Understanding AI tool engagement: A study of ChatGPT usage and word-of-mouth among university students By PLS Algorithm

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APPROVAL

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I so certify that I have reviewed this thesis and that, in my judgment, it is sufficient in both scope and quality to be awarded a Bachelor of Science degree.

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STUDENT'S DECLARATION

I hereby declare that the work in this thesis is based on my original work except for quotations and citations which have been duly acknowledged. I also declare that it has not been previously or concurrently submitted for any other degree at Daffodil International Universityor any other institution.

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Thesis submitted in fulfillment of the requirements
for the award of the degree of
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DEDICATION

This thesis is dedicated to my family, who have been my strongest allies throughout this journey due to their unwavering belief in me, support, and encouragement.My supervisor, Dr. Imran Mahmud, is also honored in this work for his guidance, patience, and invaluable mentoring, all of which have been crucial in my completion of this project.

ABSTRACT

This study examines how university students use ChatGPT, focusing on factors including system quality, personalization, trust, and satisfaction. This study examines the effects of these factors on students' behavioral intentions and word-of-mouth recommendations. Partial Least Square (PLS, is a method for survey and data analysis.

The results show how crucial customisation and trust are to increasing user satisfaction and encouraging repeat use. Word-of-mouth is discovered to have a substantial impact on this adoption. Even with ChatGPT's many benefits, Data privacy issues still remain despite ChatGPT's several advantages. It provides suggestions for enhancing AI driven educational resources, notably around the user interface, ensuring it is safe, visualised, relevant and of great quality.

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CHAPTER 1

INTRODUCTION

It is necessary to use information and communications technology, or ICT, in many areas of modern life, including work, healthcare, education, and fun. A time when artificial intelligence (AI) has changed the classroom and the workplace, it is important to know how people use ChatGPT and other AI technologies to have an impact on how these areas develop in the future.

Artificial intelligence (AI) has become a powerful force that is restructuring whole industries and everyday activities in areas like education, work, communication, and more. The most useful AI technology on the market right now is ChatGPT, which is a generative language model that has gotten a lot of attention because it can help with many tasks and speak like a person. This study's goal is to look at how college students use ChatGPT, focusing on usage trends and how word-of-mouth (WOM) affects user adoption.

Several things make it harder for ChatGPT to be widely used.One of the most important problems is the "digital divide," which happens when people don't have the same access to technology and use it in different ways. Lack of technology knowledge, bad facilities, and slow internet connections all make it harder for many people to use AI.

1.1 Background

Agents that can have complex conversations The fast growth of artificial intelligence (AI) led to ChatGPT, which has changed the way people and computers talk to each other. The cutting edge natural language processing tool ChatGPT from OpenAI can quickly make responses that sound like they came from a person. It is useful in many areas, like education, healthcare, customer service, and more, because it can have personalized, situation-aware talks with users.. Students at the college level have mostly used ChatGPT to come up with new ideas, summarize complicated problems, write essays, and better understand a wide range of subjects. Because of these features, it is an important tool for getting more done, learning faster, and teaching people how to handle their time better.

To understand how people use AI systems, you need to know about things like apparent intellect, mechanism excellence, trust, and personalization, based in a study by Balakrishnan and Dwivedi (2021). It's important for ChatGPT to be widely used because these factors affect customer happiness, behavior intentions, and word-of-mouth (WOM) communication.

1.2 Research Gaps and Problem Statement

Researchers haven't looked into how college students use and gain via artificial intelligence applications like ChatGPT in previous research.

These factors, like apparent information, system quality, and personalization, are not properly addressed when it comes to college students. Nevertheless, these factors are especially important in this study because they relate to university’s users.

1.3 Research Scope

User: Students at universities

Behavioral aspects: Elements that influence word-of-mouth (WOM), sustained use, and behavioral intention.

Important Elements Examined: Thirteen variables will be looked at in all.

1.4 Research Questions

RQ1: What are the driving forces behind people's WOM regarding ChatGPT use?

This inquiry aims to pinpoint the precise elements (such as satisfaction, trust, and personalization) that influence people's decision to refer ChatGPT to others.

RQ2: What are the key elements that have the most effects on WOM?

The purpose of this inquiry is to ascertain which elements—such as utilitarian advantages and behavioral intention—have the biggest effects on people's propensity to spread the word about ChatGPT.

1.5 Research Objectives

RO1: To determine the elements that drive and impact users' WOM about ChatGptUsage.

Finding the elements (such as trust, satisfaction, and personalization) that motivate users to promote ChatGPT favorably is the main goal of this purpose.

This goal looks at how various factors (such user experience, system quality, or personalization) affect users' intentions to stick using ChatGPT.

RO2: To evaluate how circumstances affect on intention to continue.

