



ASSESSING THE DIMENSIONALITIES OF E-MAIL UTILISATION AMONG OPEN AND DISTANCE LEARNING PRACTITIONERS IN NIGERIA: A STRUCTURAL MODELLING EQUATION APPROACH

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Abstract

The adoption and utilisation of information technologies has great impacts on productivity and performance in workplaces. In the open and distance learning environment, the utilisation of the electronic mail system by institutions of higher learning remains one viable and dependable options for an efficient communication system. But the poor usage attitude of most users within some organisations despite its availability and convenience calls for concern. Coincidentally, utilisation behaviour remains weakly conceptualised despite its critical role in the field of information systems. The data employed for the analysis were obtained through a well-designed questionnaire based on survey method administered through staff email. The respondents were chosen by purposeful sampling focusing on academic, non-academic and technical staff of the National Open University of Nigeria (NOUN) resident at both the corporate headquarters and the study centres using a sample size of 95 staff. Through a structural equation modelling (SEM) approach using smart partial least square (PLS), the sampled data were collected and analysed using the technology utilisation, satisfaction and performance model (TUSPEM) as the theoretical framework for the study. Results from the study found significant relationship between email technologies fit and staff attitude towards using the technology. The association between staff attitude towards using email system, perceived usefulness and ease of use of the technology and staff individual habit as they affect email utilisation was also supported. Testing for the fit, usefulness, ease of use of technologies, users' attitude towards using information technologies and other critical factors using the TUSPEM model in both mandatory and non-mandatory usage environment is highly recommended. Periodic training of new and old staff on modem technologies adopted by institutions is equally recommended for improved productivity in workplaces.

Keywords: *Technology utilisation, satisfaction and performance model, electronic mail utilisation, ODL practitioners, open and distance learning*

Introduction

The growing penetration and acceptability of the internet technology especially in developing economies of the world has created many opportunities for exploitations. Electronic mail is undoubtedly one of the main products of the internet services. Through a network system, electronic mails are received from the sender to the receiver. Documents of various types, pictures, diagrams and even images can be transferred from one source to the other in minutes despite the physical distance between the sender and the receiver. The growing dependence of the email system is not unconnected with its attendant benefits of efficiency, convenience, and cost.

Prior to the advent of the electronic mail (email) system in 1971 by Ray Tomlinson Pretext Magazine (1998), the traditional postal system was the sole means of communication. Physical buildings were put in place either by government or corporate organisations with branches within national, regional or global boundaries. Heavy resources including human and material resources were required for such communication to be achieved within days, weeks, months or years depending on the destination. The processes involved in sending and receiving mails were cumbersome and frustrating.

Today, electronic mail is widely used in everyday life as well as in teaching and learning contexts. In open and distance learning environment, the physical distance between the main institution and the various study centres spread across the country or world as well as their students makes the use of the email system inevitable. Memos, documents and other vital issues are communicated from office to office using either email or by physical delivery.

In a survey conducted by Dahlstrom, E., Walker, J. D., & Dziuban, C. (2013), on teacher-student communication, over 110,000 participants from 13 countries and 251 colleges/universities, 70% of students preferred to be in contact with their instructors using the email system. 50% were for text messaging, instant messaging (40%), and video chat (40%). Email was

perceived as significantly more useful when used with the instructor versus peers, while instant messaging was rated as significantly more useful when communicating with peers versus the instructor.

In a similar scenario, Tao and Boulv/are (2002) opined that email communication is beneficial to teachers by providing opportunities in the identification of the needs of the students and a corresponding development of appropriate curriculum. The findings concluded that email motivates learners, encourages authentic communication, and creates new' learning opportunities.

Established by an act of the National Assembly of the Federal Republic of Nigeria on 22nd July, 1983 as a spring-board for open and distance learning in Nigeria, the National Open University of Nigeria was later suspended on 25th April 1984. Since its resuscitation on 1st October 2002, the university has demonstrated a high sense of purpose by exploring very' robust and reliable email platforms that can sufficiently cater for its increasing email communication needs, due to the distance between the corporate headquarters and its study centres nationwide. Hence, the collaboration of the institution with Google incorporated provided the opportunity for the institution to ride on the massive global infrastructural network of the latter. Through this domain, communication is enhanced at an almost zero downtime, Google doc features are enabled, Google share, Google map. Classroom and so on. Some of these features encourage users of the system to easily share assignments, materials, and messages chat, short mobile services (SMS), calendar and a host of other sendees that enhance communication, teaching, learning and research collaboration.

Despite the availability of such a robust and reliable email infrastructure put in place by the management of National Open University of Nigeria for enhanced and efficient communication, the under-utilisation of the infrastructure is of great concern to the researcher. Apart from the physical distribution of memos with its attendant delays in delivery time depending on the destination (study centre), 47% of the users created on the university's domain accesses their emails at least twice weekly, while 17% of the staff logged-into it once after sign-up. 36% of staff are yet to login (NOUN domain admin report 2015).

