

DETERMINING THE AWARENESS AND IMPLEMENTATION OF ARTIFICIAL INTELLIGENCE AMONG UNDERGRADUATES (DAI-AI)

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Abstract

This study focus on the development and validation of determining the awareness and implementation of artificial intelligence tools among undergraduates (DAI-AI), because a standardized instrument for this is less focused specially for my population. The instrument was developed under four factors general awareness, implementation, Attitude toward AI and personal use. In first draft of DAI-AI consist 40 item reviewed by 10 experts for content validity, 16 item with weak validity were exclude from the draft. Data from 131 students were collect on 26 item instrument on five point Likert scale. Data collected through this pilot testing used to ensure the construct validity and reliability of instrument. Construct validity was ensured through exploratory factor analysis and internal validity through confirmatory factor analysis, the calculated scores fulfill the criteria of these validities. Lastly Cronbach Alpha scores were found 0.85 which ensure the reliability of DAI-AI.

Keywords: *determining, artificial intelligence, DAI-AI, Alpha scores, factors.*

INTRODUCTION

Artificial intelligence has become an essential part of every ones lives .In daily life we don't find the area where the application of artificial intelligence tools and technologies are not in operation. So it's very necessary that our young generation must have the awareness about artificial intelligence and right way to use these technologies.Artificial intelligence mean developing computer program that has human like capabilities. These programs are developed in such a way that can learn think and solve problem.

According to Long and Magerko artificial intelligence can be define as "a set

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of competencies that enable individual to critically evaluate AI technologies, communicate and collaborate effectively with AI, and use AI tools online at home and in the workplace. AI is not simply a set of tools that can be considered in isolation, as technologies often are. AI, instead, is a comprehensive set of skills or approaches for transdisciplinary inquiry, and it encompasses, or should encompass, the full life experience and education of a learner.

AI really stands out in education, Intelligence teaching system, changing learning ways and smart education tools with AI are giving are giving new moves to old schooling methods. These tools give students good way of learning that fits their needs and how they learn best. Moreover, AI getting more known for its power to improve solving skills and thinking smart. This will help people do better on problems with computers. They will be needed in the future job world so they have these abilities too. If we talk about artificial intelligence tools specifically related to education, numerous tools are available. I will determine students' knowledge about some specific and famous tools like chatgpt, virtual assistant (Apple Siri, google assistant, Microsoft Cortana) and AI chatbot.

The aim of this study is to develop a tool to determine the awareness and implementation of artificial intelligence among undergraduate of university (DAI-AI). The instrument has factors, general awareness about artificial intelligence tools, Implementation of AI tools, attitude toward AI tools and personal use regarding AI tools.

LITERATURE REVIEW

In recent years, the convergence of huge computing power, massive amounts of data and improved machine learning algorithms have led to remarkable advances in Artificial Intelligence (AI) based technologies, which are set to be the most socially and economically disruptive technologies ever developed (Russell, 2021). The violent use of Artificial intelligence in our daily life from robot home cleaner to virtual assistance enhance the interest of citizen to educate them regarding Artificial intelligence. The scientific community has also begun to engage in this education after detecting a significant gap in the understanding of AI, based on comment and fears expressed by citizen about this technology (West & Allen, 2018). Therefore integration of artificial intelligence in curriculum is important for the people who lived and act in the world of artificial intelligence.

It should be observed that the education related to AI covers more than just acquiring information about its scientific and technological fundamentals. It also includes gaining understanding and exercising analytical thinking regarding the appropriate development of reliable AI, as well as recognizing what may occur if this is not achieved.

So, it is crucial to incorporate AI teaching from the earliest stages of education (Heintz, 2021). However, although some countries are making significant effort to promote AI teaching in K-12 (Touretzky et al. 2019), this being implemented through highly varied AI training experiences, such as data driven design (Vartiainen et al., 2021), interactive data visualization (Chittora & Baynes, 2020; von Wangenheim et al., 2021) virtual reality and robotics (Narahara & Kobayashi, 2018), games (Giannakos et al., 2020) or even based on combined workshop series (Lee et al., 2021)

The impact of AI on education remains unclear (Holmes et al., 2021), and more research is needed to understand whether and how these emerging technologies benefit education.

All the previous conducted studies shows the powerful impact of artificial intelligence tools on education at different level. But there is no specific study that determine the awareness regarding these cutting edge technology at undergraduate students. Students of developing countries are very well aware about artificial intelligence tools and they are using it in their education for enhance their learning and develop cognitive abilities.

METHODOLOGY

RESEARCH DESIGN

This is descriptive type research in nature method, survey research method will be used to know about the awareness level and implementation level of students about AI tools.

INSTRUMENT

The instrument used in this research was the structure questionnaire. 42 items related the topic to determine the awareness and implementation of artificial intelligence tools was developed based on four factors.

