MEASUREMENT TOOL FOR THE ADOPTION OF CHATGPT IN EDUCATIONAL INSTITUTIONS IN BOTSWANA

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Abstract

ChatGPT helps users to write, learn, and even do assessments with the help of artificial intelligence in the form of a chatbot. Education is therefore receiving much attention in Botswana for economical and social development to be realized. In Botswana, the late implementation of ChatGPT has been associated with a lack of awareness. According to a survey, 55 % of university students use ChatGPT while 22% use it for academic purposes. Although, the study reveals that out of the students, 89 % have incorporated ChatGPT in a class environment. It is for this reason that there is comparatively limited research on this phenomenon within less developed and emerging countries like Botswana. As a result, this research aims to comprehensively understand and analyze the factors influencing customer adoption of ChatGPT within educational institutions in Botswana. SmartPLS for structural equation modeling was employed where through purposive sampling the target was 30 respondents who used ChatGPT in their academic settings. As a result

the pilot test showed that the tool was valid and reliable, and consists of 10 variables and 36 items, and could be applied for further studies.

Keywords: ChatGPT, Technology Acceptance
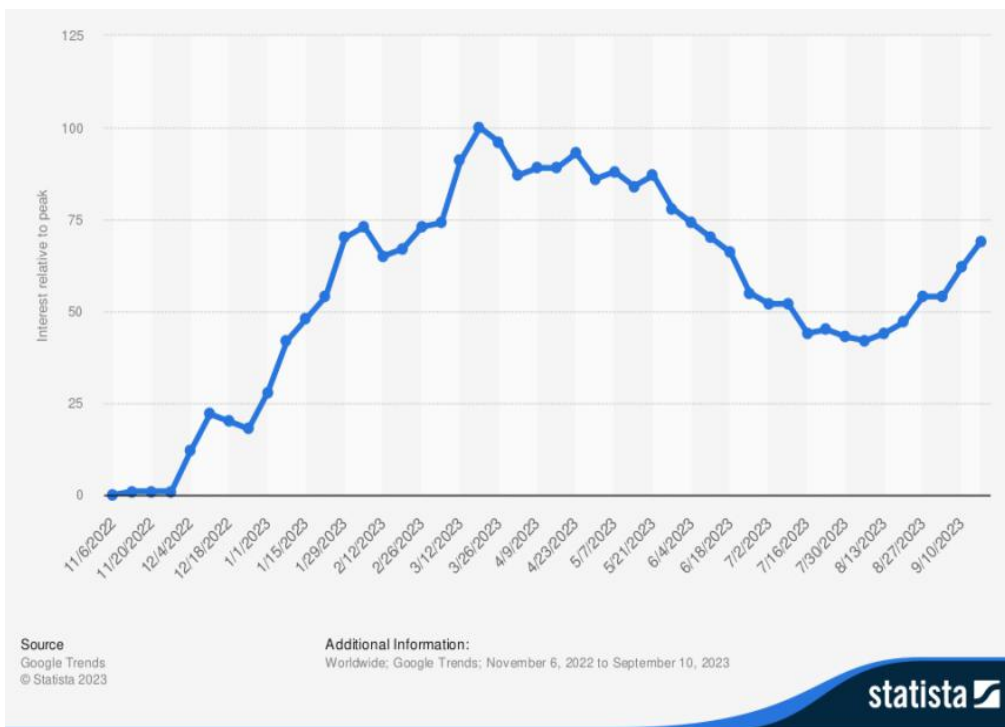
1. Introduction

Figure 1: *Google searches of "ChatGPT" (Data source: Google Trends- Statista, 2023).*

COVID-19 has enhanced the idea of distance learning methods, and the shifts towards new methods in education advanced by the pandemic (Bayaga & Plessis, 2023). The increase of such turnover has been rapid and this has called for adoption of new technologies such as the AI tools. It noted that universities are applying AI to improve students' services as well as faculty development (Zawacki-Richter et al., 2019). Some of these innovations include the ChatGPT which is an AI chatbot developed by OpenAI and was introduced in November 2022, it has 1 million users within five days, and people are discussing whether it will revolutionise education

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(Dwivedi et al., 2023). Zawacki-Richter et al., (2019) suggest that AI applications such as ChatGPT help increase learners' motivation and participation and therefore support self-organized learning through guiding, mentoring, and assessing functions. The usefulness is described in the work of Subramani et al., (2023) to enhance the understanding when teaching physiology to medical students; nevertheless, it lacks some characteristics in terms of graphical information presentation.

