

Sustainable Agriculture through ICT innovation

Internet usage behavior of Agricultural faculties in Ethiopian Universities: the case of Haramaya UniversityMilkyas Hailu Tesfaye¹
Yared Mammo²¹ Lecturer, Department of Information Science, Haramaya University
mikyashailu@yahoo.com² Assistant Professor, Department of Information Science,
Haramaya University y_mammo@yahoo.com**ABSTRACT**

STUDIES HAVE SHOWN THAT ETHIOPIAN AGRICULTURAL FACULTIES INTERNET USAGE IN TEACHING AND RESEARCH IS NOT AS TO THE EXPECTATION OF UNIVERSITY TOP MANAGEMENT AND EDUCATION PLANNERS. TO THIS END, THE GENERAL OBJECTIVE OF THE STUDY IS TO INVESTIGATE INTERNET USAGE BEHAVIOR OF AGRICULTURAL FACULTIES IN THEIR ACADEMIC WORKS BASED ON WIDELY USED MODEL IN INFORMATION SYSTEMS: THE TECHNOLOGY ACCEPTANCE MODEL. ACCORDINGLY, THE THEORETICAL FRAMEWORK OF THE STUDY INTEGRATES FOUR EXOGENOUS CONSTRUCTS WHICH ARE PERCEIVED USEFULNESS, PERCEIVED EASE OF USE, FACILITATING CONDITIONS AND SELF EFFICACY. A SURVEY WAS ADMINISTERED TO 193 AGRICULTURAL FACULTIES IN HARAMAYA UNIVERISTY, COLLEGE OF AGRICULTURE AND ENVIRONMENTAL SCIENCES. THE DATA WAS ANALYZED USING STRUCTURAL EQUATION MODELING AND DESCRIPTIVE STATISTICS. THE RESULT OF THE PROPOSED INTERNET USAGE MODEL INDICATED THAT PERCEIVED USEFULNESS (PU) AND FACILITATING CONDITIONS (FC) SIGNIFICANTLY AFFECT INTERNET USAGE OF AGRICULTURAL FACULTIES IN THEIR ACADEMIC WORKS. ON THE OTHER HAND, PERCEIVED EASE OF USE AND SELF EFFICACY DO NOT SIGNIFICANTLY AFFECT INTERNET USAGE OF AGRICULTURAL FACULTIES IN THEIR ACADEMIC WORKS. IN ADDITION, THE MODEL VARIABLES (PU, PEOU, FC, SE) EXPLAINED OVER 59% OF THE VARIANCE IN TEACHING AND 29% VARIANCE IN RESEARCH AND RELATED ACTIVITIES. AS A RESULT, THE STUDY UNDERLINED THE IMPORTANCE OF DESIGNING INTERVENTION IN THE STUDY AREA ON INTERNET TECHNOLOGIES THAT CAN BE USED TO SUPPORT ACADEMIC WORKS. EQUALLY, IMPROVING TECHNICAL, KNOWLEDGE AND PHYSICAL INFRASTRUCTURES IS ESSENTIAL TO ENABLE EFFECTIVE UTILIZATION OF THE INTERNET IN THEIR ACADEMIC WORKS.

Keywords: ICT IN AGRICULTURE, AGRICULTURAL FACULTIES, INTERNET EDUCATION, TECHNOLOGY USAGE BEHAVIOR, ETHIOPIA

Mr. Hailu "Internet Usage Behavior of Agricultural Faculties in Ethiopia Universities: the Case of Haramaya University" EFITA-WCCA-CIGR Conference "Sustainable Agriculture through ICT Innovation", Turin, Italy, 24-27 June 2013. The authors are solely responsible for the content of this technical presentation. The technical presentation does not necessarily reflect the official position of the International Commission of Agricultural and Biosystems Engineering (CIGR) and of the EFITA association, and its printing and distribution does not constitute an endorsement of views which may be expressed. Technical presentations are not subject to the formal peer review process by CIGR editorial committees; therefore, they are not to be presented as refereed publications.



Sustainable Agriculture through ICT innovation

1. INTRODUCTION AND BACKGROUND

Ethiopian HLIs are mainly established to provide access to the Internet for users like Agriculture faculties. In Haramaya University (HU) most faculties including agricultural faculties are provided with access to the Internet. The common understanding among the university top management, education planers and other government stakeholders is that users like agricultural faculties use the Internet predominately in their academic work mainly for teaching and research purposes.