Available research shows a near absence of research that focuses on the impact of an effective and efficient email system usage on open and distance learning. Understanding of the key factors responsible for the under- utilisation of technologies in open and distance learning environment and their relationships would be a useful contribution in understanding users concerns on utilisation of information systems in distance education. Hence, the research question is asked thus: In a non-mandatory technology usage environment, what factors are responsible for the under-utilisation or non utilisation of an information system and what are the relationships between them? Based on the research question, the following hypotheses were formulated:

- a. There is no significant relationship between email technology fit, users attitude towards using an email system and email utilisation.
- b. There is no significant relationship between human related factors such as social norms, user's habit, user's computer self-efficacy, perceived usefulness, perceived ease of use, attitude towards use as well as level of technical support, and ODL staff utilisation of an email technology in anon-mandatory usage environment.

The theoretical foundation for the conceptual model in this work is based on the technology-utilisation-satisfaction-performance model (TUSPEM) proposed by Osang, F.B., Abinwi, N andTsuma, C. (2015) with the assertion that for an information system to have a positive effect on individual performance, the technology must not only fit the task and be utilised, it must also satisfy the end-users. The model is viewed from three dimensions: the task technology fit to performance dimension, the precursors of utilisation to utilisation and performance dimension and the satisfaction and performance angle.

The research is focused on the predictors of information system utilisation which includes email technology fit through users' attitude towards using information system, users' social norms, habit, computer self-efficacy, perceived usefulness, and perceived ease of use as well as level of technological support enjoyed by users as contained in the TUSPEM model.

Related Literature

Since the advent of technology and its subsequent diffusion and adoption in

different regions of the world, behavioural information system researchers have proposed several theoretical frameworks aimed at understanding and predicting information system acceptance, utilisation and performance.

As reported by Osang (2014), information system researchers have combined the TPC model with other models in order to have better explanatory power of the model, capture emerging concepts in the dynamic information system field and guarantee satisfactory prediction of utilisation, satisfaction and performance. For example, utilisation variance was explained when Dishaw and Strong (1999, 2002) combined technology acceptance model with the task technology fit was 36% with TAM, 41 % with task technology fit theory and 51 % with TAM/TTF.

The TUSPEM model as proposed by Osang et al. (2015), combined construct from the following models to produce the TUSPEM model: Technology Acceptance model (TAM): (Davis 1985,1989); DeLone and McLean model of IS success: User satisfaction (DeLone and McLean, 2003); Technology- to-Performance Model (TPC): (Goodhue and Thompson, 1995); Perceived computer self-efficacy Model: (Compeau and Higgins, 1995; Teo, T., and Koh, L. 2010).

From the task technology fit dimension, Goodhue and Thompson (1995) postulated that interaction of individuals with an information system are interconnected with the individuals' task- technology adaptation behaviours. The TTF concept was focused on the assumption that there must necessarily be some level of effort exerted in while executing any given complex task designed to be accomplished using a technology. Hence, the more demanding the task or the less functional the technology, the more the TTF decreases. As captured by Yu and Yu (2010), TTF is most appropriately measured by assessing how satisfactorily the system function meets the individual task needs. TTF is seen as the correspondence between the task requirements and the functionality of the data presentation. In addition, fit was linked to the criterion of personal performance, which can be used in the larger context of studying the impact of technology on individual performance (Fuller & Dennis, 2009; Zigurs & Khazanchi, 2008). Those technology functions match task requirements and individual abilities. Although Goodhue and Thompson (1995) found weak support during their

test of whether a good TTF will lead to increased utilisation, Staples and Seddon (2004) found no relationship between fit and utilisation. Hence, they recommend that the relationship between TTF and utilisation should be investigated as a non-linear relationship. Therefore, despite being an important construct, learner utilisation behaviour remains weakly conceptualised.

Contrarily, Luarn's (2009) work on this link moderately supported the linkage that TTF will positively affect utilisation directly. Thus the hypotheses for this study are stated thus:

- a. H₁: There is no significant relationship between email technology fit, user's attitude towards using an email system and email utilisation
- b. There is no significant relationship between human related factors such as social norms, user's habit, user's computer self-efficacy, perceived usefulness, perceived ease of use, attitude towards use as well as level of technical support, and ODL staff utilisation of an email technology in a non-mandatory usage environment.