CHAPTER 2

LITERATURE REVIEW

According to a South Korean report by Jo, He examined the elements that influence the behavior plans and word-of-mouth (WOM) of ChatGPT users. It discussed the significance of demographic variables (such as age, gender, and educational attainment) and personalization. Using Structural Equation Modeling (SEM), the study demonstrated that user satisfaction and engagement are significantly impacted by personalization.

Dwivedi et al. look into the ChatGPT's ability to generate and how that affects a number of different fields. This multidisciplinary study looked at how ChatGPT can be used in different fields, including business, healthcare, and education, to see how flexible it is and how much room it has for growth.

Dinh and Park, South Korea,When it came to online store robots, they focused on what the customer wanted. It looked into how practical (utilitarian) and hedonic (pleasure-driven) rewards change the behavior of users. These rewards have an effect on customer participation, and SEM was used to show this.

Chaina, Zhu et al.His study looks at how happy users are and how much they want to keep using AI apps for mental health purposes. Using SEM to look at the data, it was found that how smart people think the system is and how well it works are two important factors that affect how happy users are. The findings are especially useful for figuring out the way intellect and quality affect how well chatbots work.

In India, Mishra and Shukla looked into the psychological factors that affect ChatGPT use and word-of-mouth behavior (WOM). They used structural equation modeling to show how factors like perceived usefulness, trust, and emotional connection affect user happiness and recommendations.

Table 2.1: Reconsideration of Literature

Writer Name	Country	Year	Dependent Variable	Independent Variable	Topic	Exploration
Dinh & Park	Korea	2023	Customer Intention	Utilitarian and Motivations Hedonic	Online Retail Chatbots	SEM
Dwivedi et al.	Global	2023	Multidisciplinary Impact	ChatGPT's Generative Capabilities	ChatGPT	Multidisciplinary Impact
Jo	South Korea	2023	WOM, Behavioral Intention	Gender, Education Age, Personalization	ChatGPT	Multi-Group Analysis (MGA), SEM
Akel & Armagan	Turkey	2021	Continuance Intention	Hedonic and Utilitarian Benefits	Location Based Service	SEM

Zhu et al.	China	2022	Contentment and Intention to Continue	Perceived System Quality and Intelligence	Chatbots with AI for Mental Health	SEM
Mishra & Shukla	India	2020	Utilization and WOM	Psychological Factors	ChatGPT	Modeling Structural Equations

CHAPTER 3

METHODOLOGY

This research looks at the factors that affect how college students use ChatGPT using quantitative research methods. The research uses the Technology Acceptance Model (TAM) and focuses on ideas like observed intellect, systemic excellence, confidence, individualization, satisfaction, behavior purpose, and word of mouth (WOM). Using SmartPLS 4, we collect raw data from college students through a questionnaire survey. The data is then examined via Partial Least Squares Structural Equation Modeling (PLS-SEM).

3.1 Instrument development

To make sure that this study was reliable and true, first a questionnaire with different variables was made. There are three questions in each poll. These things help us figure out how the person feels about ChatGPT. Table 5 shows a full list of all the things and constructs. Several items from scales used in other studies are used to measure each concept in this study. These scales are shown in Table 5. All of the things were made with college students' use of ChatGPT in mind. This question uses a seven-point Likert scale, with 1 meaning "completely disagree" and 7 meaning "completely agree."

3.2 Data Collection

I'm using an online poll to get information from college students. There are two parts to the Google Form for this survey: one is for demographic information and the other is for makeup information. Before I asked a question about qualifying, I asked, "Are you currently using ChatGPT regularly?" People who said both "yes" and "no" can fill out this poll. This will let me know who uses it often and who only uses it sometimes.

As an example of ethical research methods, the promise that the participants' answers will be kept secret and only used for academic study. They are also told that they don't have to take part and that they can quit at any time without any consequences.

3.3 Respondents

The full demographic information of the 81 people who took part in the study is shown. In Table 3.1, you can see what gender the responses were. In this case, there are 58 men, which is a legal percentage of 72.7%, and 23 women, which is a valid percentage of 27.3%. Age limits range from 19 to 25, 26 to 35, 36 to 45, and more. According to Table 2, the level of schooling, college freshmen use it the most, with a frequency of 66 and an 8.5% percentage. In Table 3.3, you can see how often staff members use ChatGPT with students who use the service. We can see that about 97.8% of people studying software engineering use it. This number is very big.

By giving a full picture of the respondents' backgrounds, this two-table ensures that the poll results include a lot of different points of view.

