

## Attitude of Instructors in Integrating Information Communication Technologies into Classroom Teaching: The Case of Two Universities of Technology in Ethiopia

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**Abstract:** This study was aimed primarily at ascertaining whether there is a difference in instructors' attitudes towards the use of ICT in classroom teaching contexts of the two technological universities in Ethiopia. Specifically, Addis Ababa Science and Technology University (AASTU) and Adama Science and Technology University (ASTU) instructors were compared to see if ICT use perceived usefulness varies with their attitudinal patterns. Attempts were evident to see if changes might be noticeable across their demographic attributes as well. A sequential explanatory mixed-method design was adopted to gain a fuller understanding of the issue. Because of this, data were collected using questionnaires administered to 136 randomly selected instructors. Interviews were held with 14 participants consisting of department heads, deans and vice presidents of both universities to collect qualitative data. Results showed that both AASTU and ASTU group members generally held a strong positive belief (with few exceptions) that integrating ICTs can significantly bring unparalleled importance to classroom teaching. Yet, apart from the reported significantly different effects between the five age groups in the ASTU context,  $F(4, 71) = 2.60, p = .04, \eta^2 = .42$ , there appeared to be no significant difference between participants' attitude towards ICT by their gender, age, academic rank, and working experience. The regression results also depicted that demographic variables could not significantly predict an attitude variable; neither did attitude contribute to a significant variation in participants' pedagogical ICT competences (TPK). A conclusion is that holding most of the positive attitude is a promising result and a solid foundation that is already in place. However, there existed some inconsistent findings in the study that future research needs to clear the disparities.

**Keywords:** attitude, ICT integration, ICT usage, technological pedagogical knowledge

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## **Introduction**

The 21<sup>st</sup> century has witnessed an unprecedented development in information and communication technologies (ICTs). New digital technologies have become ubiquitously available and revolutionized all walks of societal life including the education service (Horvath, 2017; Tezci, 2010; UNESCO, 2008). Its impact has penetrated most aspects of education sector. Numerous studies have shown that ICT can make a great contribution to dramatic changes in the delivery of more efficient and robust lesson contents and related educational services (Barack, 2017; Wang & Teng & Chen, 2015; Barris, 2012; Blattner & Fiori, 2009). As a result, digital technology is becoming an agenda that is of higher significance to a global education audience (Lillejord et al., 2018). It is widely argued by an increasing number of literature (e.g., Selwyn, 2013; UNESCO, 2018) that educational ICT is also receiving an increased global attention and considerable discussion among the education scholars and researchers. Thus, a rapid, far-reaching and unprecedented changes are required in education sector.

Recognizing its significant importance in education, government and educational authorities across the globe have prioritized ICT in their educational reform agenda to bring educational provisions to attention. Evidences indicate that a large amount of funds have been invested in the educational ICT projects so far (Alsan & Zhu, 2018; Cheah, 2010; Lane, 2012; Moraru, 2011). As argued by Law (2010) and Newosu & Ugbomo (2012), nevertheless, ICT integration efforts have not been organized well and run fragmented initiatives and pilots, particularly in the contexts some developing countries.

Ethiopia is one of the countries that recognize ICT as an increasingly important area for educational reform. However, in most of its national and education sector proclamations, policies and strategic programs provisions due attention has not been given to educational ICT aspect (FDRE, 2009a, b; HERQA, 2014; MOE, 2010, 2015; TGE, 1994). Reports further indicate that ICT in education program received little

attention by a significant number of teachers, education officials, policy makers and the stakeholder at large. Although available reports have shown that there has been a considerable quantitative increase in the number of computers at HEIs since very recent times, computer to teacher ratio, according to recently conducted country survey study, was low (10:1). In his study, Adam (2012) affirmed that Ethiopia has not yet reached the desired level, as the country's global ICT index is shown to be placed below Sub-Saharan African standard.

