UNDERSTANDING STUDENT PREFERENCES AND FACTORS INFLUENCING THE ADOPTION OF AI TOOLS IN ACADEMIC ENVIRONMENTS

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ABSTRACT

The research article explores the factors influencing student's preferences towards the usage of Artificial Intelligence (AI) tools in their academics. The study employs exploratory research methods, beginning with an online questionnaire distributed to university students, aiming to identify key attributes or variables affecting the preference for AI tools in academic work. The data collected is used to perform statistical analysis, employing factor analysis to reduce the 25 attributes. The results reveal that the attributes are reduced to 5 factors such as 'Easiness and convenience,' 'Interest Less,' 'Creativity,' 'Feeling Bored,' and 'Course Likeliness' which significantly impact students' preferences.

Keywords : Artificial intelligence (AI), Factor Analysis, Education, Academics

INTRODUCTION

Artificial intelligence (AI) refers to a collection of software programs that enable machines or computers to process information without human intervention, much like a human brain would. In the late 80's, AI was defined as "The study of how to build or program computers to enable them to do what minds can do" (Boden, 1996). With the continuous development over the years, the definition of AI and its application in the real world has changed significantly.

Several AI tools such as ChatGPT, Gamma, and Jenni are commonly utilized by students today. The integration of new technology in education holds great significance as it opens up new paths for exploration and allows creative minds to use them for the betterment of society, the environment and future generations. However, contemporarily these technologies are also used in such a way that negatively impacts the pace of student's learning and their understanding of the subject. This study aims to understand the factors affecting

the student's preference towards AI tools for their academic work and student groups preferring AI tools for different reasons.

LITERATURE REVIEW

The book written by (Boden, 1996) introduces the term 'Artificial Intelligence' and defines AI in the contemporary period. The methods used to build AI and related topics are the major context of the book.

The research article by (Tiwari et al., 2023) aims to determine the student's attitude towards ChatGPT for educational purposes. the findings reveal that factors like Usefulness, social presence and legitimacy of the tool, enjoyment and motivation, impact the usage of the tool in a learning environment.

The study conducted by (Ismatullaev & Kim, 2022) has the objective of studying the factors impacting technology adoption and forecasting the acceptance of AI-based technologies. The research finds that the adoption of AI devices by users can be improved by increasing transparency, compatibility, and reliability, and simplifying tasks in the AI tool.

The research conducted by (Hua et al., 2024) on understanding the factors which are not attracting medical professionals to use AI systems in the medical field, where the entire field could be losing the overall benefits of AI. The review explains that the methods conducted earlier do not capture AI in the context of the medical field, and suggests modifying the methods towards medical discipline to have a better understanding of the influence of factors.

METHODOLOGY

Exploratory research to identify the factors which influence the preference of the students toward the usage of AI tools for academic works. The statistics techniques of dimensionality reduction on the attributes will be performed.

Data Collection

The collection of data is performed by circulating an online questionnaire, the questions in the questionnaire are shown in Exhibit 1, and the questions are designed to measure the preference of AI tools for the application of academic works by students. The responses are recorded on a 5-point interval scale (1 is "Strongly Disagree"

and 5 is "Strongly Agree"). forty-two members did participate in filling out the questionnaire, the demographics of the respondents are shown below.

Data Analysis

1. Demography

The tables below exhibit the gender, age, preference, social status and location of the respondents.

Table 1: Gender		
Gender	**Count**	**Percentage**
Female	12	28.57
Male	30	71.43
Total	**42**	**100**

Table 2: Age		
Age	**Count**	**Percentage**
16-22	10	23.81
22-30	32	76.19
Total	**42**	**100**

Table 3: Preference		
Preference of AI Tools	**Count**	**Percentage**
Yes	42	100
No	0	0
Total	**42**	**100**

Table 4: Social Status		
Class	**Count**	**Percentage**
Poor or Deprived	1	2.38
Lower Middle Class	19	45.24
Rich	2	4.76
Upper Middle Class	20	47.62
Total	**42**	**100**

Table 5: Location		
Location	**Count**	**Percentage**
Urban (Tier 1)	18	42.86
District or Taluk (Tier 2)	15	35.71
Village (Tier 3)	9	21.43
Total	**42**	**100**

2. Factor Analysis

The questionnaire consists of 25 attributes. Factor analysis using principle component method is used to reduce the input variables into a few factors. The orthogonal rotation using a varimax of the factors will ensure no correlation between the factors.

The factors obtained from the result of factor analysis can be further used for analysis like multiple linear regression, logistic regression, etc.

Results

Table 6: KMO and Bartlett's Test

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.645
Bartlett's Test of Sphericity	Approx. Chi-Square	1101.717
	df	300
	Sig.	<.001

In Table 6, The value of sampling adequacy using KMO (Field, 2009) is 0.645, since the KMO value is greater than 0.5, we can proceed with further analysis. The significance value of Bartlett's test of sphericity is less than 0.001, which explains the rejection of null hypothesis H0 - "The correlation matrix is an identity matrix". Hence we can conclude that there exists a correlation among the variables.

