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Article

Predicting University Teachers' Behaviour Intentions Toward Digital Technologies: An Extension of the Unified Theory of Acceptance and Use of Technology Model (UTAUT)

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Abstract: Information and Communication Technologies over the past decades have enhanced University Teachers' ability to provide effective and prompt teaching and learning. Therefore, this study explored University Teachers' behavioural intentions toward the use of digital technologies for teaching and learning in higher educational institutions in Ghana. We grounded our study on the Unified Theory of Acceptance and Use of Technology (UTAUT) by testing the contributions of two key variables, the Cost of Internet Data and the Cost of smartphones to predict Behaviour Intentions (BI) of university teachers in three higher educational institutions towards the use of Digital Technologies (DTs) for online teaching and learning. We applied Partial Least Square Structural Equation Modelling for data analysis. Hypotheses testing on how the Cost of Internet Data and the Cost of Smartphones influence university teachers' Behaviour Intentions (BI) toward the use of Digital Technologies (DTs) were supported. The findings of our study further showed that university teachers' intentions to use DTs are influenced by determinants such as social influence, personal experience, and facilitating conditions. The study concludes that the polarity in the findings could help the university authorities to understand the factors to consider in selecting appropriate digital technologies for teaching and learning in universities. The findings from this study are a template for university teachers to get governments and stakeholders to change policies that affect the introduction of digital technologies in higher educational institutions.

Keywords: information; communication; digital; technologies; university teachers; UTAUT; behaviour intentions

1. Introduction

The revolutionary impact of Information and Communication Technologies has allowed university teachers in both developing and developed countries across the globe to take online teaching and learning needs to the doorsteps of students in the most effective way, by carrying out online educational interventions through the power of Digital Technologies ("DTs" thereafter)[1]. Modern DTs like smartphones, laptops computers, and tablets continue to have a great effect on how online teaching and learning are delivered in developing countries such as Ghana [2,3]. The effects brought about by mobility, the nature of wearable online educational devices,

connected gadgets as well several other technologies have become increasingly impactful over a couple of years [3]. For that reason, many advanced educational institutions that are well-equipped with the current gadgets and online teaching and learning have brought about renewed hope and are compared to the facilities that were used a decade ago [4]. The impressive trend in national policies for digital technologies in online education is a clear reflection of the firm commitment to the use of digital technologies to push for Sustainable Development Goals, shape the future of global online education, and generally provide support to universal educational coverage in developing countries [5,6].

Advancements in digital technologies in online educational practice are helping us to enjoy a more fulfilling educational life [7,8]. Currently, modern digital online technologies are playing a great role in supporting crucial purposes such as enhancing communication between teachers and students [7]. The good management of educational data and records, efficient monitoring systems as well as proper scheduling of online teacher-student appointments have been easier than ever before [5,7]. Since the emergence of the COVID-19 pandemic in late December 2019, university teachers and students have experienced changes that are associated with swift headway in DTs across the world [2]. Provisions of DMTs that are sound, fast, and cheaper are considered essential from an online teaching and learning perspective [7].

The objective of the study is to examine how digital technology Adoption Affects the Quality of teaching outcomes over time in higher education as well as explore the role of institutional support and government policy in facilitating the integration of digital technology in higher education.