PILOT TESTING

Data collected from 131 participants of the population. For aim of data collection google form and print form of questionnaire was used.

VALIDITY OF INSTRUMENT

CONTENT VALIDITY OF INSTRUMENT

To ensure the content validity of the instrument, a group of 10 was requested to provide their expert review on the DAI-AI instrument and judgment on Lawshe's (1975) three point scale i.e. essential, necessary and unnecessary. Based on the expert review and Lawshe's suggested values, 16 item with weak content validity index were excluded from the questionnaires. Some changes and refinement of items were made under the suggestions of experts to attain the clarity of concept and language. Final form of questionnaires include 26 items, of acceptable content validity index.

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TABLE 1

Sr. No	Sub factor	CVR	Decision	Sr. No.	Sub factor	CVR	Decision
1	General Awareness	0.6	Accepted	22	Implementation	0	Rejected
2	General Awareness	0.4	Rejected	23	Implementation	0.6	Accepted
3	General Awareness	0.8	Accepted	24	Implementation	0.6	Accepted
4	General Awareness	0.2	Rejected	25	Implementation	0	Rejected
5	General Awareness	0.2	Rejected	26	Implementation	0.8	Accepted
6	General Awareness	0.8	Accepted	27	Attitude	Below 0	Rejected
7	General Awareness	0.6	Accepted	28	Attitude	0.6	Accepted
8	General Awareness	0.6	Accepted	29	Attitude	Below 0	Rejected
9	General Awareness	0.8	Accepted	30	Attitude	0.6	Accepted
10	Implementation	0.2	Rejected	31	Attitude	0.6	Accepted
11	Implementation	0	Rejected	32	Attitude	0.2	Rejected
12	Implementation	0.2	Rejected	33	Attitude	0.6	Accepted
13	Implementation	0.6	Accepted	34	Attitude	0.6	Accepted
14	Implementation	0.6	Accepted	35	Attitude	0.6	Accepted
15	Implementation	0.8	Accepted	36	Attitude	0.8	Accepted
16	Implementation	0.8	Accepted	37	Personal Use	0.2	Rejected
17	Implementation	0.2	Rejected	38	Personal Use	0.6	Accepted
18	Implementation	0.6	Accepted	39	Personal Use	0.6	Accepted
19	Implementation	0.6	Accepted	40	Personal Use	0.6	Accepted
20	Implementation	0	Rejected	41	Personal Use	0.4	Rejected
21	Implementation	0.2	Rejected	42	Personal Use	0.6	Accepted

The content validity Index (CVI) of instrument was calculated as 0.65.

EXPLORATORY FACTOR ANALYSIS

Exploratory factor analysis was conducted (n=131) on the 26 items of DAI-AI scale. The results of exploratory factor analysis supported the validity of DAI-AI scale.

KMO AND BARTLETT'S TEST

The Kaiser-Meyer-Olkin (KMO) test is used to find the adequacy of sampling. The KMO helps to determine whether the data set is suitable for factor analysis. The value of KMO equal to or greater than 0.5 and with significant value us less than 0.05,then it means data already eligible for further analysis in factor analysis. (Darmawan Napitupulu, 2017).

FIGURE 1

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.658
Bartlett's Test of Sphericity	Approx. Chi-Square	1878.702
	df	325
	Sig.	<.001

Figure 1 shows that the KMO value is 0.658 and significant value 0.001, which is acceptable for further analysis.

COMMUNALITIES

According to MacCallum et al. (1999), for sample sizes between 100 and 200 it should be between 0.5 and 0.6.

In below figure generated through SPSS the extraction value of all the items is greater than 0.6, which shows that all the item must be retained and no one should extract.

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Figure 2

Communalities		
	Initial	Extraction
General Awareness1	1.000	.621
General Awareness2	1.000	.726
General Awareness3	1.000	.810
General Awareness4	1.000	.757
General Awareness5	1.000	.719
General Awareness6	1.000	.725
Implementation1	1.000	.684
Implementation2	1.000	.633
Implementation3	1.000	.802
Implementation4	1.000	.728
Implementation5	1.000	.645
Implementation6	1.000	.808
Implementation7	1.000	.756
Implementation8	1.000	.806
Implementation9	1.000	.690
Atitude1	1.000	.679
Atitude2	1.000	.761
Atitude3	1.000	.638
Atitude4	1.000	.710
Atitude5	1.000	.767
Atitude6	1.000	.772
Atitude7	1.000	.653
Personal Use1	1.000	.827
Personal Use2	1.000	.720
Personal Use3.	1.000	.835
Personal Use4	1.000	.690

Extraction Method: Principal Component Analysis.

The first eight factor explains the 72.935 of total variance .First 19 factors having eigenvalue greater than 1, rest of 7 eigenvalue somewhere between 0.9 to 0.2.