The relationship between task technology fit and user's attitude towards utilisation of an information exist due to the fact that the better the fit, the more the tendency for users to develop a positive attitude towards using an information system. In an electronic learning environment, McGill and Hobbs (2008) investigated individual and technology adaptation behaviours, and explained adaptation patterns based on users' initial appraisals and subsequent responses to web course tools (WebCT) implementation. Although Goodhue and Thompson (1995) did not test this link, despite their assumption that a relation exist, (Staples and Seddon, 2004; Yu and Yu, 2010; Osang 2015) confirmed a significant relationship between TTF and affect towards using technology.

Attitude towards Use and E-mail Technology Utilisation

According to psychologists, human beliefs and attitude play critical roles in the determination of human decisions and actions (Fishbein,1979). Consequently, the theory of reasoned action (TRA) proposed by Fishbein & Ajzen (1975) assumes that human behaviour can be determined by two independent determinants of intention namely: attitudes towards the behaviour and subjective norms (Ajzen, 2000, p. 62). While attitudes is

concerned with a person's beliefs regarding a specific behaviour and the expected outcomes, subjective norms is concerned with perceived social pressures to engage in activities. TAM scholars have applied the model in different information technology applications. For example, word processors (Davis et al., 1989), spreadsheet applications (Mathieson, 1991), e-mail (Szajna, 1996), web browser (Morris & Dillon, 1997), telemedicine (Hu et al., 1999), websites (Koufaris, 2002), e-collaboration (Dasgupta, Granger & McGarry, 2002), and blackboard (Landry, Griffeth & Hartman, 2006).

In a survey carried out by Willis (2008), five hundred students completed a questionnaire about their prior usage of online social networking systems as well as an assessment of their perceptions of the technology in terms of ease of use and usefulness, and the social forces influencing usage decisions. The findings among others indicated that perceived ease of use is positively associated with intention to use online social networking systems. Also that perceived usefulness is positively associated with intention to use online social networking systems.

Users' attitude towards using an information system and its eventual utilisation has been investigated with mixed findings and on different contexts. In a research conducted by Venkatesh, Morris, Davis and Davis, (2003), four organisations related to entertainment, telecommunications, banking and public administration were studied. It was concluded that attitude towards use do not influence system use when peoples job depends on it. In another study, Leo and Woods (2008) conducted a survey to investigate if students' attitude towards using supplementary technological devices to support face-to-face instructions would increase their use. It was found that attitude of students became positive (were improved) as students were exposed to these devices.

Social Norms and System Utilisation

Social norms deal with the personal belief and expectations that people considered important have on users' behaviour. People considered important in this context are: the University's Management, colleagues, friends and the students. While Dishaw and Strong (1999) did not find any relationship between the social norms of users and their intention to use technology,

Venkatesh and Davis (2000) found that social norms influence utilisation. In a similar investigation, Yu and Yu (2010) found a significant relationship between social norms and intention to use blackboard technology.

Computer Self-efficacy (CSE) and System Utilisation

The judgment of one's capability to use a computer is regarded as computer self-efficacy (Compeau and Higgins, 1995). It focuses on how confident people are about one's capabilities to perform broader computer related tasks. In investigating the perceived slow adoption of teachers towards the integration of technology into their teaching and assessment task, research have showed that teachers' attitude towards computer use influences usage of technology for teaching (Teo 2010; Teo et al. 2008). From their study, Zhao and Cziko (2001) identified teachers' computer self-efficacy as a major precursor of technology utilisation. In other words, teachers' beliefs about their ability to use technology play an important part in shaping their responses to instructional reforms, including technology integration for teaching and learning (Selwyn et al. 2001). A number of other researchers have established the relationship with system utilisation Aguirre-Urreta, (2011).

Furthermore, teachers need to develop a high level of self-confidence with using ICT. Therefore, they need to be very well trained on how ICT can be implemented into classroom practices, which in turn will raise teachers' confidence in their ability to use ICTs (Tezci, 2011).

Contrary, findings in other contexts have proved otherwise. For example, in a mandatory usage environment, Osang (2015) investigated ODL lecturers' usage of integrated learning management system (ileam). The findings did not find any significant relationship between lecturers ileam self-efficacy and technology utilisation.

ICT Support and Email Utilisation

As critical as it is, the relationship between ICT support and the eventual utilisation of technologies by ICT users have received little attention. Although the proponents of TPC model examined the level of support as a subset of TTF, the absence of support has been identified as critical in the choice and utilisation of technologies Osang (2015). Lack of technical and

financial support has also been cited as important inhibitors for instructor LMS use McGill, T. Klobas, J and Renzi, S. (2008).

As earlier stated by Hew and Brush (2007), the provision of inadequate number of technical support services in an institution severely limits user' technology use. Similarly, Lim and Rhine (2006) suggested that schools should arrange regular appointments with technical assistance to troubleshoot hardware and software problems, test out equipment and install software, and maintain hardware and catalogue software.