2. Literature Review

2.1 Marketing

As defined by the American Marketing Association (2023), marketing encompasses the actions, organizations, and procedures involved in generating, conveying, distributing, and trading commodities that are valuable to clients, customers, society and partners.

2.2 Consumer Behavior Theory: Reasons Why People Adopt a Product and Search For Similar Products

Consumer behaviour plays a significant role in marketing, as comprehending the reasons for product adoption and searching for similar items is imperative for businesses to maintain a competitive edge in the market. As defined by AMA, consumer behaviour encompasses examining individuals, groups, and organizations and their decision-making processes about acquiring, utilizing, and disposing of commodities, ideas, and experiences to satisfy their desires and requirements (American Marketing Association, 2023).

2.3 Performance Expectancy (PE) refers to an individual's belief that a technology will improve their work performance (Venkatesh et al., 2003).

2.4 Effort Expectancy (EE) refers to the user's perception of how easy a system is to learn and use. This aligns with the concept of Perceived Ease of Use in the Technology Acceptance Model (TAM) (Ammenwertha, 2019).

2.5 Social Influence (SI) refers to the degree to which individuals perceive pressure from their social circle to use a new system (Venkatesh et al., 2003).

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2.6 Facilitating Conditions (FC) refer to an individual's perception of the resources available within an organization to support their use of a technology (Osei et al., 2022).

2.7 **Hedonic Motivation** (HM) refers to the enjoyment or satisfaction derived from using a technology, which has been shown to significantly impact technology adoption (Venkatesh et al., 2012).

2.8 IT knowledge (ITK) refers to customers' proficiency in navigating the internet and utilizing its applications, including IoT services (Al-Momani, 2018).

2.9 Personal Innovativeness (PI) refers to an individual's tendency to be among the first to adopt and use new ideas (Dajani & Hegleh, 2019).

2.10 Habit (HT) can be defined as the extent to which an individual's utilization of a specific technology becomes automatic or deeply established as a regular practice (Venkatesh *et al*., 2012).

2.11 Behavioral intention (BI) refers to the extent to which an individual has consciously developed plans to either engage in or abstain from a particular activity in the future (Venkatesh et al., 2003).

2.12 Research Framework

The Unified Theory of Acceptance and Use of Technology (UTAUT), developed by Venkatesh et al. (2003), stands out for its comprehensiveness. UTAUT provides a framework for understanding user acceptance and technology innovation. It aims to identify the key factors influencing users' decisions to adopt a new technology (Venkatesh et al., 2003). The strength of UTAUT lies in its ability to explain a significant portion of the variation observed in users' behavioral intentions. Research suggests that UTAUT can explain up to 70% of these variations (Venkatesh et al., 2012).
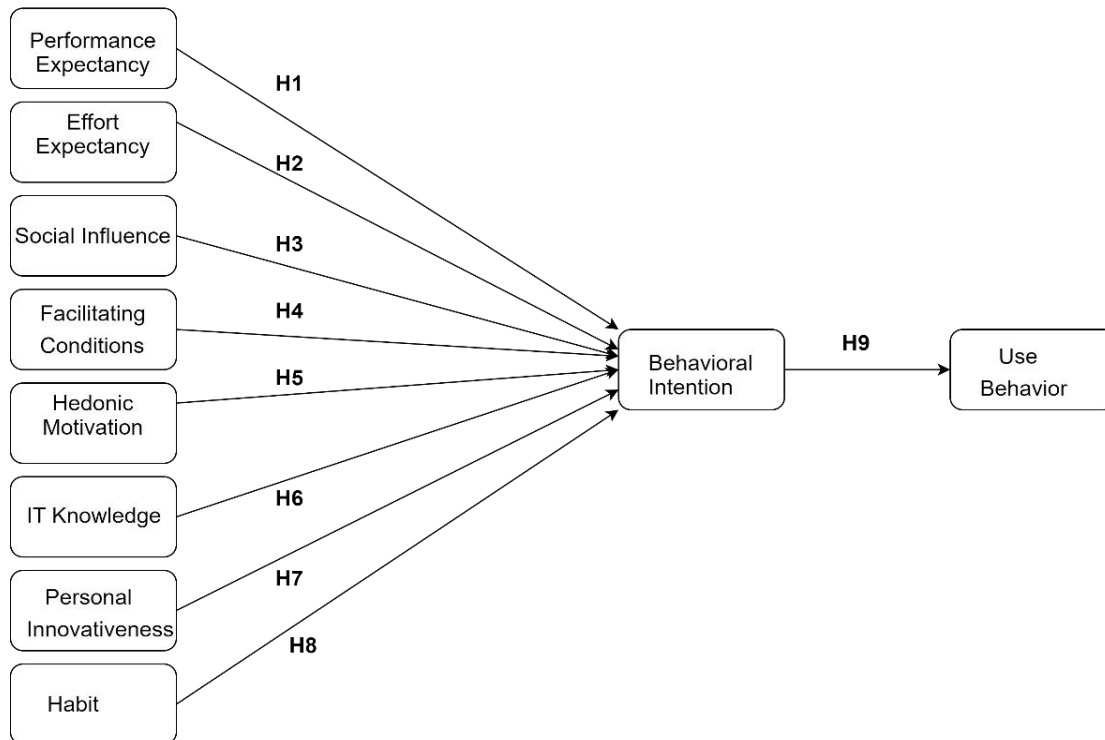
Figure 2. Research Framework

