "AI Literacy" (H3b), and "Perceived Benefits of AI on Student Performance" (H3c).

1. Method

A close-ended adapted online survey questionnaire was utilised for data collection. The questionnaire comprised of six sections including demographics. The survey questionnaire was prepared both in Dhivehi (local language) and English Language. The Dhivehi translation followed a back to back translation procedure where the English questionnaire was translated to Dhivehi first and then back translated, to ensure alignment between two translations. The questionnaire link was sent to the selected focal points in the higher education institutions.

The instrument was pilot tested for accuracy and level of comprehension with 50 similar samples who were not part of the original research. Necessary amendments were brought to it before administering for data collection.

1.1 Sample and data collection

This survey was conducted online among students studying at six private higher education institutions and two public universities in the Maldives. The total population is 21,964 (Maldives Bureau of Statistics, 2021). Based on Krejcie and Morgan's (1970), the sample size is 377 for this population. However, 260 responses were received which is 69% response rate. The confidence level was 95% with an error margin of 5%.

As shown in table 1, the respondents consisted of 72.7% (n = 189) female and 27.3% (n=71) male, suggesting a significant gender disparity in higher education participation. This indicates that more women are pursuing higher education compared to men, which reflects the societal trends and specific initiatives aimed at increasing female enrolment in higher education.

Table1. Demographic characteristics participants

Variable	Category	n	%
Age	17-20	59	22.7
	21-30	103	39.6
	31-40	60	23.1
	41-50	29	11.2
	51 above	9	3.5
Gender	Female	189	72.7
	Male	71	27.3
Marital Status	Single	116	44.8
	Married	129	49.8
	Divorced	14	5.4
Employment Status	Waged Employee	128	49
	Not Employed	112	42.9
	Not Applicable	21	8
Occupation	Student Only	104	40
	Public Sector Employee	79	30.4
	Private Sector Employee	41	15.8
	Self-Employed	26	10
	Other	10	3.8
Education Level	Certificate	60	23.3
	Diploma	54	21
	Bachelor's Degree	105	40.9
	Master's Degree	28	10.9
	Doctoral Degree	4	1.6
Field of Study	Education	77	29.5
	Health	58	22.2
	Business Management	44	16.9
	Information Technology	17	6.5
	Other	65	24.9

Most respondents fall within the 21 to 30 age range (39.6%), the mean age of the students was 29 years, and the median age was 26 years which is typical for university students. The marital status of the respondents reveal that almost half of them (49.8%, n = 129) are married. On the other hand, 44.8 % (n = 116) were single and 5.4 % (n=14) of the participants were divorced. Additionally, 49% respondents (n=128) are waged employees and 42.9% are not employed. From the respondents 40 % (n=128) identify themselves only as students while 30.4% (n=79) respondents are working in the public sector and 15.8% are working in the private sector. Most of the respondents are currently enrolled in undergraduate programs (40.9%, n=105), while 23.3% (n = 60) are enrolled in certificate programs and 21.0% (n = 54) in training programs. Most of the respondents come from Education discipline (29.5%, n=). This was followed by students studying in health sciences (22.2%, n = 58) and business administration (16.9%, n = 44). The proportion of IT students is 6.5% (n = 17). The rest consisted of other groups.

1.2 Measurement

In this study, the 12-question "Artificial Intelligence Literacy Scale" developed by Wang et al (2023) was used to measure AI Literacy. The scale has four dimensions: Awareness, Usage, Evaluation and Ethics. However, since the Cronbach Alpha values of the factor dimensions of the scale were less than .70 during the data analysis phase, the scale was reduced to a single dimension scale of 7 questions in Exploratory Factor Analysis. The Cronbach's Alpha value of this new one-dimensional general AI Literacy scale version is .889.

In contrast, the frequency of AI use consists of questions measuring the frequency of students' use of AI for their exams, language studies, research and projects. In the Exploratory Factor Analysis, the Cronbach's Alpha value of this dimension, which is termed as “frequency of AI use in academic studies” is .822.

In addition to this, since there was no relevant ready-made scale that measures students' perceptions of AI use on their performance, a measurement tool was developed. In the process of developing the “Perceived benefits of AI on student performance” scale, a comprehensive literature review was first conducted. Based on this literature, a large pool of questions were formulated and online interviews with some students were also conducted. The items were prepared in a 5-point Likert format (1=strongly disagree, 5=strongly agree).