Table 3.1: Responds of Male and Female

		True Percentage	Percentage	Frequency	Total Percentage
True	Male	27.3	27.3	58	29.4
	Female	72.7	72.7	23	99.9
	Total	100.0	100.0	81	

Table 3.2: Percentage of Academic Sector

	Valid Percentage	Percentage	Frequencys	Cumulative Percentage

True	PHD	2.3	2.3	4	8.7
	Others	8.9	8.9	7	16.3
	Master's degree	8.6	8.6	8	19.5
	Undergraduate degree	81.5	81.5	62	100.0
	Total	100.0	100.0	81	

Table 3.3: Percentage of each Segment

		Frequencies	True Percentage	Percentage	Cumulative Percentage
True	EEE	2	2.3	2.3	2.3
	Bangla	1	2.6	2.6	3.8
	BA	1	1.2	1.2	4.8
	Business Administration	1	1.2	1.2	6.1
	BSS Degree	12	14.5	14.5	20.0
	Civil engineering	1	1.2	1.2	22.2
	Information Technology	7	8.6	8.6	30.9
	Computer Science and Engineering	11	13.6	13.6	44.4
	Economics	1	1.2	1.2	45.7
	Agriculture	1	1.2	1.2	46.9
	English	2	2.5	2.5	49.4
	English Language and Literature	1	1.2	1.2	50.6

	Industrial and Production Engineering	1	1.2	1.2	51.9
	Genetic Engineering & Microbiology	1	1.2	1.2	53.1
	IPE	1	1.2	1.2	54.3
	Industrial and production engineering	3	3.7	3.7	58.0
	Mechanical Engineering	1	1.2	1.2	59.3
	College of Medicine	2	2.2	2.2	62.5
	Textile Engineering	2	1.5	1.5	60.8
	SWE	29	38.1	35.0	98.8
	Political Science	2	1.5	1.5	40.2
	Entire result	81.00	99.99	99.99	

CHAPTER 4

RESULTSAND DISCUSSION

The data for this investigation was examined using SmartPLS 4. PLS-SEM, or "partial least squares structural equation modeling," is well-known for its advantages in statistical analysis (Ringle et al., 2022). Due of its ability to assess intricate relationships between numerous variables, the PLS-SEM approach was employed. As a result, it was ideal for assessing the hypothesized correlations in this study (Hare et al., 2021).

4.1 Result

This study examined the mental and behavioral aspects that influence students' use of ChatGPT. The study examined the relationships between perceived intelligence, system quality, reliability, and personalization and how these impact behavior plans, word-of-mouth (WOM), and satisfaction using partial least squares structural equation modeling (PLS-SEM). Effects were examined.

Table 4.1: Percentage of Composite Relaibility and validity

	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
IIP	0.867	0.915	0.783
BIT	0.909	0.943	0.845
KAP	0.898	0.936	0.729
INO	0.865	0.917	0.886
KAQ	0.915	0.945	0.851
PSN	0.892	0.934	0.818
PIE	0.891	0.932	0.823
SAT	0.921	0.952	0.866
SYQ	0.816	0.881	0.711
TRU	0.962	0.967	0.931
USE	0.872	0.942	0.884
UTB	0.921	0.949	0.860
WOM	0.853	0.910	0.770

This table uses Average Variance Extracted (AVE) and Composite Reliability (rho_a and rho_c) to show the validity and reliability of the constructs in this study. With all AVE values above 0.50 and rho_a and rho_c values above the suggested cutoff of 0.70, all constructs demonstrate excellent convergent validity and good reliability. Constructs with unusually high values, such as Satisfaction (SAT: rho_c = 0.952, AVE = 0.866) and Trust (TRU: rho_c = 0.967, AVE = 0.931), demonstrate strong internal consistency and explanatory power. The necessary thresholds are met even by constructs with

somewhat lower values, like System Quality (SYQ: rho_c = 0.881, AVE = 0.711). These findings support the measurement model's robustness for additional research.

4.2 Measurement Model

Each item's factor loadings, the average variance extracted (AVE) for each construct, and the composite reliability (CR) are all used to fully test the measuring model. Findings are shown in Table 4.1 To get the 95% confidence intervals for CR and other reliability indicators, bootstrapping methods were used to make the data more reliable.

Additionally, all builds went above and beyond the standards set, as shown by AVE.

All factors must have a Composite reliability greater than 0.7 and an AVE greater than 0.5. All structures meet the Composite reliability and AVE, as shown in Table 4.1.The criteria is satisfied since, according to our test, CR and AVE are higher than 0.7 and 0.5.

Even if dimensions like behavioral intention, trust, and individual affect have high CR values, it's still vital to investigate the impacts and causes of these findings.

Extremely high CR values may mean that there is redundancy, as parts of the construct may capture the same underlying traits more than once, which could make dependency metrics too high. These high CR numbers could also mean that there are problems with the data, like people giving different answers to different questions. Yet, another point of view says that these values come from full representations of constructs. This is clear from the way we use a wide range of representative items to capture complex aspects of constructs like trust and behavioral plans.