2. Review of Related Literature

The technological Acceptance Model ("TAM" hereafter), Theory of Planned Behavior ("TRA" hereafter), and Theory of Reasoned Action (TRA) are some of the theoretical models that are used by researchers to discover the acceptance of the level of user innovations toward new technologies [Venkatesh, et al., 2016; Nordhoff et al., 2020] The Unified Theory of Acceptance and Use of Technology (UTAUT) is primarily applied for the examination of behavioral intentions ("BI" hereafter) as well as the specific use of technological innovations [9]. UTAUT is one of the unique models according to the researchers and is such a distinct model that links the user-driven (BI) and the construct. UTAUT specifically mainly looks at the factors that affect the users' (BI) according to university teachers. UTAUT model has positive implications for studies relating to the intentions of users to apply technology. Based on the relevance of UTAUT as suggested by [10], the researchers of this study decided to extend UTAUT by introducing new variables such as the Cost of Smartphones ("CoSP" hereafter) and the Cost of Internet Data ("CoID" hereafter) to investigate how those factors might influence university teachers' intentions to accept and use DTs. An earlier study conducted in Africa concerning technology adoption by users and applying UTAUT concluded that, in studying users' intentions for the utilization of technology, the UTAUT model was the best [5], thus the justification for this current study adopting the UTAUT model. To add to that, education, gender, age, and experience have been incorporated into the model to improve the level of understanding of the variables [11]. Due to the gaps that exist in the literature and which are also acknowledged by [11], this research attempts to add DTs literature, mainly based in a developing country where the application of DTs faces a myriad of challenges. A study that was carried out by [2], to determine the effects of DTs on higher education in Ghana indicates that DTs can bring about improvement and enhance online teaching and learning. According to [2], various governments in developing countries are full of optimism about DTs and hold the view that proper applications of DTs have a great possibility of providing equitable, accessible, and affordable online education among teachers and students in higher educational institutions in Ghana and other developing countries. Another gap identified shows that most of the preceding research relating to user intentions to technology use cantered on advanced countries. To fill the gaps in previous studies on factors that influence users' intentions to apply technology(digital), we grounded our study on the UTAUT model to explore the intentions of university teachers (faculty members directly involved in teaching and learning) to accept and use DTs for online teaching and learning in Ghana, by introducing two key variables CoID and CoSP and to determine how the new variables predict the intention of university teachers in Ghana to use and accept DTs for online teaching and learning.

2.1. Theoretical Framework and Study Hypotheses

Past studies on users' intentions to accept and use technology (digital technologies) have proposed a considerable number of theoretical models [12]. The common theoretical models include and are not limited to

the Diffusion of Innovation Theory [13,14], there is also a Technology Acceptance Model [15]. According to Ajzen & Fishbein [16]; and Rossi, & Armstrong [17], there is Social Cognitive Theory and the Theory of Reasoned Action Shamizadeh et al. [12], For studies relating to users' intentions to apply or use technology, scholars such as [Venkatesh, & Davis 2003], have proposed the UTAUT model as unique. According to Chao [11], and Dwivedi et al. [18], UTAUT can explain up to 60 to 79 percent variation in the intentions of the users. Venkatesh, & Davis [10] suggested that to determine a full understanding of the BI of users towards any technology, four central variables namely; Effort Expectancy ("EE" hereafter), Performance Expectancy ("PE" hereafter), Social influence ("SI" hereafter), and Facilitating Conditions ("FC" hereafter) are critical and inevitable. Again, studies by Venkatesh, & Davis [10], identified age, gender, experience, and voluntariness as the key four variables that have moderate effects on university teachers' intentions and behaviour when it comes to the use of technology. However, a key setback to using UTAUT to predict users' Behaviour Intentions (BI) to use technology is the condition to determine the coefficient (R2) and how the coefficient (R2) moderates the four constructs indicated earlier.

A study on how apps are used for physical activities among students in a university in Guangzhou, China, proposed some changes to the UTAUT model [19]. This is usually based on the result of the research that introduced three new constructs into UTAUT namely hedonic motivation, price value, and habit which extends UTAUT into UTAUT 2. Nordhoff et al. [9] and Chao [11] point out that extended UTAUT2 is used to clarify the acceptance of the users of the technology. Zuiderwijk, Janssen, & Dwivedi [20], reported that the four key constructs account for 45 percent of the variability in the behavioural intention of people to make use of open data technologies. Based on the relevance of the UTAUT model in studying users' intentions to use technology, the researchers for this current study opted to adopt UTAUT as the theoretical background to enable us to have a better insight into the factors that influence the use and acceptance of digital technologies by university teachers three universities in Ghana. The model explains that (SI), (FC), and (PE), greatly impact the user's intention to use and accept any form of technology. This current study adopted three variables (PE, SI, and FC) of the traditional UTAUT. The researchers introduced two new variables, the (CoID) and the (CoSP), to enable us to extend UTAUT. The study also categorized gender, experience, age, and experience as critical moderators of the UTAUT framework. To measure factors influencing this study, the following hypotheses are proposed.

2.2. Social Influence (SI)

Gu et al. [21] argued that by using technology such as DTs, users are greatly influenced by the surrounding environment. Factors such as friends, people they work with, and family members are also influenced. Venkatesh, & Davis and Venkatesh, & Davis explained SI as the level at which a person sees others as important and how they should use the new system [22,23]. To study personal behaviour, SI has been confirmed to be a good predictor. A study by Chao [11] concluded that (SI) was central and plays a significant role in explaining what is essential precedent for (BI) [11]. The following hypothesis is advanced:

H_1: *SI is positively related to university teachers' BI to use of DTs'.*

2.3. Personal Experience (PE)

According to Venkatesh & Davis and Dwivedi et al., Personal Experience (PE) refers to the level upon which an individual can believe in the kind of technology that is being proposed to prevent any hindrances in achieving the desired job in job performance, in this case, online teaching and learning [18,22]. Nordhoff et al and Venkatesh & Davis also establish that there is a desired affiliation between (PE) and (BI). PE affects users' intentions to use DTs that can respond by providing critical online educational services [9,11,22].

