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Artificial Intelligence in Education: Assessing Student's Creativity & Achievement Motivation

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Abstract

The integration of artificial intelligence (AI) into education has introduced transformative potential and challenges, particularly regarding students' creativity and achievement motivation. This study explores AI's influence on these factors among students from diverse academic fields—Management, Commerce, Arts, Social Sciences, and Science. Within these groups, AI usage will be assessed across three levels: low, moderate, and high. This research responds to emerging concerns that AI's convenience may unintentionally reduce students' creative engagement and intrinsic drive, as it allows tasks to be completed with minimal effort. Employing a quantitative approach, 400 students between 18 and 25 years of age will be purposely selected to capture a comprehensive picture across various disciplines. The study utilises standardised measures: the Nicolas Holt Creativity Test, The AI Usage Scale, and the Achievement Motivation Questionnaire. Through ANOVA and stepwise regression analysis, the study will assess AI's impact on both creativity and achievement motivation, considering factors such as demographic differences and academic field. Findings aim to address a gap in understanding AI's role in shaping educational experiences, revealing insights critical for designing AI-supported learning environments that balance technological convenience with essential developmental outcomes. This research has the potential to contribute substantially to educational strategies by informing AI's integration to optimise student motivation and creativity in academic settings.

Keywords: Artificial Intelligence, Creativity, Achievement Motivation, Technology, Transformative

The rise of artificial intelligence (AI) in the educational sector has brought transformative benefits and unprecedented challenges. Over the past decade, technology has fundamentally reshaped the teaching and learning landscape, delivering significant advantages such as reduced information-gathering time, easy access to resources, and enhanced personalization (Zhai et al., 2021). However, the adoption of AI tools in classrooms, while empowering for students, has also introduced potential misuse. AI's capacity to generate content with minimal effort from students has raised concerns about diminished originality, with students contributing little beyond basic commands for AI-generated assignments.

The implications of AI on intrinsic motivators, particularly creativity and achievement motivation, remain under-researched, leaving an important gap in understanding its role in student development (Ahmad et al., 2023). While AI enhances learning efficiency and personalised feedback, it may also reduce the human interaction that often characterises the educational experience. Traditional aspects of learning, such as feedback, motivation, and mentorship, typically rely on teacher-student relationships, which play a crucial role in fostering personal engagement, drive, and critical thinking skills. In some cases, the over-reliance

on AI tools could lead to a reduction in these skills, potentially stifling students' creativity and intrinsic motivation to excel independently.

In terms of achievement motivation, AI can offer personalised learning pathways that engage students by catering to their unique pace, preferences, and skill levels. Intelligent tutoring systems, for instance, adapt to individual progress, setting challenges that encourage students to strive for improvement. Such tools can boost motivation by providing timely feedback and measurable milestones, which are proven to be effective in encouraging self-improvement (Chen et al., 2020). However, the ease and accessibility of AI tools might, in some cases, reduce students' intrinsic motivation by making academic tasks too easy to complete, fostering complacency and reducing personal effort. If students increasingly rely on AI to accomplish tasks with minimal engagement, their motivation to achieve may be compromised, as they invest less effort and ownership in their academic accomplishments.

Creativity is another area where AI shows potential benefits but also raises concerns. AI offers access to diverse information sources and creative frameworks, enabling students to experiment with ideas, visualise complex concepts, and explore interdisciplinary connections. These capabilities can foster innovative thinking by sparking new ideas and providing alternative solutions that may otherwise be inaccessible. However, the overuse of AI can suppress creativity by reducing the need for students to generate their own ideas and solutions. This over-reliance may hinder students' ability to engage in critical thinking and independent problem-solving, which are essential to fostering creativity. Excessive dependence on AI tools for content creation could limit students' originality, leading them to favour AI-generated solutions over self-generated ideas, ultimately impacting the development of innovative, independent thinking skills (Hussain, 2022).

Despite its many advantages, the integration of AI in education must be approached thoughtfully to avoid unintended consequences. While AI can support both achievement motivation and creativity, excessive reliance on AI tools may risk reducing students' intrinsic drive and originality if misapplied. A balanced approach, combining AI-driven efficiencies with opportunities for independent thought, is essential. This strategy ensures that students benefit from AI's adaptive, resource-rich capabilities without sacrificing critical learning objectives such as personal engagement, self-motivation, and creativity. By cultivating an educational environment that prioritises independent thinking and personal accountability, educators can leverage AI to empower students while safeguarding essential learning attributes critical to their long-term success.