However, in Ethiopian HLIs in general, and Haramaya University in particular, there are no studies conducted that provide insights and empirical findings about agricultural faculties Internet usage. To put it differently, empirical evidences about faculties' Internet use such as their years in using the Internet, frequency of Internet usage and adequacy of the Internet, Internet service and Internet access method in the study area are lacking.

More importantly, studies in other African HLIs have shown that faculties Internet usage to support teaching and research is not as to the expectation of university top management and education planners (Derek and Philipp, 2009; Oyelaran and Adeya, 2010). In addition, faculties are less inclined to use the Internet in their work (Park et al , 2009). This phenomenon has created the need to better explain agricultural faculties Internet usage behavior in order to devise a strategy that will increase its usage.

To meet this need, investigation of agricultural faculties Internet usage behavior has became critical.

1.2. Objective

The objectives of the study is to:

- propose a research model that best describes Internet usage of agricultural

1.3. Hypotheses

Usage Behavior in Teaching and Teaching Related Tasks (TEACH)

H1a: Perceived usefulness (PU) has significant influence on usage behavior (TEACH)

H2a: Perceived Ease of Use (PEOU) has significant influence on usage behavior (TEACH)

H3a: Facilitating condition (FC) has Significant influence on usage behavior (TEACH)

H4a: Self Efficacy (SE) has significant influence on usage behavior (TEACH)

H1b: Perceived usefulness (PU) has significant influence on usage behavior (RELATED)

H2b: Perceived Ease of Use (PEU) has significant influence on usage behavior (RELATED)

H3b: Facilitating condition has Significant influence on usage behavior (RELATED)

H4b: Self Efficacy (SE) has significant influence on usage behavior (RELATED)



Sustainable Agriculture through ICT innovation

2. MATERIAL AND METHODS

In this study, subject (unit) of analysis is an individual agricultural faculty in the College of Agriculture and Environmental Sciences and the total population size of the study is only 193. Thus, this study uses purposive sampling technique known as population sampling to examine the entire population. The study used survey method to collect data from the sample population. The questionnaire used in this study includes measures of items/variables to be studied, including, perceived usefulness, perceived ease of use, self efficacy, facilitating condition, Internet usage in teaching and teaching related activities, research and related activities and basic information. a. Data analysis procedures of this study employed descriptive statistics and a second generation model (Structural Equation Modeling).

3. RESULTS

3.1. Background of Internet technology usage

Hereunder, background of personal Internet usage such as years in using the Internet, frequency of Internet usage and adequacy of Internet usage was presented. Accordingly, Substantial numbers of faculties' years in using the Internet were 1 up to 5 years of using the Internet (36.8 %). The small numbers of years indicate that the Internet is still a new phenomenon in Ethiopia as many of the faculties had not access to the Internet until recently. Faculties who had used the Internet for about 6-10 years (34.4%) were in the majority, compared to those who had used the Internet more than 10 years (20.2%). It can be noticed that these group of people (used more than 10 years), were among the first to use the Internet in Ethiopia though some of these faculties could be outside of Ethiopia for their studies and had the chance to access the Internet (Table 1).

Frequency distribution of faculties Internet usage demonstrates that large numbers of faculties (46.6 %) frequency of Internet usage were several times a day if connection is available to them. On the other hand, 18.1% of the faculties used to access the Internet five to six times a week, 14 % have accessed the Internet a few times a week. Finally, the remaining 13 % accessed the Internet only once a day (Table 1). The majority of agricultural faculties (53.4%) thought that their Internet usage is not enough which was just higher than those who thought that their Internet usage is just enough (42 %). Only 4.7% of them thought that they had used the Internet too much (Table 1).