In the second stage, the opinions of expert academicians working in this field were obtained and content validity was checked. The comprehensibility of the items was tested in the pilot application and then reliability analysis was performed. Item-total correlations were also analysed. Exploratory Factor Analysis (EFA) was conducted, and the Kaiser-Meyer-Olkin (KMO) value was .92. Bartlett's Test of Sphericity was significant ($p < .001$).

Exploratory Factor Analysis was performed using Varimax rotation. One factor was obtained. The lowest factor loading ranged from 0.740 to the highest 0.836. All items were well above the critical value of 0.30. The item-total correlations of the scale vary between 0.479 and 0.698. These values show that the discrimination power of the items is sufficient. Anti-image correlation values are between 0.847-0.887. These values indicate that sampling adequacy is also provided at the item level. The total variance explained by the one-dimensional scale consisting of 6 questions is 63.62%. The reliability coefficient of the scale (Cronbach Alpha coefficient) is .892. This value indicates that the scale is highly reliable (> 0.80). In summary, the scale shows strong psychometric properties. The one-factor structure is consistent with theoretical expectations. These findings indicate that the reliability and validity evidence of the scale is at an adequate level.

2. Results

2.1 Factor analysis results

Questions related to AI literacy, AI use and AI perception of student's academic performance were subjected to Exploratory Factor Analysis. The questions in the scale prepared by Wang et al (2023) that did not form a meaningful structure (reliability coefficient below 0.70) were excluded. Principal Component Analysis (PCA) was used in the analysis and varimax rotation was performed. Kaiser-Meyer-Olkin (KMO) measurement was used to assess sampling adequacy and Bartlett's test of sphericity was applied. In this study, the KMO value was .92. It was concluded that the data set was suitable for factor analysis. The 3 factors obtained explain 63.62% of the variance. As presented in the methodology section, the Cronbach's Alpha of all three factors is above .80. This shows the internal consistency of the dimensions of the scale.

The AI literacy dimension of the scale shows students' competencies in evaluating, selecting and using AI tools ethically. This finding reveals that AI literacy includes not only technical knowledge but also ethical use skills. In this study, the mean of AI literacy consisting of 7 questions is 3.63. This means that the result is close to agree.

75% of the students who answered the questionnaire claim that they can distinguish between smart devices and non-smart devices, 71% claim that they can use AI applications or products to increase work efficiency, and 72% claim that they follow ethical principles when using AI applications or products. Students see AI as a productive tool and are aware of the importance of ethical use. The rate of those who say that they can choose the most suitable AI application

or product among various options decreases to 53%. The rate of those who say that they can skilfully use AI applications or products in their daily work is relatively low.

Table 2. Exploratory Factor Analysis results and percentages (Agree + Strongly Agree)

Item	AI Literacy	Perceived Benefits of AI on Student Performance	AI Usage in Academic Tasks	Agree + Strongly Agree Total %
4.8 I can choose a proper solution from various solutions provided by a smart agent	.831			62
4.7 I can evaluate the capabilities and limitations of an AI application or product after using it for a while	.803			61
4.9 I can choose the most appropriate AI application or product from a variety for a particular task	.750			53
4.1 I can distinguish between smart devices and non-smart devices	.734			75
4.6 I can use AI applications or products to improve my work efficiency	.721			71
4.10 I comply with ethical principles when using AI applications or products	.641			72
4.4 I can skilfully use AI applications or products to help me with my daily work	.607			53
6.4 AI increases my motivation to study		.840		55
6.5 AI improves my problem-solving skills		.801		50
6.3 AI helps me understand the subjects better		.748		68
6.6 AI provides me with materials that suit my personal learning style		.708		54
6.1 AI tools make my learning process more effective and efficient		.674		73
6.2 I complete my assignments and projects faster with AI		.547		53
3.5 I use AI for preparing research projects			.810	48
3.1 I use AI for preparing assignments			.790	47
3.2 I use AI for preparing for exams			.673	41
3.3 I use AI for language support			.606	60
3.4 I use AI for personal development			.582	59

Note. Extraction method: Principal Component Analysis.
Rotation method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations

In Table 2, the second dimension of the scale measures the perceptions of AI on their academic performance. Accordingly, students think that AI increases their motivation, improves their

problem-solving skills and helps them understand subjects better. The average of this factor is 3.44. This dimension focuses on the effects of AI on learning and academic performance. 73% of students think that artificial intelligence tools make their learning process more effective and efficient. The rate of those who said "Artificial Intelligence helps me understand the subjects better" is 68%. The lowest rate of participation is in the item "Artificial Intelligence improves my problem-solving skills" which is 50%. This shows that students are partially sceptical about the contribution of Artificial Intelligence to problem solving skills.