Review of Literature

There has over the decade been a drastic increase in the use of technology in the education sector. People believe technology has revolutionised teaching and consequently, learning (Kenchakkanavar, 2023). The common benefits of AI in the classroom recognised are reduced time consumption to gather information, easy access and reduced efforts. As for students it acts as a medium that caters to their personalized concerns (Kenchakkanavar, 2023). With these benefits however, arose misuse. AI provided students a platform from where they could generate content from scratch making their only contribution to assignments, typing out the command. This paper seeks to understand the effects of using Artificial Intelligence in education- How it affects students' creativity, and achievement motivation. The study aims to understand the level of usage (less, moderate, high) and some of the different groups of students (Arts, Science, Social Science,Management, Commerce) and the comparison between their use. There exists a lack of comprehensive research on the impact of Artificial Intelligence on Education. (Chen

et al.,2020). It is known that often teachers are allotted administrative tasks which would take up their time but did not come under their job description but were rather an underlier. This changed with the introduction of AI as it covered these tasks such as scheduling and record keeping. These platforms are also built in such a way that they provide individualised feedback to students on their performances. While this sounds good, it comes with its own cons that being, this entire process loses its human element especially when it comes to grading and feedback provision (Krstić, 2022). Often it is a teacher's motivation that drives a student to do better. This being lost, makes a student lose some of this motivation to achieve. It is also important how the teacher utilises Artificial intelligence in the classroom should they choose to (Vengerfeldt et al., 2018).

Another factor that influences a student's achievement motivation with respect to Artificial Intelligence is laziness. On discovering that they have an easy way out, an almost undetectable software that will do their work for them, this brings about laziness amongst students. This leads to eventual lack of motivation to carry out their own academic tasks hindering achievement motivation. Most researches released thus far concentrate on the positive impact on AI and dangerously so as they tend to ignore the concerns. A study conducted on the university students of Pakistan and China revealed that AI aids in human laziness and loss in decision making abilities (Ahmad et al., 2023).

Coming to the concept of creativity, it is still being debated whether or not AI does more help or harm to a student's creativity. On one hand it can enhance it by providing more ideas and alternatives to an already existing framework possessed by a student on a particular topic/project but on the other it could in a sense disable the student from thinking on account of over dependence on AI tools to produce data (Hussain, 2022). There is a lot of existing literature on the benefits of Artificial intelligence on creativity however a very limited number on its disabling effects. One paper highlights the importance of implementing AI in everyday life in order to enhance society's creative skills (Oktradiksa et al., 2021). This paper puts forth the assumption that with this inclusion of AI into everyday life, innovation in society would peak. This study suggests using AI in daily settings such as in the professional sectors and educational sectors (Oktradiksa et al., 2021).

Taddeo & Hill, under the Journal of Intelligence, released a paper exploring the use of artificial intelligence in education and the impact it had on creativity in the perspective of students. A rather common research gap, the perspective of students have rarely been accounted for in this matter. Grounded theory was implemented making use of interview and focus group methods in order to collect information about students' perception of creativity and artificial intelligence. According to this study, the participants believed that artificial intelligence was a facilitator of creativity but also accounted for the limitations of the superficiality of AI when it came to a concept like creativity (Marrone et al., 2022). While most studies lean towards the benefits of artificial intelligence with respect to students' creativity, one cannot entirely discredit this as well. In order to explore the realms of creativity and achievement motivation the Achievement motivation theory by David McClelland, The Cognitive theory of creativity proposed by Sarnoff Mednick and the Dual Process Models of moral psychology by Joshua Greene will be used.

In order to approach our variable of achievement motivation we have chosen a rather well known theory- David McClelland's achievement motivation theory. This theory looks into why people are motivated to succeed and how this can influence their behavior. For our study we will be looking at whether Artificial Intelligence is a hindrance or boon to this achievement motivation in any way (Person et al., 2015). The third theory we will be looking at is The Cognitive theory of creativity proposed by Sarnoff Mednick

which talks about how our ideas of creativity come through the associated processes of our mind. He lays emphasis on the concept of mental flexibility and the ability to associate in order to ensure this creativity. In his theory Mednick talks of remote associations, associations, hierarchy and divergent thinking. He also devised his own model called the Associative Hierarchical model (AHM). This model primarily focuses on creative thinking (Woodman, 1981).

Need for the study

With the introduction of AI into the education sector, there have been noticeable changes- an increase in laziness, a consequent decline in achievement motivation, a possible change in creativity levels leading to a decline of original works. This is what brings- us to this study, a means to find the patterns brought about by AI usage in Educational settings in relation to students' creativity & achievement motivation. There exists a lack of comprehensive research on the topic. These particular variables have also not been studied together and there is reason to believe that the variables taken up for the study interact and influence the effects of artificial intelligence all the more in education.