Another important part of the organisational support towards successful ICT implementation is in the provision of professional development and technical training for technology users. Professional development can have an impact on users' attitudes and beliefs towards ICT, and provide them with the knowledge and skills needed to employ ICT in teaching and learning practices (Hew & Brush, 2007). Hg: Level of technical support enjoyed during technology usage has a positive influence on email utilisation. In determining utilisation in a non-mandatory usage environment; the research model for this study is shown below.

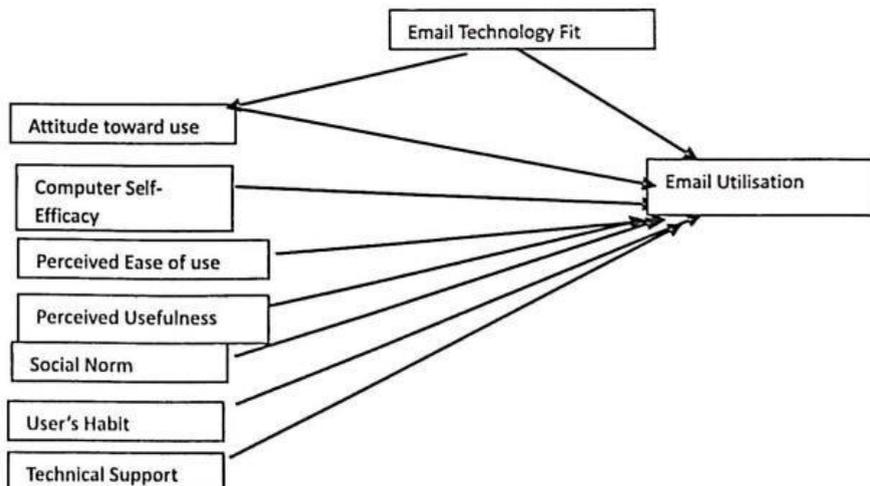


Fig. 1: The Research Model

As noted by Goodhue and Thompson (1995) and other proponents of the technology-performance model, the strength of relationship existing between the constructs in the TPC model varies depending on the context. While testing the TPC model, Staples and Seddon (2004) compared the strength of the relationship in both mandatory and non-mandatory technology usage environments. In a mandatory technology usage environment, it is expected that task technology fit would have a stronger relationship on performance than utilisation. TTF is also predicted to have a stronger relationship with attitude towards use. A social norm is also considered stronger in a non-voluntary usage environment.

The findings of Osang (2015), has focused on technology utilisation and performance in a non-voluntary usage environment with little findings on non-mandatory technology usage environment. For instance, while investigating Lecturers e- assessment usage and performance, the model predicted 53% of performance impacts, 26% of Lecturers satisfaction, and 11% of users' utilisation Osang (2015). Similarly, on the determination of open and distance learning academic staff usage of integrated learning management system (ileam), 65% of information technology utilisation was explained by Lecturers attitude towards use, perceived computer self- efficacy, perceived ease of use, perceived usefulness, social norms, habit and technical support in a mandatory usage environment.

Methodology

This study seeks to examine the precursors of email utilisation. The data employed for the analysis were primarily sourced. The primary data was obtained through a well-designed questionnaire based on survey method. The respondents were chosen by purposeful sampling focusing on academic, non-academic and technical staff resident at both the corporate headquarters and the study centres. A total of 235 respondents were contacted through their email addresses. Only 95 staff of the University participated in the survey.

The study was conducted at the National Open University of Nigeria. The University is the only single mode open and distance learning institution in Nigeria. The participants in the study consist of both academic, non-

academic and study centre staff spread across the country. In addition to other email platforms, staffs of the university are given official email addresses. Although official email addresses were created for all staff, staff were not compelled to using them as different platforms were explored for communication within and outside the institution. In a survey conducted by Dahlstrom et al. (2013), over 110,000 participants from 13 countries and 251 colleges/universities, 70% of students preferred to be in contact with their instructors using the email system.

The respondents were contacted through their NOUN email and participated in the study by clicking on the link. Participation in the survey was voluntary and responses were anonymous. The pilot test was earlier conducted using survey monkey with slight improvements on some items.

The causal relationship between the precursors of email utilisation and actual utilisation were tested using the partial least square (PLS). PLS is a structural equation modelling approach that serves as an alternative estimation approach to the traditional covariance structural equation modeling (SEM) like LISREL, AMOS etc. Its non-parametric capability in making no assumptions on the distribution of the variables makes it a more robust alternative to the former. In addition to the above, the validity of the results from significantly smaller sample sizes as reported by Hair et al. 2006, places PLS at an advantage position over covariance SEM. The minimum sample size is ten times the number of paths leading into the construct. Consequently, the selected sample size is adequate for partial least square analysis Chin (1998).