H_2: *PE is positively related to university teachers' BI to use of DTs'.*

2.4. Facilitating Conditions (FC)

FC is yet another predictor of technology. Initially, FC was found to greatly BI and the level of technology adoption [24]. The ability of the users to access an adequate set of (FC), for instance, online tutorials and demonstrations, technical support, hardware, and software is important to the development of intentions to use. Ordinarily, the advantages of FC on the usage behaviour regarding technology, as well as FC has received great support from quite several studies [18,22]. Therefore, as far as Ghana is concerned, it is proposed that users are quite in need of sufficient FC to help in planning to use online technology. This leads to the following hypothesis:

H_3: *FC is positively related to university teachers' BI to use of DTs'.*

2.5. Cost of Internet Data (CoID)

The money value that is spent in buying internet data is what is referred to as the cost of internet data. Any time we connect to the internet with a mobile phone or computer, internet data is used. During this time, we can browse, check emails, download music, play videos, or use online streaming like YouTube [25]. In developing countries, internet data is generally expensive and has affected a lot of people's intentions to use the internet [26]. The cost of 1-gigabit broadband internet data in Ghana is around $5, which is relatively expensive for university teachers to bear [26].

H_4: *CoID is positively related to university teachers' BI to use DTs'.*

2.6. Cost of the Smartphone (CoSP)

The smartphone market in Ghana is one of the most developed in Africa [26]. Notwithstanding this, due to low monthly wages, a good number of the working class in Ghana have the challenge of acquiring smartphones [25]. This study is therefore intended to investigate how the cost of smartphones may affect university teachers' intentions to use digital technologies. The following hypothesis is proposed.

H_5: *CoSP is positively related to university teachers' BI to use DTs'.*

2.7. Behavioral Intention (BI)

Behavioral Intention (BI) entails an immediate antecedent of User Behavior (UB) and is meant to indicate the inclination of an individual to be in a position to perform a specific action [18,22]. For instance, in the context of Ghana, it is believed that the intentions of a particular user to adopt DTs can lead them to adopt them. We proposed the hypothesis below.

H6: *BI is positively related to university teachers' BI use of DTs'.*

3. Materials and Methods

3.1. Participants and Study Area

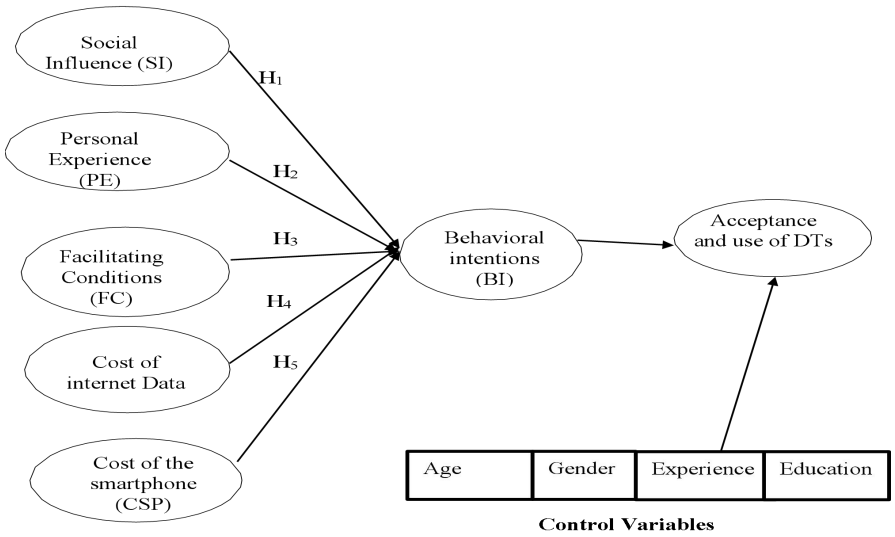
Participants of the study were (N = 270) which consists of Professors (8.5%), Senior Lecturers (36.2%), Lecturers (39.6%), and Assistant Lectures (15.7%). Respondents were from the University of Ghana [Accra] (35.5%;), Tamale Technical University [Tamale] (32.9%), and the University of Cape Coast [Cape Coast] (31.6%), respectively. Participants' mean age was 46 years.