Apart from access factors discussed so far, recent studies (e.g. Semerci & Aydın, 2018) have shown that teachers' positive attitude largely determines successful integration of ICTs in classrooms. Withstanding this finding, which appears to be theoretically grounded in technology adoption model (TAM), studies conducted within local context (e.g., Mikre, 2011; Moges, 2015; Tibebu, Bandyopadhyay & Negash, 2009; Yigezu, 2014) could not clearly show the relationships between attitude and perceived usefulness or value; other prior studies could not fully augment with more rigorous investigations and adequate findings (Sang, et al., 2018). Further, while researchers essentially agree that attitudes and beliefs enable or hinder the adoption of technology by teachers and that intrinsic factors such as the perceived usefulness of a technology are important for the implementation of new technologies in educational settings, little is known about whether teachers share certain attitudes and can therefore be assigned to teacher groups that are characterized by similar attitudes.

Previous studies related to teachers' attitudes towards educational technology such as Eickelmann and Vennemann (2017) are able to identify clearly the research gaps that still need to be addressed. One of the gaps in the previous studies is that the current research in this field cannot be regarded as methodologically appropriate because of limited methodologies used; hence, this study is envisioned to fill the gap by using varied methods and wider perspectives. It seems pressing to deal with ICT integration venture that gives due account to teachers' attitudes/beliefs in the field of educational ICT.

### *Objective of the study*

This study is aimed at examining attitudinal patterns of instructors in integrating ICTs into classroom teaching in the two technological universities in Ethiopia. Specifically, the study addresses the following research issues:

- Whether there is a significant difference in the attitude of AASTU and ASTU instructors towards ICT usage in classroom teaching;
- Whether demographic attributes such as gender, age, academic rank and experience significantly affect the two universities' instructors' attitudes towards ICT integration and use practices, and
- How important instructors of the two universities believe in ICT usage in teaching.

### *Operational Definitions*

*Attitude* is a complex organization of evaluative beliefs, feelings and tendencies toward certain actions, such as ICT use in this particular study.

*ICT integration* refers to an incorporation of ICT in classroom teaching practices by taking into account attitude as a key variable of importance.

*ICT usage* is the application of ICT tools to teaching practices by instructors skillfully and with high optimism.

*Technological Pedagogical Knowledge (TPK)* is operationalized as instructors' competences in pedagogical ICTs, or regarded as the dependent variable as it stands in this study.

To this end, the paper presents an introductory context encompassing the gaps identified in the existing researches and the underlying research questions formulated to address them. Next, an attempt was

made to introduce literature work and incorporate empirical evidences on ICT integration in the existing ICT use practices in the educational institutions, though to the lesser extent. The framework on which the study was formulated via technology adoption model (TAM) theoretical lens that is proved to show relationships between attitudes and demographic attributes as well as technological pedagogical knowledge (TPK) is also explained in this section. The analysis and discussion part is sufficiently detailed. The study concluded by making clear conclusions and recommendations.

### **Literature review**

#### *Approaches to Modeling the Use of ICTs by Teachers and the Role of Teachers' Attitudinal Factors*

Integrated theoretical models pertaining to ICT contain various external and internal factors, with the latter comprising core teacher attitudes and beliefs regarding the use of technologies in instructional settings. There are several theories conceptualizing the acceptance of technology by teachers, among which is Technology Acceptance Model (TAM) appears to be prominent in order to determine the relevance of teachers' attitudes and beliefs with regard to the implementation of digital technologies in educational settings, and can thus be regarded as the most influential model to predict the behavioral intention to use ICT in relation to causal relationships of perceived usefulness and perceived ease of use, among others. A number of empirical evidences (e.g., Sang et.al, 2018) reveal that teachers with constructivist teaching attitude and belief are found to have a stronger intention and technology acceptance tendencies to integrate technology into their future teaching practices.

Empirical findings and current state of research in the educational technology field have shown that teachers' attitude towards technology is an indispensable prerequisite and a major predictor and potential determinant to greatly influence their acceptance of the usefulness of

ICTs in educational settings (Eickelmann & Vennemann, 2017; Sang et al., 2018). Many scholars have been able to show that perceived usefulness (the subjective probability that using a specific application system will increase job performance within an organizational setting) or value (the extent to which an individual believes that there are benefits to performing a particular target behavior has proven to have a direct effect on the behavioral intention to use computers in educational settings) (Eickelmann & Vennemann, 2017). Others, in contrast, only found a weak direct effect of value on the use of technology in education (Chen, 2010).