Description	Category	Cases	Percentage
Years in using the Internet	a less than 1 year	16	8.3
	1-5 years	71	36.8
	more than 10 years	39	20.2
	6-10 years	67	34.7
Frequency of Internet usage at present	Use a few times a week	27	14.0
	use five - six times a week	35	18.1
	use once each a week	16	8.0



Sustainable Agriculture through ICT innovation

Adequacy of using the Internet	several times a day	90	46.6
	use about once a day	25	13.0
	Not Enough	103	53.4
	Enough	81	42.0
	Too much	9	4.7

Table 1: Background of Internet usage

As shown in Table 2 web-browser that faculties used most are Mozilla (50 %) and fairly large number of faculties (30.6%) use Internet explorer, Google chrome (18.7%) and Netscape (0.5%). Internet services they used most were both websites and email (26.4 %), websites (26.4%), and (3) email (14 %) (See Table 2). With respect to access to the Internet, we can observe that about 3/4 of the faculties (74.4 %) access to the Internet in their office. Thus, the most frequent place for Internet access is office (44.2%), both at office and home (30.1 %), various wireless zones in the campus (12.4 %), home (7.3%) and Internet cafe (5.7 %). This indicate that wireless access points are given less attention.

Service of the Internet	Category	Cases	Percentage (%)
Web-browser	Mozilla	97	50.3
	IE	59	30.6
	Netscape	1	0.5
	Google chrome	36	18.7
Service of the Internet use most	WWW focusing on academics	51	26.4
	Email	27	14.0
	Social Networking	13	6.7
	Website and Emails	102	52.8
Location where accessing the Internet most	At my office	86	44.2
	At my home	14	7.3
	Both at office and at home	58	30.1
	Internet café	11	5.7
	Various wireless zone in the campus	24	12.4

Table 2. Internet service and Internet access method

The study had also assessed Internet usage of agricultural faculties in the study area. The result is presented in Table 3. Accordingly, agricultural faculties purposes of Internet usage were in the order of: (1) searching information for my research (2) enhancing teaching knowledge (3) preparing teaching material (4) searching scholarships (projects fund and further studies) (5) enhancing research knowledge (6) teaching in classes (7) providing a Personal Web-Base for facilitating teaching (8) email for student contact (9) create and participate in educational and research blogs.



Sustainable Agriculture through ICT innovation

Description of Internet technologies usage	Strongly disagree (%)	Disagree (%)	Undecided (%)	Agree (%)	Strongly agree (%)	Usage (Mean)
searching information for my research	1.6	5.2	11.9	25.9	55.4	4.37
enhancing teaching knowledge	4.0	6.7	12.0	32.7	44.7	4.31
Preparing teaching materials	4	11	2	25	58	4.2
for searching scholarship (research funds, phd, postdoc, etc)	11.3	6.7	19.3	18.7	44.0	3.77
Enhancing research knowledge	18.0	7.3	8.7	26.0	40.0	3.63
student contact and giving advice	29.3	15.3	18.7	22.7	14.0	2.77
Create and participate in professional blogs	28.0	18.7	21.3	17.3	14.7	2.72
Personal Web-Base for facilitating teaching	44.0	28.3	14.0	5	8.70	2.35
teaching in classes	66.0	15.3	10.7	5.3	2.7	1.63

Table 3. Summary of faculties Internet usage

The result in table 3 implies that the Internet and Internet based technologies are not widely used in teaching class. This result is consistent with prior study in Kenya and Nigeria universities (Oyelaran and Adeya, 2010). Despite the large amount of public money spent on infrastructure, it is yet to be used in teaching classes. Thus, it requires further investigation of faculties Internet usage behavior.

3.2 Investigation of Internet usage behaviour of agricultural faculties

Structural Equation Modeling (SEM) was applied to meet the objective of the study using three concurrent steps. Firstly, initial Internet usage model representing all proposed relationships was generated. Secondly, the fit measurement results of the Internet usage model are evaluated to ensure that the items used to measure each of the constructs in the model is adequate. The third step was carried out only after the fit measurement models have shown to be proper measures of the constructs. It involves the assessment of the structural model which shows the relationships between the constructs.

Initial Internet usage model of the study includes the structural relationship between the four exogenous latent constructs: PU = Perceived Usefulness, PEOU = Perceived Ease of Use, FC = Facilitating Conditions and SE = Self Efficacy and the two Endogenous Latent Constructs: TEACH = Internet usage in Teaching and related activities, RELATED= Internet Usage in Research and related activities. The single head arrow have path coefficient leading to the dependent constructs and the letter e's represents



Sustainable Agriculture through ICT innovation

error terms. The double headed arrows represent covariance of constructs. Pu1-pu2, peou1-peou4, se1-se4 are variables used to measure their respective constructs.