3.2. Recruitment and Procedure

The study used non-probability sampling to explore behavioral intentions toward digital technologies among university teachers. This method was practical, convenient, and efficient helping to reach a specialized group through platforms like WhatsApp. It ensured familiarity and engagement with the technology, was quicker and cost-effective, and allowed respondents to share their insights, potentially leading to more thoughtful responses. Participants were recruited through a WhatsApp group of university teachers, comprising (Professors, Senior Lecturers, Lecturers, and Assistant Lecturers), from the three selected universities. The method of the survey is therefore considered suitable and is mainly used to assist the researchers in identifying the relationship between constructs when studying Behavior Intentions (BI). The administrators of each group were contacted first to explain the objective and scope of the study to seek their consent and approval to use their platforms to collect the data. Upon approval, members of each group were briefed by the group administrators and the researchers on the objectives of the study. Some members volunteered to participate in the study. The data collection instrument was designed with the QuestionPro Survey form and the link to the data collection tool was shared on each group's page for the volunteers to complete. The respondents were assured of their anonymity and the data collected were meant for only academic purposes.

3.3. Techniques and Data Collection Instruments

The researchers used QuestionPro Survey software for the data-gathering. The survey questions enabled the researchers to probe further, understand, and explore respondents' contributions. The data-gathering instrument was made up of two sections. The questionnaire was divided into two parts: The demographic characteristics of the respondents were included in **Section A**. Basic information relating to participants' age,



gender level of their education, and experience in terms of the number of years they have been working was included in **Section A**. Based on the research model **Section B** contained 25 questionnaires, with a five-point Likert scale (*1 = strongly disagree, to 5 = strongly agree*). The research model for the study is shown in Figure 1.

Figure 1. Research model. (Note: DTs = Digital Technologies)

3.4. Data Analysis

For the analysis of the research data, the researcher used Partial Least Squares Structural Equations (PLS-SEM) via SmartPLS 3 software to help hypothesize the relationships that existed between the research constructs and to carry out the testing and validating of the proposed research model. In summary, PLS-SEM is a software that is both a popular and common software that is used to measure the existing relationship between dependence and independence constructs [27,28]. Information gathered using a questionnaire was tabulated into an Excel sheet and imported into SmartPLS for further analysis.

3.5. Measurement

The variables to be measured in this study were considerably modified to suit the objectives of the current study on DTs for online teaching and learning. The researchers adopted a 5-point Likert scale to test all the survey questionnaires. To test relationships between the constructs of the research model, the educational levels, experience, age, and gender of participants were added to the traditional variables to determine the accuracy of the study results as reported in Table 1. A study conducted by Camilleri reported that the educational levels, experience, age, and gender of participants influenced university Teachers' BI [29]. A study by Gu et al. [21], to investigate the potential impacts of age, gender, experience, and education on users' intentions to use and accept technology concluded that age, gender, and education of students to accept and use digital mobile technologies for learning, and experience have little influence on users' behaviour intentions in technology usage. The demographic characteristics of the respondents are shown in Table 1.

4. Results

4.1. Common Method and Bias Normality of Data

The normality of data was determined by finding the level of kurtosis and skewness. The outcome indicated in Table 2 is within the required range of ±3 as advised by [30]. When data is collected from a given source within a given time for endogenous or exogenous variables, there is a likelihood of the existence of CMB [31,32].

Based on statistics, Harman's one-factor accounts for 46% or even more, there are likely to be CMB problems. Therefore, in this research, there was the application of Harman's one-factor test. The total dispersion of the outcome showed 35.79%. This, according to the known standards, meets the expectation, a clear indication of the presence of data that are free of any substantial issues regarding CMB.

Table 1. Descriptive statistics of participants.

Demographic Variables	Subgroups	Frequency (N = 270)	Percentage (100%)
Age (years)	34–40	98	36.2
	41–45	100	37.0
	46–50	49	18.1
	50+	23	8.7
Gender	Male	205	75.9
	Female	65	224.1
	Others	NA	NA
Education	Professor (Ph.D.)	23	8.5
	Senior Lecturer (Ph.D.)	98	36.2
	Lecturer (Ph.D.)	107	39.6
	Assistant Lecturer (Masters)	42	15.7
Experience	6 months to 1 year	14	5.3
	1 to 4 years	68	25.1
	5 to 9 years	134	49.6
	10 years +	54	20

Table 2. Factor Loadings, Cronbach's Alpha, CR, and AVE.