It has been noticed that while the introduction of artificial intelligence software tools to the education sector definitely has its pros, there are various cons that have arisen as well. Students have been seen to use AI to enhance quality academic work but also seen to rely on AI to start their work from scratch as an easy way out. In this repetitive pattern of relying on AI tools such as chatbot, CHATGPT etc to generate their work, students are seen to put less effort and more importantly *thought* into their work. This has led to a decline in their achievement motivation, a possible difference in their creativity indices and in turn, efforts, credibility and creativity are being threatened.

How can an individual be credited for their work when the idea does not originate from within them. The easy accessibility provided by these AI tools to students where all the information is gathered at one place, draws out a natural tendency to be lazy and over-rely on them. This in turn brings about a decrease in their need for achievement and in turn their motivation. The prior need for achievement as seen in the previous generations has also faced a decline due to the increasing popularity of AI. This however is a speculation that is yet to be tested.

Objectives

- To explore different AI usage in students (less, moderate and high) and AI usage among different groups of students (Management, Commerce, Science, Social Science, Arts) in their level of creativity, achievement motivation
- To study the influence of various demographic variables of student groups on their creativity, Achievement motivation

Research Questions

1. Does AI usage in students (used less, moderate and high) and AI usage in students within the groups of Management, Commerce, Social Sciences, Science and Arts differ among themselves in their creativity and achievement motivation?
2. Does the demographic variable of students influence their creativity and achievement motivation?

Hypothesis

Ha_1- there will be a significant main effect and interaction effect in AI usage among students (Less, moderate, high) and AI usage among different students' groups (Commerce, Management, Arts, Social Sciences and Science) in their creativity and achievement motivation.

Since the hypothesis has many Independent variables and dependent variables, a specific hypothesis will be formulated and tested further.

Ha_2- There will be a significant correlation of demographic variables of students towards their creativity and achievement motivation.

Since the hypothesis has 2 dependent variables, a specific hypothesis will be formulated and tested further

Method

Participants

In order to gain an overview of how Artificial Intelligence could possibly influence students creativity, and affect their achievement motivation, the sample that has been chosen is rather diverse. Students from various educational fields are to be approached in hopes to understand how AI exhibits itself in each of these settings. The chosen educational domains for the same are Management students, Commerce students, Students of Arts, Science and students of Social Sciences. The age limit will range from 18 years to 25 years.

The sample size chosen will be 400 participants (divided into each of the student groups) and the sampling method decided upon is purposive sampling- snowball sampling method.

Research Design

The study will employ a factorial research design, which enables the assessment of both main effects and interaction effects among variables, as well as how these interactions impact the dependent variable. A fundamental feature of this design is the inclusion of two or more independent variables, each with multiple levels.

In this study, the two independent variables (IVs) are: (1) AI usage levels among students (categorized as low, moderate, and high) and (2) the groups of students based on their academic disciplines—Commerce, Management, Arts, Science, and Social Science. These variables provide structured levels: IV1 reflects the extent of AI usage (low, moderate, and high), while IV2 distinguishes between the five student groups by field of study.

Our dependent variables in this factorial design are student creativity and achievement motivation. The factorial approach allows us to efficiently explore the complex interactions among these multiple variables, making it the most suitable design for capturing their simultaneous effects.

Measures

3 scales have been chosen-

The Nicolas Holt Creativity Test- The Nicolas Holt Creativity Test has been devised in order to measure an individual's creativity index in the domains of fluency, originality, flexibility and elaboration of traits among other things (these also form the subscales of this test). This is a 29 item questionnaire, the reliability of which was tested through the test retest method with a two week interval. The reliability coefficient of this test is 0.88 (Olatoye et al., 2009).

The AI usage Scale: This scale is to be used for the measurement of the levels of the independent variable. Once allotted numerical values, it ranges on a likert scale of 1-5 (Low usage to high usage)

The Achievement Motivation Scale- The Achievement Motivation Questionnaire (AMQ) is a tool to measure individuals' aspirations for success and apprehensions regarding failure in diverse domains like academics and careers. Utilizing Likert-scale items, it evaluates attributes such as persistence and task orientation. Widely employed in psychology and education research, the AMQ unveils unique individual motivations for achievement. It enables the exploration of correlations between motivation and factors

like personality traits, academic or career achievements, offering valuable insights into motivational patterns and their implications on behavior and outcomes across different scenarios and disciplines. It has a correlation coefficient of 0.75 (for a mixed sample of 0.93). The subscales of this test include Academic motivation, need for achievement, academic challenge, achievement anxiety, importance of grades/marks, meaningfulness of task, relevance of school/college to future goals, attitude towards education, work methods, attitude towards teachers, Interpersonal relations, Individual concern, General interests, Dramatics and Sports (Mohan & Deo, n.d.).