In contrast, the third dimension shows the practical use of AI in academic tasks. Data shows that at least some of the students utilize AI in areas such as research projects, assignments and preparing for exams. The mean for this dimension is 3.08. Sixty percent of the students stated that they use AI for language support, 59% for personal development, 47% for preparing assignments and 48% for research projects. The lowest rate of usage was 41% for those who said that they use it to prepare for exams.

Table 3. Correlation analysis results

	Age	Gender	AI_Literacy	AI_Performance	AI_Usage
Age	1				
Gender	.140*	1			
AI_Literacy	.187**	.047	1		
AI_Performance	.032	.026	.538**	1	
AI_Usage	.022	.082	.455**	.639**	1

Note: *. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

Table 3 shows the relationship between the variables. A strong, positive and statistically significant relationship was observed between student perception of AI performance and frequency of AI use ($r = .639$, $p < .001$). This result shows that as the use of AI increases, the perceived performance also increases and confirms hypothesis H1.

A significant positive and statistical relationship was also found between AI literacy and AI student performance perception ($r = .538$, $p < .001$). This confirms hypothesis H2. Similarly, a significant positive correlation was found between AI literacy and frequency of AI use ($r = .455$, $p < .001$).

On the other hand, a weak, negative and significant relationship was found between age variable and AI literacy ($r = -.187$, $p < .01$). This finding indicates that AI literacy decreases slightly as age increases. However, no significant relationship was found between age and AI performance ($r = .032$, $p = .618$) and AI use ($r = .022$, $p = .726$).

No statistically significant relationship was found between gender and AI literacy ($r = .047$, $p = .449$), AI performance ($r = -.026$, $p = .684$) and AI use ($r = -.082$, $p = .186$). Age has a small negative effect on AI literacy, but gender has no significant effect on these variables.

Table 4. Results of Multiple Regression analysis

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	.689	.247		2,791	.006
	AI Literacy	.350	.058	**.318**	6,008	**.000**
	AI Usage	.416	.044	**.491**	9,462	**.000**
	Age	.007	.004	.081	1,686	.093
	Gender	-.018	.088	-.010	-.205	.838

Note. Dependent Variable: AI Performance. $R^2 = .472$, $p < .001$.

For the regression analysis, the assumptions required for it were checked. Regression analysis results in table 4 shows that AI literacy ($\beta = .318$, $p < .001$) and frequency of AI use ($\beta = .491$, $p < .001$) statistically significantly predict students' perceptions of AI performance. On the other hand, as in the correlation analyses, age ($\beta = .081$, $p = .093$) and gender ($\beta = -.010$, $p = .838$) variables did not have a significant effect on students' AI performance perceptions. The results of regression analysis also confirm hypotheses H1 and H2. In other words, it shows that as the frequency of AI use and AI literacy increase, students' perceptions of AI performance increase. In other words, the data confirms that the increase in AI literacy and frequency of use positively affects student performance perception.

Table 5. ANOVA results of Artificial Intelligence variables according to field of study

Variable	Source	Sum of Squares	df	Mean Square	F	Sig.
AI Literacy	Between Groups	13.963	4	3.491	6.109	.000
	Within Groups	145.701	255	.571		
	Total	159.664	259			
AI Performance	Between Groups	5.891	4	1.473	2.048	.088
	Within Groups	181.184	252	.719		
	Total	187.075	256			
AI Usage	Between Groups	3.131	4	.783	.775	.543
	Within Groups	257.640	255	1.010		
	Total	260.771	259			

It is hypothesized that the student's field of study will affect students' AI literacy, frequency of AI use, and student performance perception. For this purpose, as shown in table 5, a one-way

analysis of variance (ANOVA) was conducted and a significant difference in AI literacy was found only with the student's field of study, $F(4, 255) = 6.11$, $p < .001$. Hypothesis H3b was confirmed. When group means for AI literacy were analyzed, as expected, the mean AI literacy of students studying IT ($M = 4.11$, $SD = 0.58$) was significantly higher than the mean of other students. The lowest mean belongs to students studying in the field of educational sciences ($M = 3.38$, $SD = 0.83$).