The discriminant validity will also be compared using the Fornell-Larcker measure and the Heterotypic-Monotypic Ratio (HTMT). The square root of the AVE for each construct (non-diagonal elements in Table 4.2) and the correlation values between constructs (off-diagonal elements in Table 4.2) are compared using the Fornell-Larcker criterion.

When the square root of the AVE for each construct is bigger than its linked construct, discriminant validity is shown, as the study said.

As an extra way to check for discriminant validity, the HTMT ratio of relationships was also looked into (Table 4.3). All of the HTMT values met the safe cutoff level of 0.90, except for those for knowledge gain and application (Henseler et al., 2015).

As you can see, even if the HTMT number is larger than the threshold, these constructs are still included in the study.

4.3 Hypothesis

I now state the 13-variable hypothesis.

H1.WOM is positively impacted by AI tools that are viewed as pereceived higher intelligence.

H2. WOM is positively impacted by system quality.

H3. WOM is positively impacted by Knowledge acquisition .

H4.WOM is positively impacted by Knowledge application .

H5.WOM is positively impacted by Personalization.

H6. WOM is positively impacted by Trust.

H7. WOM is positively impacted by Utilitarian benefits .

H8. WOM is positively impacted by Satisfaction.

H9. WOM is positively impacted by Individual.

H10 .WOM is positively impacted by Personal innovativeness .

H11.WOM is positively impacted by Behavioral intention.

H12. WOM is positively impactedUsage.

SmartPLS 4 will analyze these hypotheses to determine which are supported and which are not.

Table 4.2: Discriminant Validity Test

	BIT	IIP	INO	KAP	KAQ	PIE	PSN	SAT	SYQ	TRU	USE	UTB	WOM
BIT	0.919												
IIP	0.795	0.885											
INO	0.757	0.712	0.887										
KAP	0.717	0.832	0.807	0.911									
KAQ	0.704	0.814	0.678	0.884	0.922								
PIE	0.599	0.756	0.607	0.753	0.734	0.905							
PSN	0.757	0.818	0.799	0.822	0.753	0.736	0.907						
SAT	0.758	0.874	0.775	0.822	0.796	0.704	0.830	0.930					
SYQ	0.692	0.712	0.768	0.846	0.793	0.619	0.748	0.726	0.842				
TRU	0.656	0.715	0.657	0.706	0.649	0.587	0.726	0.755	0.702	0.963			
USE	0.818	0.804	0.663	0.740	0.726	0.661	0.797	0.721	0.679	0.636	0.942		
UTB	0.681	0.846	0.711	0.814	0.822	0.740	0.794	0.847	0.698	0.727	0.721	0.926	
WOM	0.777	0.818	0.686	0.792	0.850	0.713	0.806	0.779	0.737	0.615	0.770	0.805	0.877

In 4.2, all of the diagonal values are greater than the inside values. This means that the square root of the AVE for each design is high. This means that the models are different.

The reliability values and correlation matrices for the constructs utilized in this study are displayed in this table, highlighting their linkages and internal consistency. Each construct's dependability (such as composite reliability or AVE) is shown by the diagonal values (bold), all of which are greater than 0.85, signifying strong reliability. The correlations between the constructs are displayed by the off-diagonal numbers, which indicate how strongly they are related.

Notable findings include a robust association between Knowledge Acquisition (KAQ) and Word-of-Mouth (WOM) (0.852) and Knowledge Application (KAP) and Individual Impact (IIP) (0.831). These demonstrate the substantial influence that academic concepts like knowledge acquisition and application have on users' attitudes and actions. Additionally, Word-of-Mouth (WOM) exhibits good associations with Personalization (PSN: 0.808) and Satisfaction (SAT: 0.779), highlighting their influence on ChatGPT suggestions. Similarly, Satisfaction (SAT: 0.858) and Use (USE: 0.816) are strongly associated with Behavioral Intention (BIT), indicating the significance of these variables in promoting sustained usage.

The validity and reliability of this model are supported by the table's overall strong construct reliability and significant correlations between variables. It offers important insights into the ways in which important constructs interact to influence user behavior and ChatGPT word-of-mouth.