			Estimate	S.E.	C.R.	P
TEACH	<---	PU	0.72	0.042	3.124	0.002**
RELATED	<---	PU	0.68	0.085	2.206	0.027**
TEACH	<---	PEOU	0.20	0.187	1.506	0.070
RELATED	<---	PEOU	0.24	0.075	.985	0.099
TEACH	<---	FC	0.61	0.121	1.962	0.02**
RELATED	<---	FC	0.58	0.078	1.663	0.046*
TEACH	<---	SE	0.32	0.194	1.443	0.06
RELATED	<---	TEACH	0.60	0.105	3.6	0.02**

Table 4. Covariance of the Internet usage model

* A p value is statistically significant at the 0.05 level

** A p value is statistically significant at the 0.02 level

As shown in Table 4, the standardized regression weights are used since they allow to compare directly the relative effect of each independent construct on the dependent. Accordingly, perceived usefulness (PU) and facilitating conditions (FC) significantly affect Internet usage in teaching, research and related activities. On the other hand, Perceived Ease of Use and Self Efficacy do not significantly affect Internet usage in teaching, research related activities.

The hypotheses test (table 4) indicate that the higher the level of perceived usefulness, facilitating condition towards using the Internet by agricultural faculties the higher would be the extent of the Internet usage in teaching. Concurrently, the higher the level of perceived usefulness of the Internet and facilitating conditions for using the Internet, the higher would be the extent of the Internet usage for research and related activities of agricultural faculties in the study area.

The hypotheses test also revealed that not all of the independent constructs in the Internet usage model significantly explained usage behavior of agricultural faculties. In addition, it was also identified that the independent constructs capabilities in explaining the variance of usage behavior in teaching and related activities (TEACH) were higher than in research and related tasks (RELATED). The independent constructs (PU, PEOU, FC, and SE) account for 59 % of the variance of Internet usage behavior in teaching (TEACH) and, 29 % of the variance of Internet usage behavior in research and related activities.

The most important determinants (independent constructs) for usage behavior (TEACH) were PU, FC with their P value being statistically significant at the 0.05 level. The important determinants for usage behavior in research and related activities (RELATED) were also PU and FC with their P value being statistically significant at the 0.05 level.

Sustainable Agriculture through ICT innovation

Finally, Internet usage model that represented agricultural faculties' usage behavior has been generated. However, this model should be further investigated to find out whether the moderators including age, sex, academic rank, and experience affect the influence of PU, PEOU, FC and SE toward Internet usage behavior of agricultural faculties.

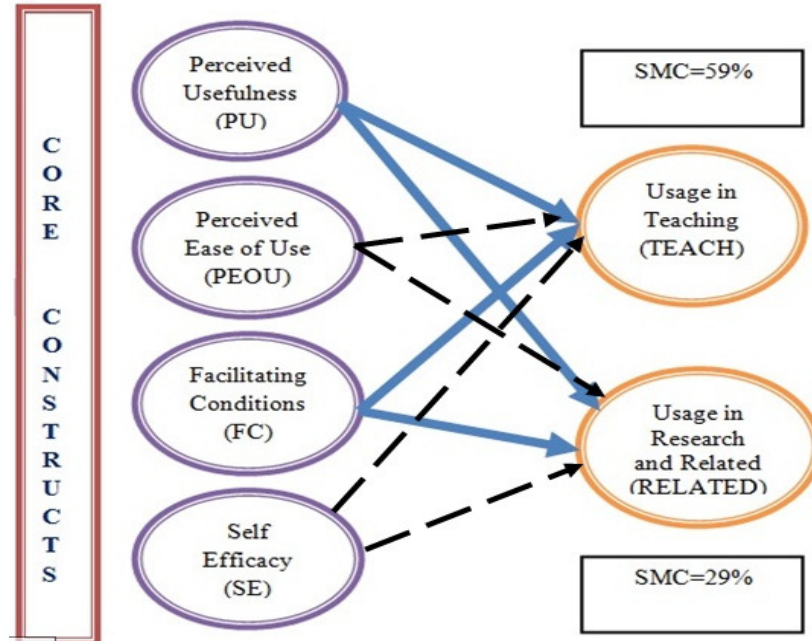


Figure 1. Proposed Research Model (IUM) explaining Internet usage behavior of agricultural faculties Internet usage behavior in teach and research and related activities.