Operational Definitions

Artificial Intelligence: Artificial Intelligence would refer to the software, technologies that are available to teachers and students alike that can possibly aid with academic work either entirely or even partially and more efficiently. It understands tasks assigned and completes them on demand or it eases the process of programme completion.

Creativity: Creativity refers to the ability of an individual to apply their minds in order to complete a task in the best way possible while exploring unusual and subjective ways to do so or initiate ideas such as programmes, events and other such engagements. This mental ability is subjective and hence varies from person to person. When AI is relied on for creative tasks, slowly the results can either become more pigeon holed and confined to similar outcomes or in some cases new more fruitful ideas are birthed from it increasing overall creativity.

Achievement Motivation: Achievement motivation refers to an individual's drive to accomplish goals, excel, and attain a high standard of success. It reflects a desire to engage in tasks and overcome challenges, often fueled by an intrinsic need for competence, mastery, and recognition.This concept is central to David McClelland's Achievement Motivation Theory, which posits that people are motivated by different needs—achievement, power, and affiliation—and that a high need for achievement is characterized by a preference for tasks that require effort, skill, and personal responsibility. In this paper, Achievement Motivation is looked at in terms of fulfilment of Academic and Co-curricular goals.

Significance of the Study

1. While the topic of AI has been the focus of a lot of research, most of these researches conducted are qualitative research studies particularly following the phenomenological approach. As most of the studies conducted are qualitative in nature, one can say it lacks generalisability. Hence this study seeks to use not only qualitative methods but also quantitative methods to help with its widespread applicability and generalisability of data results.
2. The research conducted so far has obtained primarily teacher’s perspectives or staff/ authoritative perspectives on the usage of AI in education. This study gains a student’s perspective utilizing standardized tools and bringing in the variables of creativity, and achievement motivation.
3. The usage of AI in the education sector has been studied and most of the research conducted explores the positives of its inclusion into the system. This research study aims to explore the negatives as well so once the challenges are put forth ways can be looked into to overcome them.
4. There is a lack of comprehensive research done on this topic especially with respect to comparative analysis done between various professional domains that use AI. This paper hopes to overcome this by including multiple academic fields into the study such as that of Management, Arts, Science, Social Science and Commerce.
5. This study holds significant relevance as it addresses a crucial gap in understanding the impact of artificial intelligence on educational outcomes. By examining AI's influence on creativity and

motivation across diverse academic disciplines, this research underscores the importance of tailored AI integration in education. It helps with gaining insight into how AI usage might support or inhibit student development in specific fields. This understanding is essential for designing AI tools and educational programs that foster creativity and motivation, encouraging active learning and reducing reliance on automation.

6. The findings offer a foundation for further studies on the psychological and academic implications of AI in education, helping ensure that AI serves as a constructive force in students' academic growth and future readiness.

Procedure

The statistical tools- 3 standardised questionnaires have been chosen, Nicolas Holt Creativity Test to assess participants creativity index, Achievement Motivation Scale to assess the achievement motivation and AI usage scale to classify the levels of AI usage. All of these will be assessed in relation to Artificial Intelligence usage. These questionnaires will be combined to form one questionnaire for the purpose of this study and a softcopy and hardcopy of the same will be created and distributed online as well as offline. At the start of this questionnaire will also include the consent form and in the cases of the offline data collection, verbal consent will also be obtained. The researcher will approach various higher education institutions containing the target population based on their professional fields of management, education, arts amongst others and hand out the questionnaire and response sheets eliciting data. Following the data collection, ANOVA and stepwise regression analysis will be conducted.

Statistical Analysis

ANOVA will be used for the comparative study between AI usage for different students groups (Commerce, Arts, Social sciences, Science and Management)

A *Stepwise Regression Analysis* will also be conducted to study the impact of the demographic variables on each dependent variable

Results and Discussion

Table I

ANOVA - Creativity					
	Sum of Squares	**df**	**Mean Square**	**F**	**p**
Subject Group	1385	5	276.9	2.83	0.016
Residuals	38416	392	98.0		

An ANOVA (Analysis of Variance) test was employed to analyze how different student groups (commerce, management, science, social science, arts, and others) use AI and how these varying levels of AI engagement impact the two dependent variables: Creativity and Achievement Motivation.

From the ANOVA table, we see that the "Subject Group" row has a Sum of Squares value of 1385, with a mean square of 276.9 across 5 degrees of freedom (df), while the residual or error component has a Sum of Squares value of 38416 with 392 degrees of freedom. The F-ratio of 2.83, which tests the null hypothesis that there is no difference between group means, yields a p-value of 0.016. Since the p-value is below 0.05, this suggests that there is a statistically significant difference in creativity scores across the student

groups categorized by their usage of AI. Thus, we can infer that the level of AI usage (low, moderate, or high) is likely influencing creativity differently across the subjects.
In order to see which subject is contributing to this, Tukey's HSD Post-Hoc test was conducted.