With reference to teachers' engagement with technology, a substantial body of research has investigated the relation between other individual or contextual background characteristics and the implementation of ICT in classroom teaching by teachers. Demographic factors such as gender, age, area of specialization, and years of teaching experiences have been consistently found to be important predictors of ICT integration endeavor (Suarez-Rodriguez et.al, 2018). For example, many scholars focus on gender as a mediating or influencing factor for the acceptance of technology. Recent research, especially within the TAM framework, concluded that the TAM holds for both women and men (Teo et al., 2015). In another study finding that has taken into account age as background characteristics, the younger age groups were found relatively ICT enthusiasts (Eickelmann & Vennemann, 2017) while attitudes can be described as relatively pessimistic by the larger proportion of older teachers.

Overall, the results presented raise further questions that need to be answered in order to evaluate accurately the relation between the implementation of ICT in education settings and the corresponding use of ICT by teachers. This study thus considered to be as part of further research sought to shed light on the issues raised.

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## **Methodology**

### *Description of the study setting*

The study was conducted in Addis Ababa Science and Technology University and Adama Science and Technology University, the only technological institutions established with a special mandate of producing highly qualified engineers required to meet the needs of emerging industries and as part of contribution to meeting ambitious government development objectives.

Attributable to the nature of these universities, i.e., forefront runners to technological innovations and applications, developing wide-ranging e-learning and other interactive technology platforms is considered to be a high strategic priority. The expectation is that comparing ICT use attitudes of instructors in both universities has an irreplaceable role to introduce the importance of policy directions into academic discussions and debates that surround ICT use perceptions of higher education teachers.

### *Research Design*

This study employed mixed methods which was grounded in pragmatic paradigm. The choice of the method adheres to some strategic advantages, such as confirmatory, complementary and compatibility discussed by Bryman (2012), Creswell (2009), Johnson and Christensen (2012), Johnson and Christensen (2017). These authors further explain that using mixed method gives broader perspectives and fuller account of instructors' attitudes on ICT integration practices than what can be gained using a single method (i.e., either quantitative or qualitative). Among mixed methods, a sequential explanatory design is employed in this study. It is two stage research design with focus on the quantitative phase because much interest lies on giving emphasis on the quantitative aspect. The qualitative phase of the study is found vital in corroborating the statistical results. In this way, the analysis section of this study is

carried out separately. Differently put, using the design adopted appears impossible to carry out an analysis of both quantitative and qualitative data concurrently.

### *Sampling techniques*

The larger the number of target population as in this study, the better would-be approaching sampling techniques. In the first phase, multi-stage sampling technique is employed to select representative colleges, departments, and instructors. Hereafter, simple random sampling is employed at each remaining stage to attain fair and equitable chance of representation. To bring population frame (obtained from the 2018 statistical bulletin of both the universities) to the desired manageable sample size, sample size determining formula is applied. With reference to this, Krejcie and Morgan's (1970) table of recommended sample size is consulted. Accordingly, the sample size is determined to be 136, i.e., 64 and 72 for AASTU and ASTU groups respectively. In terms of gender composition, more than 90% of the participants are male. Majority of participants are lecturers in professional rank, young, and at the age range of 26- 45 year.

In addition, purposive sampling technique is employed by virtue of its applicability to select participants with deep knowledge, experience and other qualities they acquire in ICT use and leadership in academic environment. Accordingly, 10 department heads and the rest 4 higher leaders from the two universities under consideration are selected on the basis of purposive sampling.

### *Data Collection Instruments*

Principally, two data gathering tools are used in the study, including self-filled questionnaire and structured interview. The former is found to be important because it gives more opportunity of collecting a large amount of data across wider area of interest. A questionnaire with items of 5-point Likert scale ranging from strongly disagree (1) to strongly agree (5)



is prepared and tested with five pretest groups. In addition, Cronbach's alpha is also used to determine reliability of the 13 items using SPSS 25 software. Accordingly, alpha value for each item on a scale is found above .70, i.e., all found reliable for inclusion in the final questionnaire. In the data collection effort, a special strategy called 'pyramid of networks' is applied, as a result of which higher rate of return (97%) is recorded in the study.