TOTAL VARIANCE EXPLAIN AND SCREE PLOT

Parallel analysis is more powerful than scree test because it compare originally generated component eigenvalue s with random generated values. A component is accepted if its real eigenvalue is greater than the randomly generated eigenvalue and reject in case of opposition to this situation (Kline, 2013).

The following figure 3 shows the eight components are accepted as their real value is greater than eigenvalue that is 1. Moreover, reaching a status of 75% is important for retaining the factors through observing total variance explain (Pett, Lackey, & Sullivan, 2003).

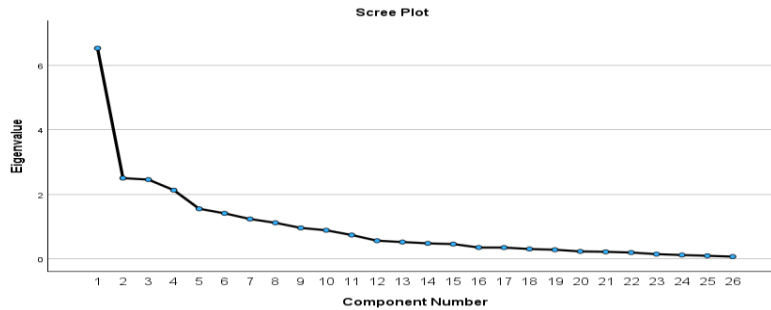
FIGURE 3

Component	Total Variance Explained								
	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.533	25.128	25.128	6.533	25.128	25.128	3.237	12.450	12.450
2	2.506	9.637	34.765	2.506	9.637	34.765	3.003	11.549	23.999
3	2.460	9.463	44.227	2.460	9.463	44.227	2.559	9.841	33.840
4	2.134	8.208	52.435	2.134	8.208	52.435	2.351	9.043	42.884
5	1.556	5.985	58.421	1.556	5.985	58.421	2.101	8.080	50.964
6	1.414	5.439	63.860	1.414	5.439	63.860	1.923	7.398	58.361
7	1.239	4.764	68.624	1.239	4.764	68.624	1.904	7.324	65.685
8	1.121	4.311	72.935	1.121	4.311	72.935	1.885	7.250	72.935
9	.963	3.702	76.637						
10	.890	3.422	80.059						
11	.743	2.858	82.917						
12	.566	2.179	85.095						
13	.525	2.019	87.115						
14	.484	1.860	88.975						
15	.462	1.776	90.751						
16	.355	1.367	92.118						
17	.354	1.360	93.478						
18	.309	1.189	94.667						
19	.287	1.103	95.771						
20	.234	.901	96.671						
21	.222	.854	97.525						
22	.200	.769	98.294						
23	.150	.577	98.871						
24	.122	.468	99.339						
25	.099	.379	99.719						
26	.073	.281	100.000						

Extraction Method: Principal Component Analysis.

The cutoff line in the graph obtained through the Scree test determines the number of factors in the data (Preacher & MacCallum, 2002).

FIGURE 4



ROTATED MATRIX TABLE

The below figure shows the image of rotated component matrix. Varimax rotation is applied because it is most preferable used by developer. Figure shows the there is no cross loading of difference less than 0.10. As the rotated component matrix item loading meeting the recommendation of Tabachnick and Fidell (2013), as if cross loading less than 0.10 item should be deleted.