Table II Tukey's Post Hoc test

Comparison							
Subject Group		**Subject Group**	**Mean Difference**	**SE**	**df**	**t**	**p_{tukey}**
	-	6	-6.936	2.45	392	-2.835	0.054
5	-	6	-8.577	2.44	392	-3.513	0.007
Note. Comparisons are based on estimated marginal means							

The above table is a fragment of Tukey's Post Hoc results table. The comparison between Group 5 and Group 6 (where Group 5 is 'Arts' and Group 6 is "Others" referring to subjects such as UX design, architecture, medical, engineering and so on) has a mean difference of -8.577, with a t-value of -3.513 and a significant p-value of 0.007. This suggests that Group 5 and Group 6 have a statistically significant difference in creativity scores. No other pairs demonstrate statistically significant differences, as their p-values are greater than 0.05. This significant finding implies that these two groups may have distinct patterns in how AI usage influences their creativity, highlighting the need for targeted approaches if attempting to enhance creativity in specific academic fields.

Table III Anova on IV- AI usage levels; DV- Creativity

ANOVA - Creativity					
	Sum of Squares	**df**	**Mean Square**	**F**	**p**
AI Usage Levels	827	4	206.7	2.08	0.082
Residuals	38973	393	99.2		

Next, the ANOVA was conducted on AI usage levels as an independent variable with Creativity as the dependent variable. The table above provides the results. The analysis suggests that AI usage levels do not have a statistically significant effect on students' creativity scores ($p = 0.082$). While there is some variation in creativity scores between different levels of AI usage, it is not enough to conclude a significant effect. As the results were not significant, no Post-Hoc test was conducted.

Table IV

ANOVA - Achievement Motivation					
	Sum of Squares	**df**	**Mean Square**	**F**	**p**
Subject Group	1664	5	332.9	3.42	0.005

Residuals	38136	392	97.3		

The above table indicates that subject groups have a statistically significant effect on students' achievement motivation scores (p = 0.005). This suggests that differences in achievement motivation are likely influenced by which subject group a student belongs to. Since the p-value is less than 0.05, we can conclude that not all subject groups have the same average level of achievement motivation. Following evidence of significance, a Post Hoc test was conducted.

The results of the Post Hoc revealed that there are two significant differences in achievement motivation between the subject groups. First, Group 4 has significantly higher achievement motivation than Group 1, with a mean difference of -4.813 and a p-value of 0.016. Second, Group 5 has significantly higher achievement motivation than Group 4, with a mean difference of 5.692 and a p-value of 0.009. Most other comparisons between groups, such as between Groups 2 and 1 or Groups 3 and 6, did not show statistically significant differences, as their p-values were above 0.05.

(Group 1= Science; Group 2= Social Science; Group 3= Management; Group 4= Commerce; Group 5= Arts and Group 6= Others)

Table V

ANOVA - Achievement Motivation					
	Sum of Squares	**df**	**Mean Square**	**F**	**p**
AI Usage Levels	508	4	126.9	1.27	0.282
Residuals	39292	393	100.0		

The analysis indicates that AI usage levels do not have a statistically significant effect on achievement motivation (p = 0.282). The differences in achievement motivation scores across AI usage levels are minor and likely due to chance. Thus, we cannot conclude that varying levels of AI usage are associated with significant differences in achievement motivation.

Table VI Stepwise Regression- Dependent Variable- Creativity

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Other Subjects	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
2	Arts	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
a. Dependent Variable: Creativity			

Model 1: The variable **Other Subjects** was the first to be included, as it met the criterion for entry (significance level of ≤ .050).

Model 2: The variable **Arts** was subsequently included in the model, meeting the entry criterion after **Other Subjects**.

Table VII
Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate		
1	.145[a]	.021	.018	13.148		
2	.183[b]	.033	.028	13.080		

Model 1:

- R = 0.145: Indicates a weak positive correlation between Other Subjects and Creativity.
- R Square = 0.021: Suggests that 2.1% of the variability in creativity scores is explained by Other Subjects alone.
- Adjusted R Square = 0.018: Adjusts for the number of predictors and indicates minimal improvement in model fit.
- Standard Error = 13.148: Reflects the average distance of the data points from the regression line.

Model 2:

- R = 0.183: The correlation is still weak, though slightly improved with the inclusion of Arts.
- R Square = 0.033: The model now explains 3.3% of the variance in creativity, a slight increase from Model 1.
- Adjusted R Square = 0.028: Further adjustment shows minimal improvement, indicating that Arts adds only a small predictive value.
- Standard Error = 13.080: The small decrease in the standard error shows a slight improvement in the model's accuracy.