Instrumentation

The first section of the questionnaire gathered information regarding the respondents. Information such as category of staff, sex, number of years using NOUN mail and so on were collected. To establish that usage was voluntary by the users, questions were asked to determine the degree of voluntary usage. All items used in the survey were worded on a seven point Likert scales ranging from strongly disagree to strongly agree. The second section of the questionnaire focused on the relationship between the precursors of utilisation and actual utilisation of email.

Six items adapted from Davis et al. (1989) were used to assess perceived

usefulness construct. Details of all construct in the study, their items and sources are contained in the table below:

Table 1: Constructs and their Items

S/N	Construct	Item	Source
1.	Perceived usefulness	1: Using NOUN mail would enhance my effectiveness in discharging my official duties 2: Using NOUN email platform would improve my performance in handling my assigned duties 3: Using email would increase my productivity in handling my official assignments. 4: I found NOUN mail platform useful for my task. 5: Using email platform would make it easier to do my work. 6: Using email task would enable me to accomplish my task more quickly.	Davis, F.D. Bagozzi, R.P. and Warshaw, P.R. (1989).
2.	Perceived ease of use	1: I found NOUN email platform easy to use. 2: Learning to use NOUN email would be easy for me. 3: My interaction with NOUN email was clear and understandable. 4: It would be easy for me to find useful information/guide at the email platform. 5: I found NOUN email flexible to interact with 6: It would be easy for me to become skillful while using the email platform.	Davis, F.D. Bagozzi, R.P. and Warshaw, P.R. (1989); Maslin Masrom (2007)

<p>3.</p>	<p>Email technology fit</p>	<p>1: NOUN mail platform fit well with the way email platforms function 2: NOUN email platform is easier to use 3: NOUN email platform is user friendly 4: It is easy to get the email platform to do what i want to do 5: With NOUN email platform, the communication and collaborative task are easy to learn 6: It is easy for me to become skilful with the computer while using the NOUN mail 7: New features of email platform are easy to learn. 8: The NOUN mail approach of the communication task is compatible with all aspects of my computer usage.</p>	<p>Goodhue and Thompson (1995); McGill, T.J and Klobas J.E (2008)</p>
<p>4.</p>	<p>Computer self – efficacy</p>	<p>1:1 could complete the email activities using the NOUN mail if I had never used a system like it before 2:1 could complete the email activities using the NOUN mail if I had only the manual for references 3:1 could complete my email activities using the NOUN mail if I had seen someone else using it before trying it myself 4:1 could complete my email activities using the NOUN mail platform if I had just the built-in facility for assistance 5:1 am able to use almost all the features included in the email platform* 6:1 am required to use the NOUN email platform*</p>	<p>Compeau and Higgins (1995); Roca C.J <i>et al.</i> (2006); items 5 and 6 were self - developed.</p>

5.	Attitude towards using information technology	<p>1:1 have fun interacting with the email platform 2: Using NOUN mail platform provides me with lots of enjoyment 3:1 enjoy using NOUN mail 4: Using NOUN mail portal bores me 5:1 make it a point of duty to use NOUN mail on regular basis* 6: It is valuable for me to be a heavy user of the system*</p>	<p>Davis, F.D. Bagozzi, R.P and Warshaw, P.R. (1989); Goodhue and Thompson (1995); items 5 and 6 were self - developed</p>
6.	Utilisation	<p>1:1 think the NOUN email platform is suitable for my email task 2: It would be much better for me to use the present email platform compared to other known email platforms. 3:1 think the present NOUN mail platform should be maintained for future tasks as well 4:1 am able to use the system effectively* 5:1 have used it once after the creation of the email account* 6: During the major university's activities, my expected usage is usually high</p>	<p>Davis, F.D. Bagozzi,R.P. and Warshaw, P.R. (1989); Goodhue and Thompson (1995); items 4, 5 and 6 were self-developed.</p>
7.	User's habit	<p>1:1 use the email platform as a matter of habit 2: Using the NOUN mail platform has become automatic to me 3: Using email platform has become natural to me 4: When faced with the need to reach out, using the NOUN mail platform becomes an obvious choice to me compared to other email platforms 5: using the email technology has become a habit to me 6: It is a habit of mine to use the email platform for my email needs</p>	<p>Limayenm, M.; Hirt, Sabine Gabriele; and Cheung, C. M.K. (2003); Limayem, M., Hirt, S. G., & Cheung, C. M. K. (2007); Staples and Seddon, (2004)</p>

8.	Social Norms	1: My friends think it is important for me to use NOUN email for recognition 2: ICT policy expects me to use NOUN mail* 3: Your colleagues will respect you if you can competently use NOUN mail 4: Management of the institution think it is important for me to use NOUN mail 5: My job requires me to use the email technology*	Roca, J.C,Chiub, C, Martmeza,F.J (2006); McGill and Klobas (2009), Items 2 and 5 were self-developed
9.	Technical support	1:1 received my NOUN mail during my documentation exercise* 2:1 participated in the training on usage of NOUN mail system* 3: User s of NOUN mail enjoy online support services* 4: When I need help while using the system, I always contact ICT support* 5: The support system is effective 6: Technical Staff are always available before seeking for external assistance*	All items were self-developed

Method of Data Analysis

From the data collected, the respondents were within the age bracket of 27 to 65 years old. The composition of the respondent comprised of men (40) while women (55) representing 42% and 58% respectively. Respondents were from both Academic, non-academic and technical background residents in both the corporate headquarters and the study centres. Respondents showed high level of familiarity with email usage.