3. Research Methodology

This research employed a quantitative research approach which involved administering closed-ended questionnaires through Google Forms. Thus, purposive sampling method of non-probability sampling, as described by (Indrawati, 2015) was used, where certain members of the sample were purposely chosen according to a certain criterion and not each of the members.

 some or all the people in the target population have an equal opportunity to have their name selected. Data validity and reliability were noted in the conduct of the study. Validity that checks on how well a given tool on the intended measure, was tested by the researcher. Reliability which works on the principle of consistency and dependability of the results obtained was also checked to reduce measurement errors to be able to provide reliable results (Indrawati, 2015).

The authors of this paper have used and modified the survey question, which was taken from a previous study carried out by Venkatesh et al., (2003; 2012) and also other researchers. The

researcher adhered to the five-step approach delineated by Indrawati et al., (2020). The reason for this type of assessment is to get expert advice to make appropriate changes that will refine the questionnaire items as per the purpose of the research. After this, the researcher has to undertake a readability check on the participants regarding each of the proposed questionnaire items to ensure clarity is understood appropriately. The following table shows the items for each factor:

Table 1: *Tools for Measuring*

Construct	Items	Item Code
Performance Expectancy	"I think that ChatGPT is useful for my academic studies."	PE:1
	"Using ChatGPT improves my chances of accomplishing important goals in my academics."	PE:2
	"Using ChatGPT helps me to complete projects in my studies more quickly."	PE:3
	"Using ChatGPT helps me to complete homework in my studies more quickly."	PE:4
	"Using ChatGPT improves my academic productivity."	PE:5
Effort Expectancy	"It is simple for me to learn how to use ChatGPT."	EE:1
	"My engagement with ChatGPT is understandable."	EE:2
	"I find ChatGPT easy to use."	EE:3
	"Becoming proficient with ChatGPT is easy for me."	EE:4
Social Influence	"Important people in my life believe that I should use ChatGPT."	SI:1
	"My behavior is influenced by others who think I should use ChatGPT."	SI:2
	"People whose perspectives I value prefer that I use ChatGPT."	SI:3
	"My family/friends frequently use ChatGP."	SI: 4
Facilitating Conditions	"I have access to a mobile device, tablet or computer that can run ChatGPT."	FC:1
	"I am knowledgeable enough to use ChatGPT."	FC:2
	"My technological devices are compatible with ChatGPT."	FC:3
	"I can seek assistance from others if I encounter problems while using ChatGPT."	FC:4
	"It's fun to use ChatGPT."	HM:1
	"It is quite enjoyable to use ChatGPT."	HM:2

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Hedonic Motivation	"Using Chat GPT is very entertaining."	HM:3
	"Using ChatGPT would provide me with positive emotions such as excitement."	HM:4

Habit	"I've developed a habit of using ChatGPT."	HT:1
	"I have an addiction to use ChatGPT."	HT:2
	"I have to use ChatGPT."	HT:3
	"For me using ChatGPT has become natural."25	HT:4

Behavioral Intention	"I intend to keep using ChatGPT in the future."	BI:1
	"In my studies I will always strive to use ChatGPT."	BI:2
	"I intend to keep using ChatGPT frequently."	BI:3
	"I would recommend ChatGPT to others."	BI:4

Personal Innovativeness	"I enjoy trying out new information technology."	PI:1
	"I would try to find ways to experiment with new information technologies that I heard about."	PI:2
	"I am usually the first in my family or friends to try out new information technologies."	PI:3
	"In general, I am not afraid to try out new information technologies."	PI:4