Constructs	Items	Loadings	Cα	CR	AVE	Skewness	Kurtosis
PE	Pe = a	0.522	0.771	0.901	0.453	−0.603	1.222
	Pe = b	0.710	-	-	-	-	-
	Pe = c	0.915	-	-	-	-	-
	Pe = d	0.423	-	-	-	-	-
SI	Si = a	0.612	0.554	0.673	0.531	−0.276	0.131
	Si = b	0.531	-	-	-	-	-
	Si = c	0.643	-	-	-	-	-
FC	Fc = a	0.523	0.910	0.911	0.715	−0.701	1.324
	Fc = b	0.941	-	-	-	-	-
	Fc = c	0.535	-	-	-	-	-
	Fc = d	0.745	-	-	-	-	-
CoID	Cid = a	0.646	0.668	0.681	0.809	1.215	0.673
	Cid = b	0.912	-	-	-	-	-
	Cid = c	0.725	-	-	-	-	-
CoSP	Csp = a	0.609	0.804	0.633	0.561	0.114	0.810
	Csp = b	0.735	-	-	-	-	-
	Csp = c	0.509	-	-	-	-	-
BI	Bi = a	0.746	0.698	0.705	0.957	0.351	0.335
	Bi = b	0.658	-	-	-	-	-
	Bi = c	0.558	-	-	-	-	-

* CR = composite reliability; AVE = average variance extracted; Cα = Cronbach's alpha.

4.2. Testing Reliability and Validity

It was important to determine the reliability and cogency of all constructs. Reliability determines internal consistency which is obtained using Cronbach's alpha and composite reliability (CR). For a clear sign of satisfaction and consistency, Perneger et al. [33], recommended that Cronbach's alpha (Cα) and CR values should

not be more than 0.60. To ensure this the researchers assessed the Average Variance Extracted (AVE) and the Convergence Validity, the loading items were all above 0.70. To arrive at the Cα, CR, and AVE values the researchers again carried out the analysis of the model. The estimated values of Cα, as shown in Table 2 are more important compared to 0.80 for all constructs. When the value of CR lies between 0.60 to 0.70 then it is acceptable. According to Patton [34], a CR of between 0.80 and 0.90 is also not far and is therefore acceptable. In our current study, CR is 0.914. This is more but within the threshold. CR value that is more than 0.9 is not acceptable because it implies that the chosen question is considered unrelated [35]. After viewing, there was the assessment of reliability data for validity purposes. To ensure there is convergent validity, AVE was evaluated. According to Creswell and Patton, convergent validity entails how structural indicators are there on the available constructs [34,35]. Among the statisticians, it is believed that the value of AVE must be more than 0.5 for a reflective construct. In this research, the AVE value was found to be past the expected threshold, a clear sign of good convergent validity.

The current data was tested for discriminant validity. The discriminant validity test was conducted using the Fornell-Larcker criteria. Based on the square root of the Average Variance Extracted (AVE) for each construct. The results and methodology in the publication meet this criterion, but the language provided does not meet the HTMT requirement. According to Tesser and Krauss [36], discriminant validity is the level of a single construct in a model that is different from other constructs. To get discriminant validity, you get the square root of AVE. It has to be always greater than the correlation of every construct [36]. The details of the results are reported in Table 3. As indicated by the asterisk*, the values of the square of AVE (see Table 3) and off-diagonal value reported that correlations existed among constructs (Table 4, Cross-loading).

Table 3. Discriminant validity results.

Constructs	M	SD	1	2	3	4	5	6	7
1. BI	3.84	0.80	0.770*	-	-	-	-	-	-
2. FC	4.03	0.88	0.836	0.116*	-	-	-	-	-
3. ADTs	3.99	0.14	0.940	−0.106	0.733*	-	-	-	-
4. PE	3.82	0.90	0.826	0.033	0.515	0.696*	-	-	-
5. CoID	3.92	0.93	0.976	−0.056	0.331	0.667	0.152*	-	-
6. SI	3.59	0.12	−0.152	0.329	0.125	0.206	0.038	0.922*	-
7. CoSP	3.52	0.10	0.925	−0.158	0.233	0.836	0.991	0.061	−0.009*

* N = 270. The bold diagonal numbers show sound discriminant validity. BI = behavioral intention; FC = facilitating conditions; PE = performance expectancy; ADTs = acceptance of digital technologies; SI = social influence; CoID = cost of internet data; CoSP = Cost of smartphones. * = Significance levels at 10% ($p < 0.01$).