Smart PLS version 3.0 was used for the analysis. All constructs were modeled with reflective indicators. Analysis of the SEM approach involves the evaluation of both the measurement model criteria and the structural model estimations.

The Measurement Model

The measurement model was assessed in terms of uni-dimensionality, internal consistency reliability, convergent validity and discriminant validity.

Uni-dimensionality of the Indicators: According to Gefen and Straub (2005), for indicator to be considered to show high evidence of uni-dimensionality, the item loadings among the constructs must be higher than the minimum threshold of 0.6 for all reflective models. Analysis of the indicator loadings of all the constructs shows the following exceptions: TTF (TTF8 = 0.52). Utilisation (USE 4 & 6 = 0.12 and 0.24). Attitude towards use (ATT6 = 0.23). Computer self-efficacy (CSE 5 and 6 had 0.18 and 0.01 respectively). Social Norms (SNN2 = 0.49, SNN5 = 0.09). ICT support (SPPT 5 = 0.53, SPPT 6 = 0.22). All other items loaded significantly on their latent variables. Hence there was high evidence of uni-dimensionality with the other constructs indicator loadings used in the model as all items loaded above the upper threshold.

Measurement of the composite reliability criteria: For this criteria to be fulfilled, constructs in the model must exceed the minimum threshold of 0.6 (Nunally and Berstein, 1994) and 0.70 (Hair et al. 2006). From the calculation using internal consistency reliability (ICR), all construct exceeded the minimum threshold. Hence, there was sufficient evidence of internal consistency reliability among the items of the variables using the TUSPEM model in the determination of email utilisation among the open and distance learning practitioners. See table 1 for ICR.

Convergent Reliability: From the average variance extracted, all constructs met the guideline of AVE greater than 0.50 (Hair et al. 2006) except social norms and computer self-efficacy construct as shown in table 1 below.

Discriminant Validity: For strong discriminant validity criteria to be satisfied, the diagonal elements in table 1 must be highest than any other corresponding row or column entry Barclay et al. (1995). Another test for discriminant validity of the items is the assessment of the individual item loadings. Item loadings must be highest on targeted construct and shows relatively low loadings on all other constructs. Consequently, all items

loaded highest on their targeted constructs as showed in table I below:
Table 2: Showing Internal Consistency, AVE and Discriminant validity of the Constructs

Construct	CR	No. of Items	AVE	1	2	3	4	5	6	7	8	9
Attitude toward use	0.83	6	0.53	0.73								
Self-efficacy	0.72	6	0.42	0.72	0.65							
Email Tech Fit	0.91	8	0.57	0.62	0.51	0.75						
Email Utilisation	0.81	6	0.50	0.72	0.55	0.62	0.71					
ICT Support	0.83	6	0.47	0.32	0.33	0.10	0.21	0.69				
Ease of use	0.89	6	0.57	0.55	0.48	0.72	0.59	0.10	0.76			
Usefulness	0.93	6	0.69	0.46	0.41	0.46	0.38	0.13	0.72	0.83		
Social Norms	0.71	5	0.41	0.59	0.42	0.54	0.60	0.14	0.59	0.49	0.64	
User Habit	0.91	6	0.62	0.70	0.59	0.65	0.64	0.20	0.62	0.52	0.62	0.79

The Structural Model

In structural equation modeling, the evaluation of the structural model involves the use of two key criteria: the predictive power of the endogenous variables represented by an R: value and the statistical significance of the estimated model coefficients.

The Predictive Power of the Model

The predictive power of the endogenous variables is presented in figure 2 below. From figure 2 below, 67% of email utilisation was predicted by the constructs used by the TUSPEM model. Similarly, 38% of attitude towards use of the email technology was predicted by the construct email technology fit. The overall prediction of the endogenous variable email utilisation is considered reasonable given the fact that there would certainly be other contextual variables that would affect the ODL practitioners' net belief. In

other words, 33% and 62% of email utilisation and ODL practitioners' attitude towards use of email respectively could be determined by other independent variables not included in this model.