Graphical Representation

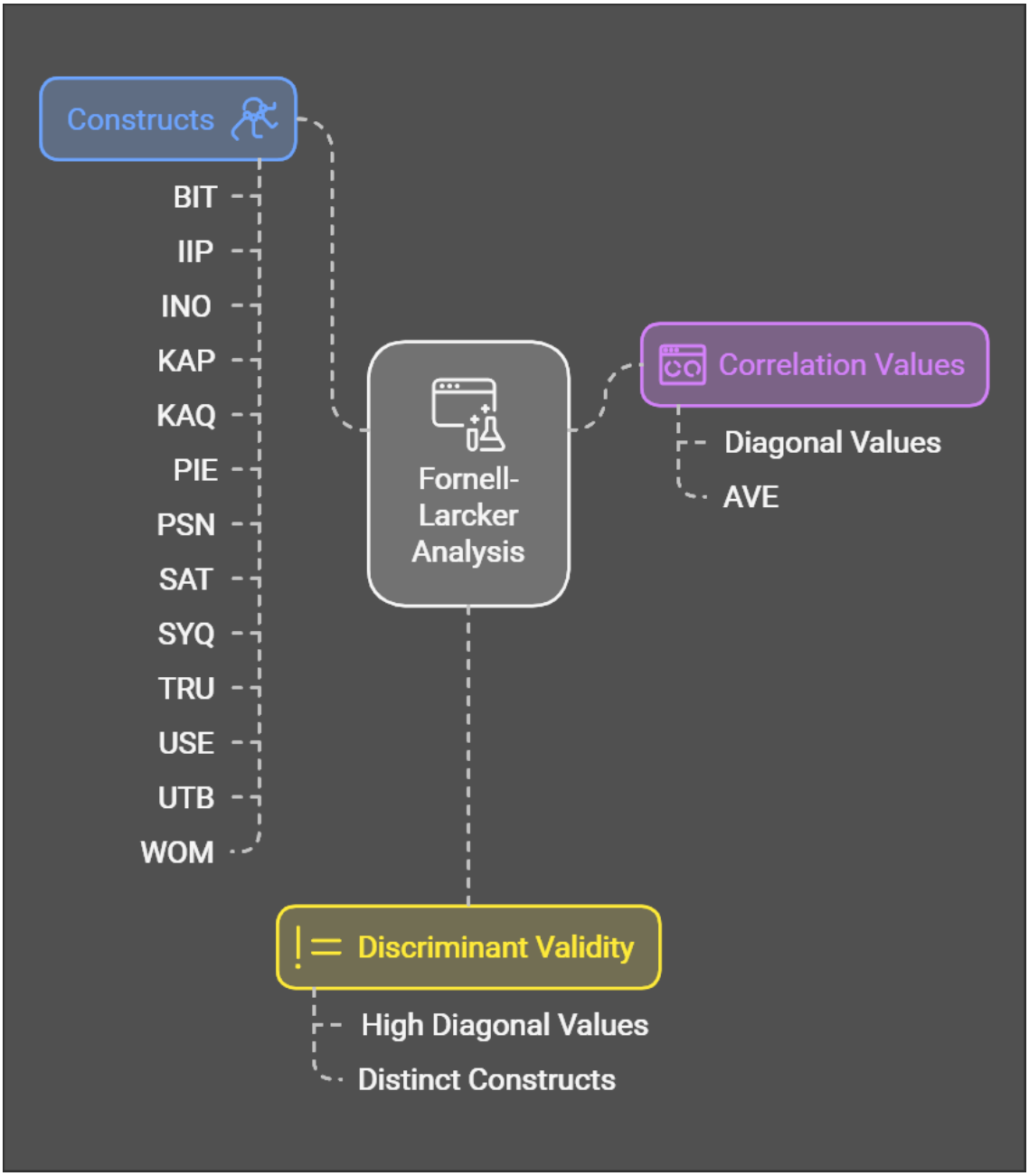
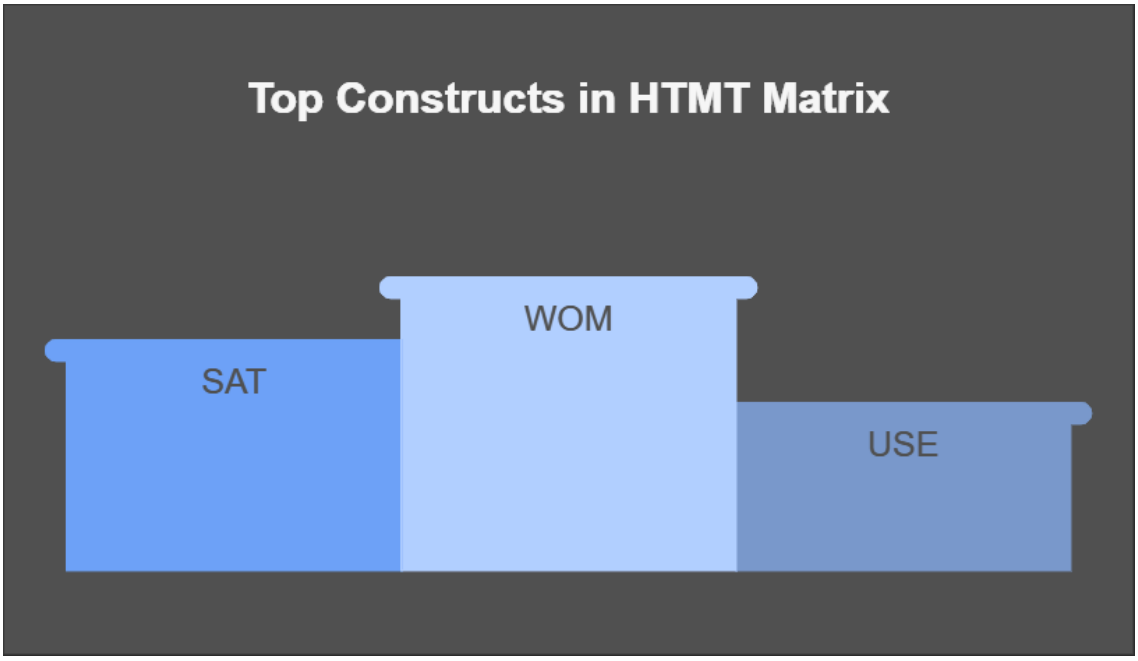