4.3. Structural Model Evaluation

Hypothesis testing:

The significance of the structural model is to be able to categorize models that have been used during the research and their relationship. Bootstrapping with a 270-sample size was meant to find coefficients of hypotheses through the use of SPSS software. From the results obtained, it was confirmed that the data results support all the possible suggestions except the Cost of Internet Data (CoID)and the Cost of the Smartphone (CoSP). The study assessed the relationship between the internal and external construct through the use of *t-statistics and path coefficient* (β). The following phase provides the results of the research from the four variables. Table 5 reports the analysis of the path coefficient (β) and t-statistics of the study (see Table 5). To test the proposed research model in Figure 1, the results for the structural model for the significance levels of the three original UTAUT variables (SI, PE, FC), the two new introduced variables ((CoID, CSP) and the controlled variables (Age, Gender, Education, and Experience) are reported in Figure 2.

5. Discussion

According to this study, PE influences university teachers' intentions to accept and use DTs ($\beta = -0.213$, $p = 0.003$) and was supported. These results are expected, considering that in trying to keep up with technology, Schukat, & Heise uphold a substantial relationship between PE and BI [37]. Williams, Rana, & Dwivedi found that PE influences the teachers' acceptance of online technology for online learning [38]. Similarly, Chao points to a

positive relationship between PE and BI on users' (teachers') adoption of mobile technology for instructional activities [11]. The result reveals that most university teachers in Ghana are familiar with digital technologies and the benefits to teaching and learning We found 75.1 % (n = 206 out of 270) of university teachers, comprising (Professors, Senior Lecturers, Lecturers, and Assistant Lectures), were aware of DTs, accepted, and used. However, 93.0 % (n = 255 out of 270) of those who were aware of the DTs employed them in their daily teaching and learning activities. Our analyses also indicate that increased usage of these DTs has significantly enhanced online teaching and learning in Ghana. These DTs have also improved and boosted teacher-student communications.

Table 4. Item and cross-loadings.

Items	BI	FC	PE	SI	ADTs	CoID	CoSP
Adts*a	0.962	0.032	0.214	0.672	0.412	0.175	0.204
Adts*b	0.823	0.011	0.113	0.432	0.632	0.414	0.413
Adts*c	0.802	0.026	0.251	0.704	0.534	0.616	0.356
Adts*d	0.423	0.810	0.245	0.412	0.382	0.762	0.351
Bi*c	0.731	0.832	0.321	0.128	0.643	0.006	0.045
Bi*d	0.003	0.857	0.010	0.302	0.216	0.005	0.016
Fc*a	0.161	0.914	0.934	0.231	0.034	0.009	0.009
Fc*b	0.012	0.384	0.822	0.007	0.056	0.008	0.035
Fc*c	0.025	0.021	0.813	0.305	0.180	0.114	0.243
Fc*d	0.321	0.201	0.881	0.821	0.244	0.074	0.132
Pe*a	0.153	0.213	0.911	0.923	0.153	0.064	0.306
Pe*b	0.141	0.701	0.625	0.911	0.213	0.140	0.331
Pe*c	0.344	0.034	0.226	0.813	0.615	0.344	0.537
Pe*d	0.619	0.022	0.361	0.430	0.746	0.412	0.341
Si*b	0.215	0.071	0.219	0.321	0.934	0.045	0.303
SI*c	0.223	0.024	0.367	0.512	0.814	0.605	0.418
Coid*a	0.911	−0.041	0.216	0.423	0.841	0.922	0.134
Coid*b	0.113	−0.16	0.302	0.421	0.245	0.917	0.631
Coid*c	0.284	−0.12	0.212	0.233	0.334	0.843	0.935
Coid*d	0.321	−0.11	0.128	0.342	0.307	0.064	0.813
Cosp*a	0.132	−0.19	0.314	0.230	0.246	0.103	0.951
Cosp*a	0.231	−0.413	0.713	−0.331	0.005	0.034	0.904
Cosp*b	0.112	−0.321	0.415	0.232	0.319	0.211	0.926
Cosp*c	0.354	−0.243	0.332	0.452	0.532	0.134	0.846
Adts*a	0.962	0.032	0.214	0.672	0.412	0.175	0.204

* BI = behavioral intention; FC = facilitating conditions; PE = performance expectancy; ADTs = acceptance of digital technologies; SI = social influence; CoID = cost of internet data; CoSP = cost of smartphones.