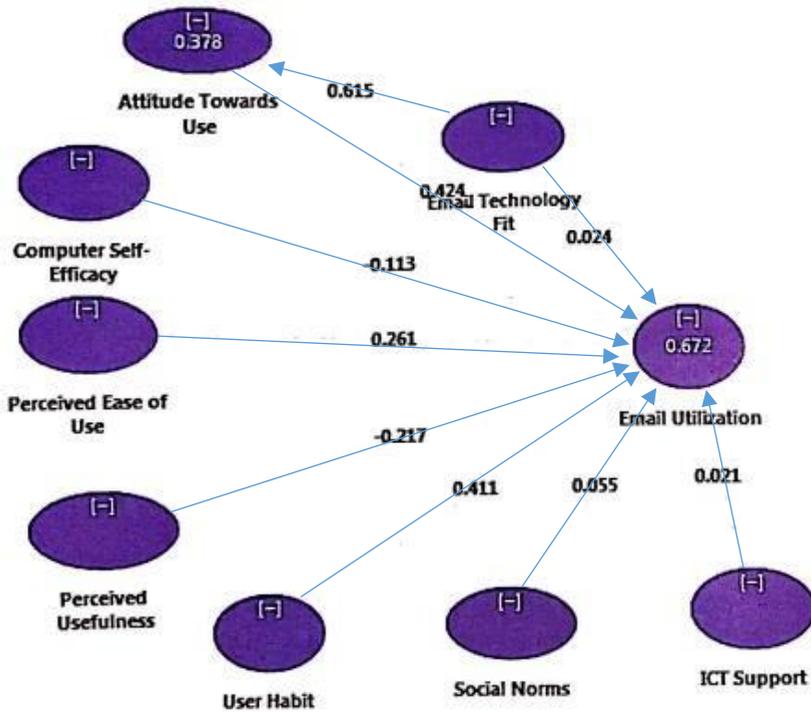


Fig. 2: Research Model Analysis Result

The Statistical Significance of the Estimated Model Coefficients

This section of the structural equation modeling is concerned with the loadings on the coefficients of the variables, the t-statistic obtained from each of the paths from the dataset through the process of bootstrapping (Appendix 1) at a 0.05 level of significance. The following paths were found to be statistically significant at a 5% level of significance H₂, H₃, H₅, H₆, and H₇.

Table 3: Path Coefficients

Summary of Path Coefficient and Significance Level

Hypothesis and Corresponding path	Path Coefficient	t-Value (degree of freedom = 498)	Support?
Email Technology Fit (ETF) to Email Utilisation – H ₁	0.03	0.22	No
ETF to User’s attitude towards use - H ₂	0.62	8.90	Yes
Attitude towards use to Email Utilisation - H ₃	0.42	3.01	Yes
Computer Self -efficacy to Email utilisation - H ₄	0.11	0.77	No
Perceived Ease of use to Email utilisation - H ₅	0.26	2.21	Yes
Perceived Usefulness to Email Utilisation - H ₆	0.22	2.28	Yes
User’s Habit to Email Utilisation - H ₇	0.41	3.65	Yes
Social Norms to Email Utilisation – H ₈	0.06	0.54	No
Technology Support to Email Utilisation - H ₉	0.02	0.20	No

Note: $p < .05$; $p < .01$; $p < .001$ (two tailed test); the t-statistic was calculated using bootstrapping.

Discussion on Findings

From the results presented above, the following contributions can be deduced.

Strong support was found between email technology fit and ODL practitioners’ attitude towards using information system (H₂) consistent with previous research results. The predictive power of the model derived from the dataset, the high statistical significance of the independent variable predicting users' attitude towards using an information system (email

system) as well as the strength of the path shows the dominant role TTF plays in determining users' attitude towards using an information system. Email technology fit alone contributed 38% prediction of users' attitude towards using the email system with 62% path strength.

The higher the appropriateness of the technology to the task, the more the users of the technology would like to use the technology. One major contribution from the findings of Staples and Seddon (2004) while testing the technology-to-performance model (TPC) proposed by Goodhue and Thompson (1995) is that relationships in the TPC model vary under two usage conditions namely mandatory and non-mandatory usage environment. Under the non-mandatory usage scenario, the result contradicts those of Staples and Seddon, (2004) and agrees with them in a mandatory usage environment. Under the mandatory usage environment, the result is consistent with previous research as earlier presented by (Yu and Yu, 2010; Osang 2015). Although usage is non-mandatory in this context as the respondent indicated clearly that they were not under compulsion to using the official email system, 35% of the respondent believes it is important using it.

The hypothesised relationship between user's attitude towards use of email system and email utilisation was found to be significant. It implies that users with positive attitude towards using information systems are more likely to use any useful information at their disposal. The result of the study corroborates with the findings of Leo and Woods (2008) that attitude of students towards using supplementary technological devices to support face-to-face instructions became positive (were improved) as students were exposed to these devices which resulted to increased usage of the technology. The result is also supported by the findings of Venkatesh et al. (2003) which investigated four organisations related to entertainment; telecommunications, banking and public administration were studied. It was concluded that attitude towards use influences system use when usage is non-mandatory.