Figure 5

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Rotated Component Matrix^a

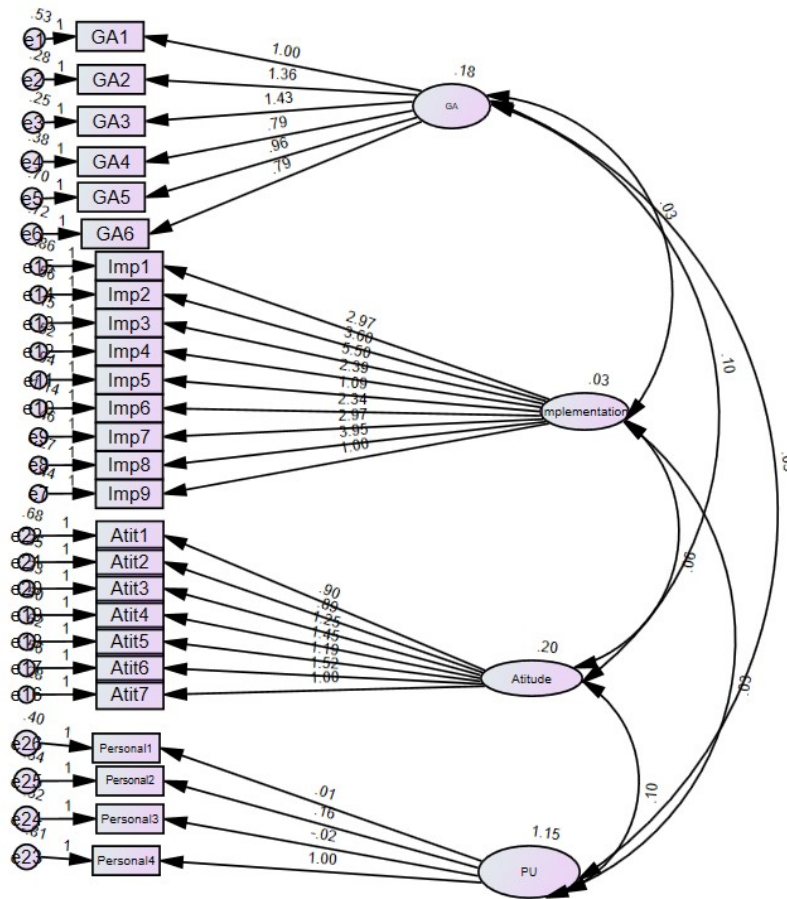
	Component							
	1	2	3	4	5	6	7	8
General Awareness1				.596				
General Awareness2								.617
General Awareness3								.736
General Awareness4								.800
General Awareness5				.800				
General Awareness6				.743				
Implementation1			.759					
Implementation2	.472							
Implementation3	.482	.568						
Implementation4			.770					
Implementation5					.778			
Implementation6					.768			
Implementation7		.449	.546					
Implementation8	.518		.453					
Implementation9			.561				-.519	
Attitude1		.644			.449			
Attitude2		.846						
Attitude3		.550						
Attitude4	.420	.499		.491				
Attitude5	.840							
Attitude6	.807							
Attitude7	.602							
Personal Use1								.873
Personal Use2						.785		
Personal Use3								.884
Personal Use4						.764		

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 15 iterations.

**CONSTRUCT VALIDITY OF DAI-AI
FAST AMOS GRAPHICS**

By using Amos 24 to ensure the internal validity of instrument with 26 item and 4 factors. The Amos diagram of DAI-AI is shown in figure 6.

FIGURE 6



MODEL FIT INDICES

Construct validity of instrument was ensured through CFA by running in Amos .Different researcher suggest different values of model fit by interpreting CFA results .Mcdonald and Ho(2002) focused on Comparative fit index(CFI),Goodness of Fit Index(GFI) and Normal Fit Index(NFI).Kline(2015) suggest Chi-squared test(CMIN/df),Root Mean-Square Residual(RMR),Root Mean-Squared Error of Approximation(RMSEA) and Comparative Fit Index(CFI).

In this study CMIN/df, RMR, GFI, NFI, CFI, RMSEA and AGFI (adjusted Goodness of fit Index) are used for validation of instrument,

TABLE 2

Sr. No.	Indicators	Estimate	Criteria	Judgment
1	CMIN/df	2.49	Less or equal to 3	Good
2	RMR	.05	Less than .09	Good
3	GFI	.98	Above .95	Good

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4	AGFI	.91	Above .90	Acceptable
5	NFI	.95	.90 to .95	Acceptable
6	CFI	.99	Above .95	Good
7	RMSEA	.07	Less than .10	Good

Table show that all the value of Model Fit Indices are good and acceptable under the cut off values, ensuring the construct validity of instrument.

Reliability of Instrument

The reliability of instrument was ensured through calculating Cronbach Alpha and it meet the criteria of reliability.

The below table shows that the value of Cronbach Alpha for first factor i.e. general awareness is 0.71,for second factor Implementation is 0.77 and for third and fourth factors are 0.79 and 0.50.Thr overall reliability of instrument is calculated as 0.85.According to DeVellis and Thorpe (2021), the minimum accepted reliability value for sub factors must be $\geq .50$. Karagoz (2019) suggested that the reliability value of the instrument greater than .70.Based on this criteria, the instrument is found reliable.

Table 3

Conclusion and Recommendations

Factors	No of items	Mean	Standard Deviation	Cronbach Alpha
General Awareness	6	23.66	3.21	0.71
Implementation	9	33.57	4.91	0.77
Attitude	7	26.47	4.04	0.79
Personal use	4	17.40	1.35	0.50
Total Scale	26	101.11	10.21	0.85

It is conclude that the instrument DAI-AI found validate and reliable on the bases of given criteria. The content validity was ensured through expert opinion based on Lawshe (1975) criteria. Construct Validity was ensured through exploratory factor analysis and confirmatory factor analysis. And it was found good on the basis of given criteria. Furthermore reliability of DAI-AI was also found good. So, on the basis on conclusion t can be recommended that DAI-AI can be used to determine the awareness and implementation of artificial intelligence tools among undergraduates. The DAI-AI was consisted 4 factors general awareness, Implementation, Attitude toward AI and Personal use. It may be extended on different factors according to geographical area and population of the study.

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