Table 5. Hypotheses decision table.

Hypothesis	Proposed Influence	Unstandardized	Path Coefficient (β)	SE	t-value	p-value	Comments
H1	PE = BI	0.421	0.213	0.016	5.614	0.03	Supported
H2	SI = BI	0.135	0.103	0.015	3.710	0.056	Supported
H3	FC = BI	0.147	0.160	0.041	1.405	0.009	Supported
H4	CID = BI	0.024	0.022	0.041	0.609	0.422	Supported
H5	CSP =BI	0.042	0.045	0.012	0.501	0.613	Supported
H6	ADTs = BI	0.320	0.910	0.025	11.061	0.043	Supported

* BI = behavioral intention; FC = facilitating conditions; PE = performance expectancy; ADTs = acceptance of digital technologies; SI = social influence; CID =cost of internet data; CSP = cost of smartphone. *Significance levels at 1% ($p < 0.1$). **Significance levels at 5% ($p < 0.05$*). ***Significance levels at 10% ($p < 0.01$).

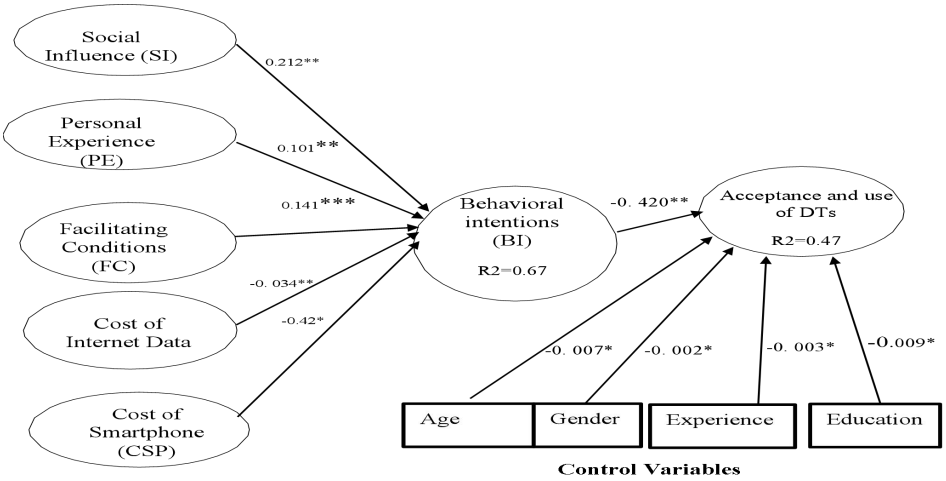


Figure 2. The results of the structural model (N = 1126).

* Note. *, **, *** refers to significance levels at 1% (p <0 .1), 5% (p < 0.05), and 10% (p < 0.01), respectively.

The opinions point to the fact that (SI) plays a greater role in the intentions of university teachers to adopt DTs for teaching and learning in Ghana. Moreover, our results are also consistent with [Lowenthal 2010; Chao 2019] who discovered an insignificant impact of SI on BI users to mobile learning for instructional activities in higher educational institutions. The third hypothesis, which supported FC positively influences a university teacher's intentions was supported. Also, the findings for (PE) (α = 0.046, p = 0.002), signified by H2, impact (FC) so that it can accept DTs after being supported by the initial study work [11]. The current results support Safi, Thiessen, & Schmailzl findings that FC (α = 0.160. p = 0.000) appears to be more enhanced when someone has inadequate experience with DTs [39]. Vannoy & Palvia [40]; Talukder & Quazi [41], also point out that SI is a significant component in the adoption of technology adoption for teaching and learning.

Our findings paint a clear picture of the positive effect of the intentions of the university teachers and how the fact is supported (α = 0.160, p = 0.009). This means that university teachers require affordable internet and the associated digital equipment to help users' intentions to move towards (FC) [39]. To add to that, to investigate user adoption of DTs in a better way, the current study added (CoID), and (CoSP) to the UTAUT model. The reason behind this is that few studies have managed to apply these constructs in DTs for university teachers and for those who have done, they have ended up with different conclusions. The outcome did support the suggested notion of the fourth and fifth hypotheses CoID and CoSP did not show a significant effect on university teachers' intentions to accept and use DTs (β = 0.005, p =0.022) and (β = −0.045, p =0.613), which are key determinants of university teachers' acceptance and use of DTs.