Use Behavior	"I indent to use ChatGPT in my academic studies in the future."	UB:1
	"I predict I would use ChatGPT in my academic studies in the future."	UB:2
	"I plan to use ChatGPT in my academic studies in the future."	UB:3

IT Knowledge	"My knowledge of ChatGPT is quite comprehensive."	ITK:1
	"In comparison to my peers, I would grade my understanding of ChatGPT as extremely good."	ITK:2
	"I have expert knowledge of ChatGPT."	ITK:3

4. Research Method & Analysis

A pilot study was conducted to assess the validity and reliability of each item in the questionnaire before proceeding with the research. 30 respondents who used ChatGPT in educational settings, completed the pilot test survey items, and this data was utilized to conduct validity and reliability assessments (Indrawati et al., 2020). Therefore, the reliability of the instrument was established

when testing the validity of the instruments through the Pearson Product Moment (r-count) correlation using a significance level (α) of 0. 05 and with a sample size (n) of 30 gave a correlation rate (r-table) of 0. 361.

Table 2. Validity Test Results

VARIABLES	ITEM CODE	CITC	RESULT
Performance Expectancy	PE1	0.672	Valid
	PE2	0.644	Valid
	PE3	0.743	Valid
	PE4	0.633	Valid
	PE5	0.629	Valid
Effort Expectancy	EE1	0.652	Valid
	EE2	0.800	Valid
	EE3	0.812	Valid
	EE4	0.713	Valid
Social Influence	SI1	0.772	Valid
	SI2	0.751	Valid
	SI3	0.706	Valid
	SI4	0.541	Valid
Facilitating Conditions	FC1	0.795	Valid
	FC2	0.717	Valid
	FC3	0.744	Valid
	FC4	0.339	Valid
Hedonic Motivation	HM1	0.819	Valid
	HM2	0.727	Valid
	HM3	0.848	Valid
	HM4	0.731	Valid
Habit	H1	0.799	Valid
	H2	0.931	Valid
	H3	0.863	Valid
	H4	0.941	Valid
Personal Innovativeness	PI1	0.549	Valid
	PI2	0.778	Valid
	PI3	0.692	Valid
	PI4	0.696	Valid
IT Knowledge	ITK1	0.746	Valid
	ITK2	0.779	Valid

	ITK3	0.802	Valid
Behavioral Intention	BI1	0.834	Valid
	BI2	0.875	Valid
	BI3	0.894	Valid
	BI4	0.687	Valid
Use Bevaviour	UB1	0.915	Valid
	UB2	0.859	Valid
	UB3	0.905	Valid

From the data in the table, it indicates that the validity test using SPSS is considered valid. This means that makes it possible to conclude that the items in the questionnaire have met the validity test. The first is the reliability of the research where this element cannot be overemphasized as it forms the basis of the confidence, consistency and reliability of the measurements so as to validate the findings as well as reduce any possible errors that could have been made in the entire process (Indrawati, 2015). Internal consistency is usually estimated by Cronbach's Alpha if the instruments contain more than one item.

 The results are considered reliable if the obtained value of Cronbach's Alpha coefficient is more than 0. 70. This measure is frequently being applied to calculate the internal consistency of questionnaires which contain many items, and those indicators that have high values are considered to be reliable. Cronbach Apha Coefficient more than 0. 70.

Table 3. Reliability Test Results

VARIABLES	CRONBACH ALPHA	RESULT
Performance Expectancy	0.849	Reliable
Effort Expectancy	0.880	Reliable
Social Influence	0.850	Reliable
Facilitating Conditions	0.793	Reliable
Hedonic Motivation	0.890	Reliable
Habit	0.951	Reliable
Personal Innovativeness	0.829	Reliable
IT Knowledge	0.879	Reliable

Behavioral Intention	0.911	Reliable
Use Bevaviour	0.947	Reliable

From the table data above, it is also evident that all the variables in this research have adequate reliability and are suitable for use.

5. Conclusions

The validity and reliability of the measurement instruments were evaluated with data collected from 30 students who used ChatGPT in academic setting. The results support the measurement validity and reliability of all the variables and items, which supports measurements are prepared for further research at the time that was recorded. The findings of the average validity test indicate affirmation for all items in relation to their correlation. Thus, values above the r-table threshold confirm the validity that characterizes their meanings. However, results derived from the reliability tests prove that the obtained values for Cronbach's Alpha are higher than 0. 70.Thus, inter-observer reliability on all the variables was affirmed.

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