Table 7: Factor Extraction

Communalities

	Initial	Extraction
Often	1.000	.835
Easy_task_completion	1.000	.653
Less_time	1.000	.794
Lack_Basic_knowledge	1.000	.810
Bored	1.000	.802
Data_only	1.000	.683
Reliable	1.000	.611
Name_sake	1.000	.750
Lack_of_interest	1.000	.912
My_friend_do_same	1.000	.897
Creativity_lackness	1.000	.842
Better_results	1.000	.848
More_score	1.000	.850
Excitement	1.000	.691
P_better_understanding	1.000	.684
Easy_accessability	1.000	.790
Proudness	1.000	.891
Content	1.000	.629
Templates_only	1.000	.914
Guidance	1.000	.684
Quick_learning	1.000	.758
Lack_programming knowledge	1.000	.613
Few_Courses	1.000	.797
Liked_subjects	1.000	.784
Unliked_subjects	1.000	.748

Extraction Method: Principal Component Analysis.

In Table 7, The extraction value of all the variables is greater than 0.5, which ensures that each variable explains at least 50% of its variance. Thus there is no requirement to drop any variables from further procedures.

Table 8: Total Variance Explained

Total Variance Explained

| Component | Initial Eigenvalues | | | Extraction Sums of Squared Loadings | | | R(... |
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Tot...
1	12.069	48.275	48.275	12.069	48.275	48.275	6.
2	3.166	12.662	60.937	3.166	12.662	60.937	4.
3	1.892	7.569	68.507	1.892	7.569	68.507	3.
4	1.143	4.573	73.080	1.143	4.573	73.080	2.
5	1.001	4.005	77.085	1.001	4.005	77.085	2.
6	.942	3.768	80.853				
7	.778	3.113	83.966				
8	.695	2.780	86.746				
9	.551	2.205	88.951				
10	.458	1.830	90.781				
11	.434	1.737	92.518				
12	.421	1.683	94.201				
13	.323	1.293	95.494				
14	.239	.958	96.452				
15	.173	.691	97.143				
16	.149	.596	97.739				
17	.144	.575	98.314				
18	.108	.434	98.748				
19	.085	.338	99.086				
20	.082	.328	99.415				
21	.068	.271	99.686				
22	.046	.182	99.868				
23	.020	.079	99.947				
24	.009	.037	99.984				
25	.004	.016	100.000				

Extraction Method: Principal Component Analysis.

Table 9: Total Variance Explained

Rotated Component Matrix[a]

	Component 1	2	3	4	5
Often	.846				
Easy_task_completion	.573				
Less_time	.779				
Lack_Basic_knowledge	.557		.686		
Bored				.779	
Data_only	.725				
Reliable	.589	.502			
Name_sake		.815			
Lack_of_interest		.908			
My_friend_do_same		.669	.610		
Creativity_lackness			.801		
Better_results			.690		
More_score			.752		
Excitement	.581				
P_better_understanding	.581				
Easy_accessability	.763				
Proudness		.691			
Content					
Templates_only		.657		.501	
Guidance		.528			
Quick_learning	.859				
Lack_programming knowledge	.611				
Few_Courses					.885
Liked_subjects		.626		.558	
Unliked_subjects					.647

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 13 iterations.

In Table 8, the dimensionality reduction technique factor analysis has reduced twenty-five variables into five factors accounting for 77.08% of the variance in the data. In Table 9, the rotated components of the five factors are displayed. They are F1:" Easiness and convenience ", F2:" Interest Less", F3:" Creativity", F4:" Boredness ", and F5:" Course Likeliness" The first factor consists of 10 components with a factor loading above 0.5,

hence the first factor is considered to be an important factor which alone explains 24.18% of the variance in the data.

CONCLUSION

The demographics of the respondents show that all of them belong to young age groups and 90% are middle-class people. The preference to use AI tools is 100% which explains the adaptability nature of the students and the requirement of such tools always in demand, hence the usage of AI tools in academics cannot be avoided in future. The report of the exploratory analysis suggests that 'convenience', 'lack of creativity', 'personal preference of subjects' and 'disinterest'(both short-term and long-term) are the factors which have a great influence on the students towards the usage of AI tools in their academic work. These factors may lead negatively on student's learning.

To overcome these uprising issues in the academic ecosystem, changes in the way of learning should be implemented considering the objective as 'to improve student's creativity', which helps to shape the student's personality and creativity better.

Exhibit 1: Questionnaire

Explanation
I use AI tools more oftenly.
I prefer AI tools to complete my academic work, since it is very easy to complete the tasks.
I prefer AI tools to complete my academic work, when i don't have much time to do it on my own
I prefer AI tools to complete my academic work, when i don't have strong basic knowledge of the subject.
I prefer AI tools to complete my academic work, when i feel bored to do the work.
I prefer AI tools to complete my academic work, only for getiing related data easily and complete the work on my own.
I prefer AI tools to complete my academic work, because the information is reliable.
I prefer AI tools to complete my academic work, since i don't have interest to study but opted the course for name sake.
I prefer AI tools to complete my academic work, since i joined the course because of my parents compulsion.
I prefer AI tools to complete my academic work, because my friends also does the same.
I prefer AI tools to complete my academic work, when i lack creativity in the subject.
I prefer AI tools to complete my academic work, because it provides a better result than me.
I prefer AI tools to complete my academic work, because i get more marks than my own.
I prefer AI tools to complete my academic work, because i like to experiment new developments.
I prefer AI tools to complete my academic work, because i get better understanding of the subject.
I prefer AI tools to complete my academic work, since is it easily accessible
I prefer AI tools to complete my academic work, because i feel proud when i do so.
I prefer AI tools for content creation.
I prefer AI tools for only templates.
I prefer AI tools, because it provides better guidance than others.
I prefer AI tools to learn things quickly.
I prefer AI tools since i dont have coding or programming knowledge.
I prefer AI tools for only few subjects
I prefer AI tools for the subjects i like more
I prefer AI tools for the subjects i don't like.

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