Table VIII- ANOVA[a]

Model		**Sum of Squares**	**df**	**Mean Square**	**F**	**Sig.**
1	Regression	1430.648	1	1430.648	8.276	.004[b]
	Residual	67073.519	388	172.870		
	Total	68504.167	389			
2	Regression	2291.380	2	1145.690	6.696	.001[c]
	Residual	66212.787	387	171.092		
	Total	68504.167	389			

a. Dependent Variable: Creativity

b. Predictors: (Constant), Other Subjects

The ANOVA table tests the overall significance of each model, showing if the predictors in the model significantly explain the variance in Creativity.

- **Model 1:**

- F = 8.276 with p = .004: This indicates that Other Subjects alone significantly contributes to explaining creativity scores, as the p-value is below .05.

- **Model 2:**
  - F = 6.696 with p = .001: After adding Arts to the model, the overall model remains statistically significant. The reduced F-value reflects a small reduction in overall model fit, but it is still statistically significant at p < .05.

Overall, both models are statistically significant, but the additional variance explained in Model 2 is marginal.

Table IX

Excluded Variables[a]

Model		Beta In	t	Sig.	Partial Correlation	Collinearity Statistics Tolerance
1	Arts	-.113[b]	-2.243	.025	-.113	.988

a. Dependent Variable: Creativity

b. Predictors in the Model: (Constant), Other Subjects

c. Predictors in the Model: (Constant), Other Subjects, Arts

The excluded variables table lists variables that were not included in the final model due to not meeting the entry criterion for statistical significance. It shows each variable's **Beta**, **t-value**, **p-value**, **partial correlation**, and **Tolerance**.

Excluded Variables in Model 1 and Model 2: Many demographic variables (such as **Age 18-20**, **21-22**, **23-24**, gender, place, and specific subjects like **Science** and **Social Science**) were considered but excluded as they did not significantly contribute to predicting **Creativity**. None of these excluded variables met the entry criteria of p ≤ .050, so they were not added to the model.

This table indicates that variables like **Age 18-20**, gender, and place did not have a statistically significant impact on **Creativity** scores when considered individually.

Table X

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	102.698	.685		149.840	.000
	Other Subjects	8.302	2.886	.145	2.877	.004
2	(Constant)	103.393	.749		138.047	.000
	Other Subjects	7.607	2.888	.132	2.634	.009
	Arts	-4.060	1.810	-.113	-2.243	.025

a. Dependent Variable: Creativity

This table shows the contribution of each predictor variable to Creativity within the regression models, providing Unstandardized Coefficients (B), Standardized Coefficients (Beta), and t-values.

- **Model 1:**
  - (Constant) B = 102.698: The baseline creativity score when Other Subjects is zero.
  - Other Subjects (B = 8.302, Beta = 0.145, p = .004): For each additional unit increase in Other Subjects, creativity is predicted to increase by 8.302 points. The p-value of .004 suggests a statistically significant positive association between Other Subjects and Creativity.
- **Model 2:**
  - (Constant) B = 103.393: Baseline creativity score with both Other Subjects and Arts included in the model.
  - Other Subjects (B = 7.607, Beta = 0.132, p = .009): The positive relationship remains significant but slightly weaker compared to Model 1 after adding Arts.
  - Arts (B = -4.060, Beta = -0.113, p = .025): For each additional unit increase in Arts, creativity is predicted to decrease by 4.060 points. The negative Beta coefficient suggests that students in the Arts category may have lower creativity scores, and the p-value (.025) indicates this association is statistically significant.

Stepwise Regression: Dependent Variable- Achievement Motivation

Table XI

Variables Entered/Removed[a]			
Model	**Variables Entered**	**Variables Removed**	**Method**
1	Management	.	Stepwise (Criteria: Probability-of-F-to-enter <= .050, Probability-of-F-to-remove >= .100).
a. Dependent Variable: Achievement Motivation			

In this stepwise regression analysis for Achievement Motivation, the results focus on predicting how much the variable Management explains the variance in students' achievement motivation scores.

Variables Entered/Removed

- **Variables Entered**: The variable "Management" was included as a predictor for Achievement Motivation.
- **Method**: A stepwise regression method was applied, with entry criteria set to a $p-value \leq .050$ and removal criteria set to $\geq .100$. This approach aims to retain only statistically significant predictors.

Table XII

Model Summary				
Model	**R**	**R Square**	**Adjusted R Square**	**Std. Error of the Estimate**
1	.150[a]	.023	.020	20.428
a. Predictors: (Constant), Management				

R: The correlation coefficient R=.150R = .150R=.150 indicates a weak positive association between "Management" and Achievement Motivation.