On the other hand, a face-to-face interview is used to gain insights that support and corroborate data gained through questionnaire in more depth from sampled officials using recording device.

### *Data Analysis*

Using sequential explanatory design leads us to carry out quantitative data analysis first followed by qualitative analysis, which is based on the findings of the former. Additional note is given by Johnson and Christenson (2017: 633-634) that mixed research/explanatory design analysis and report appears to be different from conventional and mono method types. As also further asserted by these authorities, the two data sets are merged at discussion stage of this study only.

When it comes to analysis of each phase data, the questionnaire items are checked for clarity before analysis begins. Then SPSS 25 statistical analysis package is used for both data entry as well as analysis. An alpha level of .05 is used for test of significance. Then, quantitative data are analyzed using descriptive as well as inferential statistical tools. Specifically, *t*-test is used to test whether differences are significant between participants of AASTU and ASTU with respect to their attitude towards ICT usage, while one-way ANOVA analysis is approached to see if ICT attitudes of participants varies with age, rank and experience, and determine in which variable(s) the difference(s) is/are significant.

On the other hand, all the audio-recorded interviews are transcribed verbatim initially, and analysis is followed by using text descriptions and

narrations. Pseudonyms are used in quoting an interview transcript intended not to reveal the interviewees' names, as motivated by research ethical rules and standards. Hence, the names used in quotes are not real names.

## **Results**

### *Phase One: Findings*

#### *Q1. Analysis of difference in the attitude of AASTU and ASTU instructors towards ICT usage*

The result of descriptive analysis on teachers' attitude toward ICT usage in teaching is loaded into two factors, namely, ICT use willingness and ICT apprehension, as presented in Table 1.

The results in Table 1 reveal that participants of AASTU and ASTU generally hold a strong positive belief (i.e., mean scores > 4.0) that integrating ICTs can significantly bring unparalleled importance to their classroom activities. It is implicitly reported that ICT integration in classroom makes classroom management easier, saves time, and less trivialize teaching role.

Table 1. Mean and SD of Participants' Perceived Willingness and Anxiety towards ICT usage

ICT willingness		AASTU		ASTU	
Item	<i>I believe ICT use in teaching:</i>	M	SD	M	SD
1	Has positive effects on transforming instruction.	4.52	.89	4.46	.84
2	Keeps me confident to act in meaningful manner in classroom.	4.19	.96	4.48	.79
3	Offers greater access to various teaching resources.	4.50	.89	4.42	.90
4	Maximizes students' involvement in learning.	4.41	.89	4.36	.91
5	Makes class teaching more interesting for me.	4.30	.79	4.31	.93
6	Helps me spend time to think how best to integrate it in class.	3.67	.96	3.81	.96
7	Promotes student centered learning.	4.17	.75	4.11	.99
8	Increases my interest to plan and learn more how best to use it.	4.03	.99	4.47	.99
9	Offers alternative learning opportunities such as e-assessment.	4.03	.98	4.22	.79
10	Increases my rapport with students.	4.04	1.10	4.08	.95
<b>ICT apprehension</b>					
Item	<i>I am afraid that ICT use in teaching:</i>				
11	Makes it difficult for me to manage class	1.98	1.19	2.18	1.22
12	Is more of class time consuming.	2.02	1.27	2.15	1.18
13	Trivializes my future classroom sessions	1.75	1.14	2.15	1.36

### T-test Results on Participants' Attitudes towards ICT Usage in AASTU vs. ASTU

Table 2. Results of Independent Samples t-Test on the Attitude Scale

Factor	Groups	N	M	SD	t	Df	Sig.	95% confidence interval	
								Lower	Upper
ICT use willingness	AASTU	64	4.19	.92	-.39	134	.69	-.25	.16
	ASTU	72	4.23	.64					
ICT apprehension	AASTU	64	1.92	1.20	-14	134	.18	-.59	.11
	ASTU	72	2.16	1.08					

$p < .05$

The results in Table 2 showed that there certainly appear no statistically significant differences reported between participants of AASTU and ASTU concerning their attitude towards ICT usage. Specifically, similarities are significant between participants of both groups with regard to ICT use willingness,  $t(134) = -.39, p = .69, 95\% \text{ CI } [-0.25, 0.16]$ , as well as ICT apprehension,  $t(134) = .14, p = .18, 95\% \text{ CI } [-0.59, 0.11]$ . This could also be meant that participants in AASTU and ASTU seem to show similar positive attitudinal patterns as they scored higher mean (i.e., willingness) and lower mean, i.e., less anxious towards ICT usage in teaching (Table 1).