5.1. Theoretical and Practical Implications

From a theoretical perspective, this study plays a great role in understanding, UTAUT, and its application within the higher educational institutions in developing countries. The present study integrates eight different theories to form the UTAUT, which is a model that has been widely used, to determine the users' intentions to adopt DTs. Past studies have applied various innovation-oriented models to determine acceptable levels of users' online technology among the users. However, the literature on the application of UTAUT among university teachers in developing countries is very limited [5]. This current study is therefore among the few studies that try to extend the original UTAUT model with the inclusion of key variables, such as (CoID), and (CoSP), in the setting of Ghana. This study takes into consideration the UTAUT model that is modified. Consequently, it was able to significantly contribute to educational technology and is considered to be among the few to establish factors that impact the usage of DTs among university teachers in countries that are still developing. The research has played a role in improving the intention of university teachers and enabled them to understand how they can benefit from adopting and making use of modern technology in higher education. The study proposed an extended theoretical model as it will bring about possible development in literature. The results will

create more awareness about the UTAUT model together with some other variables in trying to adopt DTs by teachers in higher educational institutions.

The findings of this current study have some significant practical benefits in promoting the acceptance of DT by university teachers in the least-developed countries. The outcome of the research is the importance of more improved DTs within the context of least-developed countries. As pointed out by Zalat, Hamed, & Bolbol [42], one main reason why university teachers in developing countries have a lower usage of DTs is due to factors such as Personal Experience (PE) and Social Influence (SI). The findings from this study could help stakeholders come up with practical guidance that can be applied to ensure that there is a successful introduction of DTs in the least developed economies. The experiments that have been carried out give practical strategies that can lead to the successful adoption of DTs in developing economies. It is also important to note that because of the general approach, the study outcome can be improved based on the context of other developing countries to ensure that they are in line with the prevailing circumstances to help in planning and adopting DTs for the prevention of diseases. The research is significant, especially for DT designers and providers. This is because it will help them understand and appreciate the problems that are associated with designing and implementing successful digital communication strategies for online teaching and learning in higher educational institutions. The introduction of gender, education, age, and experience was meant to enhance understanding of the effects of the variables.

5.2. Limitations and Directions for Future Studies

It is agreeable that the study gives some valuable information about the utilization of DTs by university teachers in developing countries. Nevertheless, several shortcomings call for further research in the same field. Among the possible limitations of the study is that the study employed a cross-sectional mode of data collection. This implies that the method is cheap and affordable as a means of data collection. Most researchers have greatly disapproved of the method of cross-sectional studies because they tend to be biased. After all, participants do not significantly reflect the viewpoint or the perspective of the larger population. Consequently, this might affect the final results, which in most cases are generalized because the respondents are only interviewed only once. It is therefore suggested that studies should make use of longitudinal techniques for the collection of data that embraces the possibility of participants being interviewed more than once. It is also essential to note that the findings cannot be generalized to non-developing countries because the research is specific as it narrows down to Ghana as a country. Data were obtained from three universities in urban Ghana, it is therefore recommended that other researchers should incorporate comparative analysis of universities in rural areas to find out how university teachers' intentions to adopt DTs. Other past publishers also point to the fact that moderators of age, experience, and gender contributed towards establishing a significant role in envisaging the acceptance of technology by the users [21,43]. It is recommended that further research puts into consideration the moderating roles of the above variables on the BI of the patients because they are likely to influence the nature of decisions that they may end up with regarding the use of technology. Despite the limitations mentioned above, this study assesses the leading factors that affect university teachers and their intentions or willingness to accept and make use of DTs in Ghana.

6. Conclusions

The limited research on predicting university teachers' intentions and the level of acceptance of DTs in developing countries, this research extended the UTAUT with the inclusion of two key variables (CoSP), (CoID), to examine the user's intentions to accept and use digital technologies by university teachers in Ghana. The study found that CoSP, CoID, SI, and FC, to a great extent impacted university teachers' intentions to embrace DTs to improve teaching and learning. Nonetheless, it can still be concluded that the outcome is a true reflection of the economic characteristics of a country that is still developing. The results of this study will guide duty-bearers on how to come out with pragmatic policies and strategies that can bring about the successful implementation of DTs for improved teaching and learning, specifically for university teachers in other developing countries.

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Conflicts of Interest

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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