R Square: R2=.023R^2 = .023R2=.023 suggests that approximately 2.3% of the variance in Achievement Motivation can be explained by the "Management" variable. This low R Square value indicates that other factors outside this model contribute significantly to Achievement Motivation.
Adjusted R Square: The Adjusted R2R^2R2 (.020) adjusts for the number of predictors and sample size, reinforcing the limited explanatory power of "Management" on Achievement Motivation.
Standard Error of the Estimate: The standard error (20.428) represents the average deviation of actual values from the regression line, showing substantial variability in Achievement Motivation scores that the model doesn't account for.

Table XIII

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3729.822	1	3729.822	8.938	.003[b]
	Residual	161911.155	388	417.297		
	Total	165640.977	389			
a. Dependent Variable: Achievement Motivation						
b. Predictors: (Constant), Management						

ANOVA Table

- Regression Sum of Squares: 3729.822, indicating the variance in Achievement Motivation explained by the model.
- Residual Sum of Squares: 161,911.155 represents the unexplained variance.
- F-Statistic: The F-value (8.938) with a p-value of .003 indicates that the model, though weak, is statistically significant. This implies that being in the "Management" group has a statistically significant impact on Achievement Motivation, albeit with a small effect.

Table XIV

Coefficients[a]						
Model		**Unstandardized Coefficients**		**Standardized Coefficients**	**t**	**Sig.**
		B	**Std. Error**	**Beta**		
1	(Constant)	133.524	1.147		116.377	.000
	Management	7.928	2.652	.150	2.990	.003
a. Dependent Variable: Achievement Motivation						

Coefficients

- **Constant (Intercept)**: The constant value (133.524) represents the predicted Achievement Motivation score when "Management" is not in the model.
- **Management**: The unstandardized coefficient (B = 7.928) indicates that students in "Management" have an estimated 7.928-point higher Achievement Motivation score than those not in this category. The standardized coefficient (Beta = .150) aligns with the low correlation observed, showing a small effect size. The p-value (.003) confirms that "Management" is a statistically significant predictor for

Achievement Motivation

Table XV

Excluded Variables[a]						
Model		**Beta In**	**t**	**Sig.**	**Partial Correlation**	**Collinearity Statistics**
						Tolerance
1	Age 18-20	.013[b]	.251	.802	.013	.982
	21-22	-.017[b]	-.344	.731	-.017	.990
	23-24	.011[b]	.209	.834	.011	.993
	Male	.074[b]	1.453	.147	.074	.981
	Female	-.072[b]	-1.428	.154	-.072	.980
	Othgenders	-.005[b]	-.099	.921	-.005	.999
	Bangalore	-.003[b]	-.064	.949	-.003	1.000
	Mumbai	.094[b]	1.885	.060	.095	.999
	OthPlace	-.073[b]	-1.453	.147	-.074	1.000
	Science	.050[b]	.983	.326	.050	.955
	Social Science	-.060[b]	-1.146	.253	-.058	.914
	Commerce	.030[b]	.579	.563	.029	.956
	Arts	-.069[b]	-1.345	.179	-.068	.956
	Other Subjects	.090[b]	1.784	.075	.090	.986

a. Dependent Variable: Achievement Motivation

b. Predictors in the Model: (Constant), Management

Excluded Variables: Variables like age, gender, location, and other subject groups (e.g., Science, Social Science, Arts, etc.) were not included in the final model due to their lack of statistical significance. This suggests that these variables do not contribute meaningfully to predicting Achievement Motivation.

Summary

For Achievement Motivation, "Management" is a statistically significant predictor, though its effect size is small, and most variability remains unexplained. For AI Usage, "Science" significantly predicts AI Usage, but the effect size is minimal, with most variance not accounted for by the model. The excluded variables for both models were not statistically significant and thus not included in the final regression models.

Conclusion

Hypothesis Ha_1 (there will be a significant main effect and interaction effect in AI usage among students (Less, moderate, high) and AI usage among different students' groups (Commerce, Management, Arts, Social Sciences and Science) in their creativity and achievement motivation) was proved insignificant.
Hypothesis Ha_2 (There will be a significant correlation of demographic variables of students towards their creativity and achievement motivation), was proved to be partially significant. Some demographic factors do have a part to play in the Creativity Index and Achievement Motivation.
This study provides valuable insights into the nuanced impacts of artificial intelligence in education, especially regarding its influence on student creativity and achievement motivation. Findings indicate that AI usage across disciplines affects students' creativity differently, with Arts and other specialised fields (such as UX design, architecture, and engineering) showing statistically significant variation in creativity scores compared to more traditional fields. Additionally, student motivation appears to be influenced by subject area, but no significant differences were found between high, moderate, and low AI usage in terms of motivation. Regression analysis reveals that factors like "Science" and "Management" fields have minor predictive power over AI usage and motivation, respectively, suggesting that while these disciplines contribute meaningfully to outcomes, other factors likely play a stronger role. Thus, while AI has transformative potential in education, its effects on creativity and motivation are shaped more by the academic context and individual engagement than by the intensity of AI usage alone.