*Q2: Instructors' ICU use attitude test by demographic attributes*

Table 3. *Analysis of Participants' Attitude towards ICT Use According to Gender*

University	Gender	N	M	SD	df	t	Sig.	95% confidence interval for mean	
								lower bound	upper bound
AASTU	Male	59	3.68	.43	62	.79	.43	-2.36	0.54
	Female	5	3.52	.18					
ASTU	Male	68	3.77	.57	70	.86	.39	-0.33	0.83
	Female	4	3.52	.41					

$p < .05$

Table 3 presents the mean scores and independent samples t-test results regarding participants' attitude towards ICT use by gender. The results indicate no statistically significant difference between male and female participants both in AASTU,  $t(62) = .79, p = .43, 95\% \text{ CI } [-2.36, 0.54]$ , and ASTU,  $t(70) = .86, p = .39, 95\% \text{ CI } [-0.33, 0.83]$ . Explicit to the findings is that there is no significant effect posed on participants' belief pattern towards ICT usage due to differences in sex in the context of participants of both groups.

Table 4. *Participants' Attitude towards ICT Use by age*

University	Age category	N	M	SD	df	F	Sig. (2-tailed)	Eta squared
AASTU	23 – 25	SPSS output data nil			3,63	.82	.49	.14
	26 – 35	31	3.72	.36				
	36 – 45	24	3.50	.49				
	46 – 55	6	3.78	.29				
	56- 65	3	3.64	.41				
ASTU	23 – 25	2	3.77	.43	4,71	2.60	.04	.75
	26 – 35	39	3.83	.52				
	36 – 45	17	3.83	.53				
	46 – 55	6	3.02	.89				
	56- 65	8	3.72	.33				

$p < .05$

Table 4 shows that there are significantly different effects between the five age groups on attitude towards ICT in the ASTU context,  $F(4, 71) = 2.60$ ,  $p = .04$ ,  $\eta^2 = .75$ , but not in the AASTU context,  $F(3, 63) = .82$ ,  $p > .05$ ,  $\eta^2 = .14$ . The finding suggests that ASTU younger age groups of teachers had higher and more positive attitudes to operate teaching activities with ICTs. In other words, it appears that the ASTU age variable result might be implied as the older the age becomes, the nearer they tend to show reluctance towards ICT usage.

Table 5. *ANOVA Analysis of Academic Rank and Attitude (AASTU vs. ASTU)*

Academic rank	AASTU							ASTU						
	N	M	SD	Df	F	P	$\eta^2$	N	M	SD	df	F	P	$\eta^2$
Lecturer	33	3.66	.31	3,63	1.57	.21	.26	37	3.84	.54	3,71	1.36	.26	.42
Assistant Prof.	17	3.52	.57					21	3.76	.34				
Associate Prof.	11	3.87	.39					8	3.42	1.06				
Full Professor	3	3.71	.36					6	3.63	.22				

$p < .05$

As shown in Table 5, there is no statistically significant different effect between academic ranks, and at the same time results are similar for participants AASTU,  $F(3, 63) = 1.57$ ,  $p = .21$ , and ASTU,  $F(3, 71) = 1.36$ ,  $p = .26$ . Accordingly, teachers are found to have similarly high level of beliefs towards ICTs regardless of differences in academic rank.

Table 6, on the other hand, reveals that participants with a professional experience of 16 – 20 years in the AASTU and 6 – 10 years in ASTU contexts have a statistically higher score. It is also apparent to observe that differences between year categories are not significant,  $p > .05$ .