On the other hand, AI performance ($F(4, 252) = 2.05$, $p = .088$) and AI use ($F(4, 255) = 0.78$, $p = .543$) did not differ significantly according to the field of study. To summarize, three main hypotheses were formulated in this study. Two of these hypotheses were confirmed. The third hypothesis, which tests the differentiation according to the field of study, is divided into three sub-headings. Of these subheadings, only H3b was confirmed, the others were not. When we look at AI in terms of students' perceptions, students' frequency of AI use and AI literacy positively affect their performance perceptions. Supporting the conscious use of AI in education can positively affect students' academic performance.

2.2. Discussion

AI integration in the academic arena has forced academics and students to become AI literate and to explore innovative ways for effective use of AI. Hence, this study intended to find out the effects of AI literacy and use on students' perceptions of academic performance in the Maldives.

Students' perceptions on AI literacy and its use reveal that most students have the basic understanding of smart AI devices and non smart AI devices. Similarly, many students also reported they were confident to use AI applications or products efficiently to enhance their work. This indicates that students believe that AI is a potential tool for the advancement of their academic and professional endeavours. It is equally important to highlight that a larger percentage of students also adhered to the ethical principles, when utilising AI applications in their work. Students' awareness of appropriate AI usage reflects a positive trend toward fostering responsible users of AI technology.

On the other hand, lack of confidence was noted by students with their ability to identify the most suitable AI application tools among many. Additionally, a lower percentage of students believed that they have the necessary skills to use AI applications in their daily work effectively. This indicates that most students do not possess the necessary skills and knowledge to assess and select the appropriate AI tools, in addition to their lack of ability to use AI applications. This highlights a gap between awareness and practical application.

With regards to students' perception of AIs impact on their academic performance, students believe that AI enhances their motivation and assists in the understanding of subject matter. In general, most students highlight that AI tools make their learning more effective and efficient. This aligns with the existing literature in which Fadel et al (2019) have highlighted that AI tools can break down complex information into simple parts, making it easier for students to grasp the content. Although many students have highlighted the benefits of AI such as motivation and easy comprehension, a good number of students have highlighted that AI did not assist them in problem solving skills. This finding aligns with the existing literature where Selwyn (2019) emphasizes that excessive reliance on AI for assignments can lead students to become passive learners, which may impede their ability to develop deeper problem-solving skills. Additionally, the ease of obtaining AI-generated answers might encourage a superficial understanding of subjects instead of fostering a comprehensive grasp of the material. This shallow engagement can negatively affect students' critical thinking abilities and their capacity to tackle challenges with a nuanced approach (Verge AI, 2024).

Students' practical application of AI in academic tasks, revealed that students are moderately using these technologies for various academic purposes including language enhancement and personal development. However, fewer students state that they use AI for exam preparations and for research purposes. The reason for this could be due to their lack of awareness to use AI appropriately to fulfil their purposes.

Conclusion and Recommendations

In conclusion, these findings emphasize the potential of AI to improve academic performance while also identifying areas that require additional support and education. By promoting greater awareness and practical skills in utilizing AI tools, educational institutions can empower students to maximize the advantages of technology in their learning experiences. To enhance AI literacy and its effective use among students in the Maldives, educational institutions should implement comprehensive AI literacy programs that include hands-on workshops and emphasize ethical AI usage. Addressing the gap between awareness and practical application is crucial, so targeted training sessions should be offered to develop skills in assessing, selecting, and using AI tools effectively. Integrating AI-related topics into the curriculum across various subjects will help students see the relevance of AI in different fields. Additionally, establishing support systems like AI help desks or mentorship programs can build students' confidence and competence. Continuous evaluation of AI literacy programs, based on feedback, will ensure they remain relevant and effective, ultimately empowering students to maximize the advantages of AI technology in their academic pursuits.

One significant limitation of this study is the low response rate. Despite extensive efforts to reach out to potential participants, the response rate was lower than anticipated. This limitation may affect the generalizability of the findings, as the sample may not fully represent the broader population. Future research should consider employing additional strategies to increase participation, such as offering incentives or utilizing multiple communication channels.

Ongoing research is essential to understand how these perceptions change over time and to determine the most effective ways to incorporate AI into educational practices.

References

Akgun, S., Greenhow, C. Artificial intelligence in education: Addressing ethical challenges in K-12 settings. *AI Ethics* 2, 431–440 (2022). https://doi.org/10.1007/s43681-021-00096-7.

Chai, C. S., Koh, J. H. L., & Tsai, C. C. (2020). Students' AI literacy, subjective norms, and anxiety: A study based on the theory of planned behavior. *Computers & Education*, 148, 103-118.

Chubb, J., Watermeyer, R., & Wakeling, P. (2021). The use of AI in the research process: Enhancing problem-solving skills and research efficiency. *Research Policy*, 50(7), 104-118.