References

1. mediaofficer. (2023, December 6). *Artificial intelligence in schools – everything you need to know*. The Education Hub. https://educationhub.blog.gov.uk/2023/12/06/artificial-intelligence-in-schools-everything-you-need-to-know/
2. Kenchakkanavar, A. Y. (2023). Exploring the Artificial Intelligence Tools: Realizing the Advantages in Education and Research. *Journal of Advances in Library and Information Science*, *12*(4), 218-224.
3. Zhai, X., Chu, X., Chai, C. S., Jong, M. S. Y., Istenic, A., Spector, M., Liu, J., Yuan, J., & Li, Y. (2021). A Review of Artificial Intelligence (AI) in Education from 2010 to 2020. Complexity, 2021, 1–18. https://doi.org/10.1155/2021/8812542
   Tindle, R., Pozzebon, K., Willis, R., & Moustafa, A. A. (2023). Academic Misconduct and Generative Artificial Intelligence: University Students' Intentions, Usage, and Perceptions. PsyArXiv Preprints. https://doi.org/10.31234/osf.io/hwkgu
4. Abd-Elaal, E., Gamage, S. H. P. W., & Mills, J. E. (2019). Artificial Intelligence Is a Tool for Cheating Academic Integrity. In Proceedings of the AAEE2019 Conference Brisbane, Australia
5. Kiryakova, G., & Angelova, N. (2023). ChatGPT—A challenging tool for the university professors in their teaching practice. *Education Sciences*, *13*(10), 1056. https://doi.org/10.3390/educsci13101056
6. Chen, L., Wang, Q., & Liang, Y. (2020). Artificial Intelligence in Education: A Review. IEEE Access, 8, 75263-75275. https://doi.org/10.1109/ACCESS.2020.2983307
7. Karaseva, A., Pruulmann-Vengerfeldt, P., & Siibak, A. (2018). Relationships between in-service teacher achievement motivation and use of educational technology: case study with Latvian and Estonian teachers. *Technology, Pedagogy and Education*, *27*(1), 33-47. https://doi.org/10.1080/1475939X.2017.1339633
8. Oktradiksa, A., Bhakti, C. P., Kurniawan, S. J., Rahman, F. A., & Ani. (2021). Utilization artificial intelligence to improve creativity skills in society 5.0. Journal of Physics: Conference Series, 1760,

012032. https://doi.org/10.1088/1742-6596/1760/1/012032

9. Marrone, R., Taddeo, V., & Hill, G. (2022). Creativity and Artificial Intelligence—A Student Perspective. Journal of Intelligence, 10, 65. https://doi.org/10.3390/jintelligence10030065
10. Olatoye, R. A., Akintunde, S. O., & Yakasai, M. I. (2009, November 30). *Emotional intelligence, creativity and academic achievement of Business Administration students.* Electronic Journal of Research in Educational Psychology. https://eric.ed.gov/?q=business%2BAND%2Bintelligent&id=EJ900909
11. Ahmad, S. F., Han, H., Alam, M. M., Rehmat, Mohd. K., Irshad, M., Arraño-Muñoz, M., & Ariza-Montes, A. (2023, June 9). *Impact of artificial intelligence on human loss in decision making, Laziness and Safety in Education*. Nature News. https://www.nature.com/articles/s41599-023-01787-8
12. Griffiths, C. V. (2019). *Moral psychology, dual-process theory, and psychopathology*. OhioLINK ETD: Griffiths, Cara Veronica. https://rave.ohiolink.edu/etdc/view?acc_num=kent1564526866237073
13. Person, David, & McClelland. (2015, March 26). *Achievement motivation theory: 6 : Organizati*. Taylor & Francis. https://www.taylorfrancis.com/chapters/edit/10.4324/9781315702018-6/achievement-motivation-theory-david-mcclelland
14. Woodman, R. W. (1981, January 1). *Creativity as a concept in personality theory*. Journal of Creative Behavior, Buffalo Vol. 15 (1981), pp. 43-66. https://opus4.kobv.de/opus4-Fromm/frontdoor/index/index/docId/29183
15. Salah, M., Mukhaini, M. A., & Alhalbusi, H. (2023, October 31). *Me and my ai bot: Exploring the "aiholic" phenomenon and university students' dependency on Generative AI Chatbots - is this the new academic addiction?* Research Square. https://www.researchsquare.com/article/rs-3508563/v1