Table 6. *Teachers' Attitude towards ICT Use by Teaching Experience*

Experience	AASTU							ASTU						
	N	M	SD	df	F	P	$\eta^2$	N	M	SD	Df	F	p	$\eta^2$
1-5 years	16	3.67	.36	5, 63	.11	.99	.02	18	3.70	.36	5,71	.59	.71	.18
6 -10 years	21	3.64	.35					29	3.87	.56				
11-15 years	15	3.62	.59					9	3.72	.45				
16-20years	8	3.75	.44					5	3.61	1.38				
21-30 years	1	3.69	.					5	3.47	.19				
31 & above	3	3.64	.29					6	3.73	.38				

$p < .05$

#### *Predicting the effects of demographic variables on attitude towards ICT integration*

Regression analysis is run to test if demographic variables have potential effect on attitude, on the one hand, and if demographic variables/predictors have statistically significant effects on the TPK, as an outcome variable, on the other. So far, the analysis is also made to see how much of the variance in the outcome variable is accounted for by respective predictor(s) in the model. Table 7 and Table 8 give a detailed account of the presentation of the results.

Table 7. *Regression Coefficients between Demographic Variables on Attitude*

Model		Unstandardized		Standardized	<i>t</i>	Sig.
		Coeff. B	Std. Error			
AASTU	(Constant)	4.06	.319		12.70	.000
	academic rank	.114	.080	.250	1.42	.159
	teaching experience	.033	.078	.104	.427	.671
	age in years	-.166	.122	-.331	-1.36	.179
	Gender	-.209	.199	-.136	-1.05	.298
ASTU	(Constant)	4.506	.411		10.96	.000
	academic rank	-.069	.106	-.118	-.652	.517
	teaching experience	.067	.075	.184	.892	.376
	age in years	-.151	.129	-.285	-1.176	.244
	Gender	-.370	.300	-.152	-1.234	.222

Table 7 illustrates that demographic variables have significantly different relationships with attitude, i.e., relationship is not significant. What the demographic variables contribute towards attitude variation, with regards to ICT usage is only very insignificant, about 06% in AASTU and 07% in ASTU. According to regression model findings, none of the demographic variables (gender, age, rank, and experience) shown have significant effect; similarly, there is no difference between their groups that tend to show varied impact on attitude.

Regression analysis is conducted further to see if there exists statistically significant predictive relationship between attitude and TPK (teachers' pedagogical ICT competences).

Table 8. *Regression Coefficients between Attitude and TPK*

Variable	Unstandardized Coefficients		Standardized Coefficients	<i>t</i>	Sig. (2-tailed)
	B	Std. Error	Beta		
(Constant)	2.37	.843		2.81	.01
AASTU Attitude	.306	.229	.17	1.34	.19
(Constant)	2.05	.562		3.64	.00
ASTU Attitude	.39	.148	.303	2.66	.01

As shown in Table 8, attitude has statistically significant relationship with TPK in the context of ASTU,  $\beta = .303$ ,  $t = 2.66$ ,  $p = .01$ , while relationship is not significant in the AASTU counterpart,  $\beta = .17$ ,  $t = 1.34$ ,  $p = .19$ . In other words, the finding reveals that having any positive attitude significantly increases ASTU teachers ICT use and integration practices even if it accounts for only 1% variation in the outcome variable. Whereas having a high level of positive attitude could not significantly increase the same outcome (TPK) in the AASTU context, and at the same time, the amount of variation accounted by the predictor (attitude) remains insignificant (03%). Overall, the finding suggests that attitude is neither a good predictor of teachers' TPK, nor is it significantly and efficiently explained by demographic variables.

### *Phase Two: Findings*

#### *Q3. Question related to positive attitude and its impact on ICT use practice of instructors*

From the deep analysis of the interview transcripts, most of the participants hold similar viewpoints that their dispositions towards ICT are positive, with only a few showing speculations about its significant effects on classroom teaching. The common belief held by participants is that introducing ICT into classroom instruction is a matter of necessity rather than a choice. A close look at the below findings clearly illustrates this contention.