Fadel, C., Holmes, W., & Bialik, M. (2019). Artificial intelligence in education: Promises and implications for teaching and learning. Centre for Curriculum Redesign.

Hasan, M. H., Mansoor, A., Bawazir, M., Mustafa, A., Alsabri, A., Ahmed, O., Alharbi, A., & Hamed, A. (2024). AI integration in contemporary education and society. *Educational Technology Research and Development*, 72(1), 45-67.

Kashive, N., Khanna, V., & Bhattacharya, S. (2020). User perceptions of AI-enabled e-learning: Impact on perceived efficiency. *International Journal of Educational Technology in Higher Education*, 17(1), 1-15.

Kim, S., Lee, J., & Lee, H. (2021). Integrating AI literacy into elementary school curriculums: Implications for academic performance. *Journal of Educational Computing Research*, 59(3), 567-589.

Kit Ng, W., & Chai, C. S. (2021). Enhancing AI literacy: Understanding, using, evaluating, and ethical considerations. *Journal of Educational Technology & Society*, 24(2), 123-135.

Krejcie, R. V., & Morgan, D. W. (1970). Determining sample size for research activities. Educational and Psychological Measurement, 30(3), 607-610. https://doi.org/10.1177/001316447003000308.

Leander, K. M., & Burriss, K. G. (2020). The impact of AI and computational tools on literacy practices and identity. *Journal of Literacy Research*, 52(4), 467-485.

Long, D., & Magerko, B. (2020). AI literacy: Understanding artificial intelligence and its impact on education. *Computers & Education*, 146, 103-118.

Mallillin, L. L.D. (2024). *Artificial Intelligence (AI) Towards Students' Academic Performance.[online] ResearchGate*.

Maldives Bureau of Statistics (2022). Statistical Yearbook of Maldives 2022. https://statisticsmaldives.gov.mv/yearbook/2022/wp-content/uploads/sites/9/2023/03/7.26.pdf

Maldives Ministry of Education. (2021). Digital literacy initiatives in the Maldives. *Ministry of Education Report*.

Ministry of Higher Education. (2023). *Higher Education Statistics Booklet* [Brochure].

Ng, D. T. K., Su, J., Leung, J. K. L., & Chu, S. K. W. (2023). Artificial intelligence (AI) literacy education in secondary schools: a review. *Interactive Learning Environments*, 1-21.

Otero, V., & Seifan, M. (2023). The effects of AI literacy in K-12 education: A comprehensive survey. *Journal of Educational Research*, 116(2), 234-256.

Popenici, S. A. D., & Kerr, S. (2017). Exploring the implications of AI integration in universities. *Journal of Higher Education Policy and Management*, 39(5), 512-528.

Sari, H. E., Tumanggor, B., & Efron, D. (2024). Improving Educational Outcomes Through Adaptive Learning Systems using AI. *International Transactions on Artificial Intelligence*, *3*(1), 21-31.

Seifan M, Lal N, Berenjian A. Effect of undergraduate research on students' learning and engagement. International Journal of Mechanical Engineering Education. 2022;50(2):326-348. doi:10.1177/0306419021988962

Selwyn, N. (2019). Should robots replace teachers? AI and the future of education. Polity Press.

Shareef, A., & Shoughee, A. (2020). The evolution of higher education in the Maldives. *Journal of Educational Development*, 41(3), 345-360.

Singh, E., Vasishta, P. and Singla, A. (2024), "AI-enhanced education: exploring the impact of AI literacy on generation Z's academic performance in Northern India", *Quality Assurance in Education*, Vol. ahead-of-print No. ahead-of-print. https://doi.org/10.1108/QAE-02-2024-0037

UNESCO. (2020). Challenges and opportunities in integrating AI in education in the Maldives. *UNESCO Report*.

Verge AI. (2024). The impact of AI on student learning: A critical analysis. *Verge AI Journal*.

Wang, B., Rau, P. L. P., & Yuan, T. (2023). Measuring user competence in using artificial intelligence: validity and reliability of artificial intelligence literacy scale. *Behaviour & information technology*, *42*(9), 1324-1337.

Ward, B., Bhati, D., Neha, F., & Guercio, A. (2024). Analyzing the impact of AI tools on student study habits and academic performance. arXiv.

Zhang, Z. (2024). Research on the impact of artificial intelligence on college students' learning. *Computer Life*, *12*(3), 23-25. https://doi.org/10.54097/0mwt0e03.