Table 4.3: Heterotrait-Monotrait ratio of correlations

	BIT	IIP	INO	KAP	KAQ	PIE	PSN	SAT	SYQ	TRU	USE	UTB	WOM
BIT													
IIP	0.898												
INO	0.853	0.825											
KAP	0.793	0.943	0.917										
KAQ	0.772	0.913	0.765	0.977									
PIE	0.664	0.860	0.693	0.843	0.815								
PSN	0.841	0.932	0.910	0.918	0.833	0.826							
SAT	0.828	0.978	0.870	0.905	0.866	0.778	0.915						
SYQ	0.809	0.840	0.921	0.992	0.920	0.722	0.880	0.836					
TRU	0.700	0.786	0.723	0.761	0.691	0.633	0.784	0.802	0.792				
USE	0.918	0.927	0.762	0.837	0.814	0.750	0.904	0.803	0.805	0.694			
UTB	0.742	0.947	0.801	0.895	0.898	0.819	0.877	0.922	0.807	0.775	0.804		
WOM	0.883	0.953	0.803	0.907	0.967	0.819	0.927	0.880	0.892	0.680	0.896	0.910	

Graphical Representation



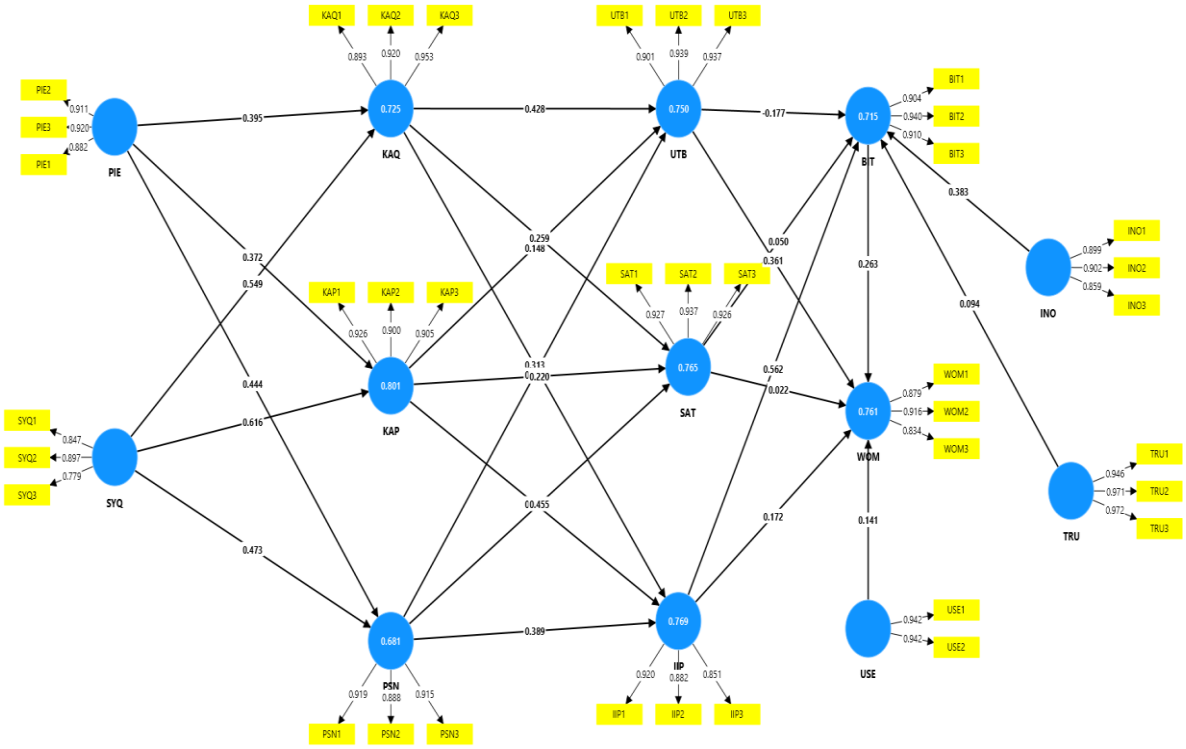


Figure 4.1: Partial Least SquareOutcomes

4.4 Test of Hypotheses

Table 4.4: Result of Path Coefficients Matrix

Hypothesis		Sample mean (M)	Original sample	T statistics (|O/STD	Standard deviation (STDEV)	P values	Hypothesis Result