Majority of AASTU interviewed participants hold positive attitudes towards ICT usage in teaching. They believe that ICT benefits them to have much convenience and report a high level of comfort in teaching and learning. Most of them remark that they have learned new ways to deliver lesson contents and they may continue to incorporate these skills in their teaching. An increase in positive feelings and a high concern to engage in ICT based teaching activities are also reported.

One of the AASTU participants noted: *I owe a positive attitude towards the utilization of ICT tools since it simplifies the teaching-learning processes.... It is a life simplifying equipment as well* (Natnael, January 7, 2019). However, he highly states that this happens only if ICT is used wisely and properly. Another participant from the same university expressed his belief towards ICT usage with time saving role, and he said *I believe I use ICT because it saves time for teaching and other educational activities* (Solomon, January 10, 2019). This means ICT use saves time, and teachers can be benefited much out of applying ICTs in their teaching duties. Solomon further underscored the importance of ICT use from students' perspectives. Here is the viewpoint he held: *I think technology helps a lot when to include images and different tools in teaching. I use pictures and sounds. I guess technology is everything to provide multimodal affordance to help students see things differently* (Solomon, January 10, 2019). The participant believed that the use of technology was relevant for learners than it was for teachers, as it supposed to wider their attention spans, increase motivation and engagement. The finding implies that technology use for teaching and learning process would be catering not only to help teachers introduce lessons in different forms, but also learners could be exposed to think quickly and creatively.

In the same token, two ASTU participants expressed that they had a firm belief in that ICT use would have positive impact on their confidence in teaching. Chali expressed his concern believing that *“teaching without the use of ICT can be regarded as impossible. I cannot escape from the use of this cutting-edge technology. No IC, no confidence in teaching”*

(Chali, February 22, 2019). Abdi also underlined his positive feeling about ICT and noted that “*ICT has a surprising and lasting impact in firmly imparting knowledge in the learners’ minds than what old-fashioned approaches do. ICT is everything for me*” (Abdi, February 26, 2019).

Although an extensive use of ICTs in instructional practices often perceived as an advantage by a good number of participants, most of ASTU respondents invariably expressed their concerns that difficulties to cope with fast changing technologies may be threatening. They strongly opposed the above ideas, perhaps reflecting an objection based on blurring lines between ICT usage and age and between the same and time. Reflecting intimidating feelings, one of the participants strongly noted:

I do not know what will happen to us [the elder teachers] if ICT becomes center of instructional activities. One speculation I have is that the use of emerging technologies such as robotics and artificial intelligence will take over the role of teachers in the future. I guess the teaching profession is being endangered in this regard. So, I prepare to react to ICT usage with a great care may be seeking solution to maintain teacher friendly, technologies in classroom functions (Abdi, February 13, 2019)

The above transcript reveals that digitalization of education is contested from age point of view. Such a perception might happen often as a result of misconceptions or due to fear to accept changes that require new skills. One more participant from the same group owe negative connotation still connected to age factor. The concern is stated as: *ICT is a language most often convenient to the younger teachers, as technology itself is young. I feel I fit less to technology use probably because of my age* (Berhanu, February 12, 2019). The above viewpoints appeared to reflect that older teachers had more difficulties to use ICTs in teaching than younger ones. Being ‘digital immigrants, aged appears

more reluctant and felt unconfident to perform with ICT. Whether these views might be maintained by many still seeks further exploration, however.

Even though many individuals truly showed their positive concern that technology use saves time, there were respondents from the two groups who held malicious opinion about ICT usage because of time utilization. Here are excerpts illustrating the views held:

I feel ICT use may some of the times distract students' interest because of a certain amount of time consumed to make computers work in class, and to maintain when they fail to work in class. During this time, students might lose their motivation in the lesson. I have faced difficulties of motivating them again. Imagine what will happen if connection fails while preparing lesson and during other times. For me, ICT usage is partly time consuming than saving. Headache! (Hirut, January, 25, 2019).

I heard much is talked about information and communication technology, but no attention is given to reflect the reality of institutions and classrooms we are working at. We are rather encouraged to waste time waiting for technology to bypass us. New technologies are introduced with change in time. Except with the smart phone and laptop, I most of the times do teaching without ICT (Bereket, February5, 2019).