The hypothesised relationship between perceived ease of use and usefulness were found to be statistically supported and significant. The understanding of the usefulness and ease of use of any information systems are key determinant of information system usage. These findings are in line with the popular theory of technology acceptance model (TAM). The introduction of the technology acceptance model by Davis et al. (1989)

expanded the horizon into circumstances surrounding technology acceptance and utilisation. TAM proposed that perceived ease of use and perceived usefulness of technology are predictors of user attitude towards using the technology, subsequent behavioural intentions and actual usage.

The link between users' habit and actual email utilisation was supported by the result from the dataset. Staff of the institution with a habit of checking their emails for communication on daily basis would be seen a regular users of the email system. The availability of options such as printed memos with its attendant cost implications and logistics inconveniences, and other email options poses great challenges to full utilisation of the platform as a reliable and dependable option for efficient communication in open and distance learning environment.

The direct path from email technology fit and email utilisation was not supported despite the expectation that the fit of the technology should significantly impact on actual system utilisation. The finding is supported by other previous results. For example, while Goodhue and Thompson (1995) reported weak support during their test of whether a good TTF will lead to increased utilisation, Staples and Seddon (2004) found no relationship between fit and utilisation. Hence, they recommended that the relationship between TTF and utilisation should be investigated as a non-linear relationship through the precursors of utilisation.

The hypothesised association between social norms and email utilisation was also not supported in this research. Although, NOUN mail system is an official email system, usage of the system was not mandatory. In a non-mandatory email usage environment, expectations from management, colleagues etc on usage of the specific email platform are low. Users are not in any way compelled to using the system as other email platforms were equally used and recognised.

Conclusions and Recommendations

The dynamic nature of information technology places a heavy burden on information systems researchers. The introduction of the TUSPEM model by Osang et al. (2015) as a modern tool for assessing variables associated with technology acceptance, utilisation and performance is a relatively new innovation in information systems research. While some of the relationships

have been validated by proponents of technology acceptance model (TAM) and technology-to-performance model (TPC), valuable efforts should investigate the TUSPEM model with a view to understanding the underlying variables determining technology acceptance, utilisation and performance.

This study found support for some relationships in the TUSPEM model and for the argument that in a non-mandatory usage environment, users' attitude, habit, usefulness and ease of use of information systems play critical roles in determining information system usage. The indirect relationship between task technology fit through the precursors of utilisation are indicators of the significant role that task characteristics, technology characteristics and individual characteristic play in influencing user's attitude towards use and eventual usage of information systems.

Training of new staff of the institution on the robust features and capabilities embedded on the Google based email infrastructure adopted by the University is important in order to create more awareness about the system. Such exposure and interactions with technologies would not only assist the users explore the functionalities and potentials of emerging platforms for communication and collaboration; it would also assist to erase erroneous beliefs and enhanced optimal system utilisation.

Future research should investigate more closely the links between computer self-efficacy; task technology fit and technological support as it affect utilisation of information systems. In a non- mandatory usage scenario, computer self-efficacy level and the level of technological support enjoyed by users of information systems should serve as key variables in determining information system usage. Future research should be clear about the context whether mandatory or non-mandatory with larger dataset and different sectors of human endeavours where technology is applied with a view to broadening our understanding of the predictive power of the TUSPEM model.

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Appendix 1

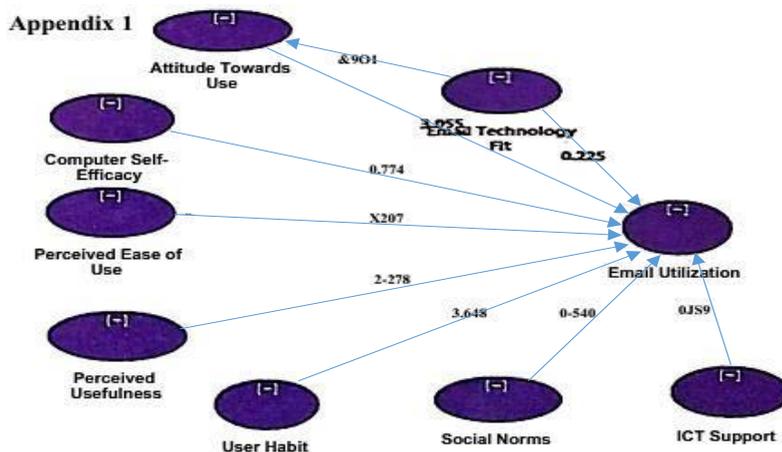


Fig. 1: Bootstrapped PLS Result