			(O)	EV|)			
H1	**BIT ->WOM**	0.275	0.263	1.952	0.135	0.053	Not Supported
H2a	**IIP -> BIT**	0.547	0.562	3.715	0.151	0.000	Supported
H2b	**IIP -> WOM**	0.160	0.172	0.835	0.206	0.402	Not Supported
H3	**INO -> BIT**	0.410	0.383	1.991	0.192	0.048	Supported
H4a	**KAP -> IIP**	0.239	0.236	1.292	0.183	0.198	Not Supported
H4b	**KAP -> SAT**	0.221	0.220	1.451	0.151	0.146	Not Supported
H4c	**KAP -> UTB**	0.150	0.148	0.788	0.188	0.432	Not Supported
H5a	**KAQ -> IIP**	0.319	0.313	2.055	0.152	0.041	Supported
H5b	**KAQ -> SAT**	0.266	0.259	2.100	0.123	0.035	Supported
H5c	**KAQ -> UTB**	0.426	0.428	2.892	0.148	0.003	Supported
H6a	**PIE -> KAP**	0.388	0.372	3.685	0.101	0.000	Supported
H6b	**PIE -> KAQ**	0.406	0.395	3.420	0.115	0.001	Supported
H6c	**PIE -> PSN**	0.463	0.444	3.529	0.125	0.000	Supported
H7a	**PSN -> IIP**	0.379	0.389	3.421	0.114	0.001	Supported

H7b	**PSN -> SAT**	0.446	0.455	3.509	0.130	0.000	Supported
H7c	**PSN -> UTB**	0.349	0.350	2.911	0.120	0.004	Supported
H8a	**SAT -> BIT**	0.054	0.051	0.234	0.214	0.817	Not Supported
H8b	**SAT -> WOM**	0.018	0.017	0.116	0.186	0.909	Not Supported
H9a	**SYQ -> KAP**	0.599	0.616	6.185	0.100	0.000	Supported
H9b	**SYQ -> KAQ**	0.537	0.549	4.875	0.113	0.000	Supported
H9c	**SYQ -> PSN**	0.451	0.473	3.667	0.129	0.000	Supported
H10	**TRU -> BIT**	0.075	0.094	0.684	0.135	0.488	Not Supported
H11	**USE -> WOM**	0.137	0.141	1.008	0.139	0.313	Not Supported
H12a	**UTB -> BIT**	-0.179	-0.177	1.046	0.169	0.296	Not Supported
H12b	**UTB -> WOM**	0.368	0.361	2.802	0.126	0.003	Supported

4.5 Discussion

Results of this study give us important new details about how college students use ChatGPT. Focusing on academic settings adds to previous study on how people use technology and increases our understanding of the topic. This research aims to look into

how different factors affect how people use and spread the word about ChatGPT. This research uses four stages to combine several basic ideas about AI chatbots and how people behave. Incorporating theory into my arguments allows me to offer more than just empirical data in terms of context, explanations, and insights.