4. CONCLUSION AND RECOMMENDATION

This study generated Internet Usage Model (IUM) that explains Internet usage behavior of agriculture faculties in the study area. Accordingly, the research managed to link the various constructs which are the main predictor of usage behavior. The model provides various avenues of research opportunities that would ultimately shape and strengthen the Internet Usage Model. Equally, the Internet Usage Model provides insights to predict and explain Internet usage as part of the teaching-learning and research in Ethiopian context.

According to the proposed model, priority has to be given to Facilitating condition and Perceived usefulness constructs. Accordingly, improved use of Internet in teaching and research is highly correlated with the presence of Facilitating conditions (technical, physical and knowledge infrastructure). Therefore, much attention has to be given to improve the technical knowhow of technicians in the ICT units so that they can support faculties, it is also suggested the decisiveness of improving the physical infrastructure as well as the knowledge infrastructure of the university. On the other side, the proposed model suggested the need to empower faculties' in order to increase their perceived use



Sustainable Agriculture through ICT innovation

of the Internet and Internet based technologies in their academic works. Last but not least, the study also proposed the need to put in place a policy in agriculture colleges which harmonizes the use of ICT in general and the Internet based technologies in particular.

5. REFERENCES

ADIKI, G., 2003. INTERNET USE AMONG FACULTY MEMBERS OF UNIVERSITIES IN GHANA. *JOURNAL OF LIBRARY REVIEW*.52(1): 29 – 37.

BACON, L.D., 2009. USING AMOS FOR STRUCTURAL EQUATION MODELLING IN MARKET RESEARCH. 6(1):11-14.

BARRETT, P., 2006. STRUCTURAL EQUATION MODELLING: ADJUDGING MODEL FIT. 4(1):12 -23.

Belay K., 2000. Empowering Agricultural Labor in Ethiopia: the Challenges to Training and Development. *Journal of African Development*. XXV (1):12-21.

DEREK, K.J. AND S. PHILIPP, 2009. THE GENESIS AND EMERGENCE OF EDUCATION 3.0 IN HIGHER EDUCATION AND ITS POTENTIAL FOR AFRICA.

Hoffman, L., 2011. Reliability and Validity: Interpreting GRE scores. 32-41.

OYELARAN D. AND F. ADEYA, 2010. DYNAMICS OF ADOPTION AND USAGE OF ICTS IN AFRICAN UNIVERSITIES: A STUDY OF KENYA AND NIGERIA.

PARK, N., R., ROMAN, S., LEE, AND J. CHUNG, 2009. USER ACCEPTANCE OF A DIGITAL LIBRARY SYSTEM IN DEVELOPING COUNTRIES: AN APPLICATION OF THE TECHNOLOGY ACCEPTANCE MODEL. *INTERNATIONAL JOURNAL OF INFORMATION MANAGEMENT*. 29(3):196–209.

MARK, M., 2000. GLOBALIZATION, PRIVATIZATION OF THE ECONOMY AND CLIMATE CHANGE HAS CREATED NEW CHALLENGES TO AGRICULTURE IN DEVELOPING COUNTRIES. UNITED NATION INDUSTRIAL DEVELOPMENT ORGANIZATION, VIENNA.

NARS (NATIONAL AGRICULTURAL RESEARCH SYSTEM OF ETHIOPIA), 1999. THE NATIONAL AGRICULTURAL RESEARCH SYSTEM OF ETHIOPIA: NATIONAL REPORT ON AGRICULTURE IN ETHIOPIA.

HARAMAYA UNIVERISTY, 1972. ALEMAYA COLLEGE OF AGRICULTURE YEAR BOOK. 10-11.

IWS (INTERNET WORLD STATUS), 2011. INTERNET WORLD STATUS REPORT.

KRIPANONT, N., 2007. USING TECHNOLOGY ACCEPTANCE MODEL OF INTERNET USAGE BY ACADEMICS WITHIN THAI BUSINESS SCHOOLS. PHD THESIS, VICTORIA UNIVERSITY.