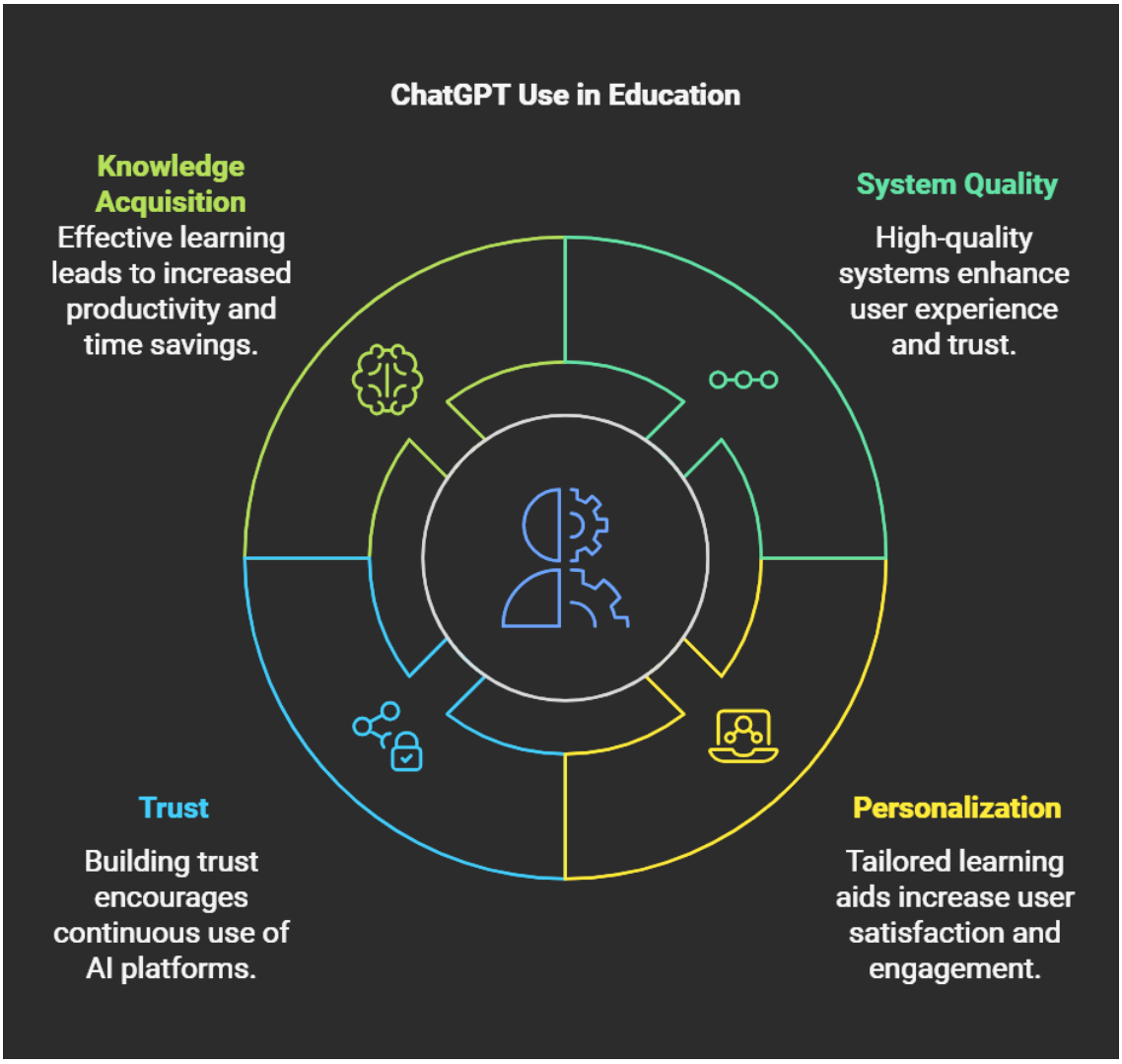
A framework for thinking about how smart people think others are and how good a system is: According to the Technology Acceptance Model (TAM), how much students use ChatGPT depends on how smart and well they think the system works. To build trust and help people learn, feedback that is well-thought-out, correct, and useful is needed.

These benefits of a good system show how important it is to be quick and dependable so that users have a smooth experience, especially when doing schoolwork.

Knowledge Acquisition and Application: In the setting of AI systems, users get both tangible and intangible benefits from acquiring knowledge and then using it. As the study shows, the main reasons people keep using AI are the real benefits they get from it, like higher productivity and quicker tasks. Regardless, it's fascinating to observe the complicated connections between users, apps, and gaining knowledge.

Customization and faith are important in AI platforms: One of the best ways to tell if someone was planning to do something or having fun was if they could customize it to them. Like personalized learning materials and explanations, students like tools that can be changed to fit their needs. For people to keep using something, you need to build trust. To get students to give useful information to ChatGPT, it's important to have strong privacy rights.

Graphical Representation



CHAPTER 5

CONCLUSION

ChatGPT and other artificial intelligence (AI) tools are being used more and more in schooling and other areas, which shows how revolutionary they can be. In this study, we looked into the key things that make college students use ChatGPT. We focused on behavioral intentions, such as how smart they think the system is, how trustworthy it is, and how personalized it is.This study examined the key elements influencing users' satisfaction, behavior intentions, and word-of-mouth (WOM) communication using the Technology Acceptance Model (TAM), which is based on a solid theoretical foundation. Perceived intelligence and customization increased students' enjoyment of ChatGPT and encouraged them to continue using it, according to the findings. It was also found that trust was a very important factor. This shows how important data security and prompt answers are for gaining user trust. WOM behavior was especially amazing because happy users actively told their peer networks about ChatGPT, which helped it get a lot of support.

Despite the positive appearance of these results, a few issues could prevent ChatGPT from becoming extensively utilized and accepted. These include concerns about ethical dilemmas, data protection, and possibly relying too heavily on AI capabilities. These problems need to be fixed so that the tool can be most useful in the classroom and the workplace. Finally, this research gives us useful details on how to best utilize ChatGPT and other AI tools in school settings. To keep up with users' changing needs, educators and developers should work on making their systems better in terms of quality, flexibility, and dependability. This study can be expanded upon in the future by examining ChatGPT's impact on various demographic groups and long-term academic results. This will help us understand how AI is used in learning settings better.

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