The above viewpoints are additional reflection to holding negative attitudes towards ICT usage. The essence in both the transcripts is that improper use of ICT would likely lead teachers to develop negative attitudes and frustrations. They might perceive ICT usage as a waste of time shifting own speculations partly to ICT devices malfunctioning particularly at the times of teaching. With no instant support, relying on technology is meaningless. In that sense, traditional methods were taken as more reliable. The above extracts purely reflect that teachers may be preoccupied with misunderstandings and unintentional threats.

Further argument in disfavor of ICT usage in teaching appears to emerge as a result of lack of appropriate ICT skills and incompetence. Helen appeared to develop discomfort with ICT use due to this reason. *I feel uncomfortable with ICT use. I still forget what I have manipulated previously; tried again and again, but lost control of it.* (Helen, February 25, 2019). The transcript entails that it is unrealistic to expect teachers to favor ICT integration into their professional activities when they have no preparation through training for example. The competing argument might follow. Teachers might develop negative attitudes not due to lack of interest to use ICTs, but as a matter of external inflicting factors such as absence of appropriate and sufficient professional development opportunities in that line.

Generally, most respondents feel that ICT use strengthens their teaching and processing new information. This is promising, but not well accepted by all. That is to say, data sources on attitude variable reflect that some participants do not like to express their opinion on issues might feel that they do not have enough knowledge and expertise about. In this sense, ASTU participants appear they hold more negative opinions than their counterparts.

## **Discussion**

The findings of both quantitative and qualitative studies disclosed that participants of the AASTU and ASTU viewed ICT use in teaching positively, and from further statistical findings participants shown to have remarkably significant similarities for all the items in the attitude scale (Table 2). The results seem similar to the results of previous researches (Liu, 2017; Palak& Walls, 2009; Sang et al., 2018; Teo et.al, 2011; Tezci, 2010). Prior studies also showed that ICT integration practices are closely related to users' attitudes (Paraskeva et al., 2008). Additional finding to this is that of Park and Ertmer, (2007) who stated that perceived relevancy of ICT in the classroom can have significant effect on its subsequent use in classroom instruction. It seems that holding positive attitude towards ICT triggers much of research in the field of

education. A further implication is that teachers with strong constructive beliefs towards ICT are more adopters of ICT in their teaching practices, and this is believed to bring desirable effects on quality teaching.

Unlike previous studies discussed above, Aslan and Zhu (2018) disclosed that there are teachers who have shown their concerns and frustrations that ICT might bring some challenges to them. This finding appears to agree with the aforementioned study findings in that ICT use in teaching is perceived as threatening to some of the interview participants, presumably on the account of its fast change and dynamics that teachers might not cope with. Particularly, ICT integration in teaching is felt as repulsive rather than zealous by some ASTU interview participants. Teachers may show negative feelings due partly to misconceptions and fears that surround them. Some might speculate that technology might take over their roles, or replace them once in time in the future. This is in fact a wrong conception. Another reason, according to many studies, is related to lack of adequate technical competence due presumably age factor and lack of preparation in that line. This is implied as some proportion of teachers might need more awareness than they have now to change their previous views and to overcome resistance.

The attitude factor has more noticeable effect when seen from age perspective. Results of ANOVA analysis shows that teachers' attitude towards ICT usage relatively pegged on age variable, e.g. attitude of ASTU participants varied with age (difference was significant between age groups indicated,  $F(4, 71) = 2.60, p = .04, \eta^2 = .42$ ). This was not apparent for groups in the AASTU context. Likewise, the finding with the age versus ICT use contention, however, shows inconsistent results in the previous studies. The result which is in line with the finding of Teo (2011) underlined that elderly teachers perform less with ICTs, or conversely, novice teachers are more adept at rapid change and development than more experienced teachers (Bond et al., 2018). One likely reason stated by Prensy (2011) is the digital native versus digital immigrant interplay. Teo's finding contradicts with Rana (2013) findings,

which claimed that younger teachers scored lower for the relative place they give to ICT in classroom instruction. This implies that there are gaps in the findings of this study in terms of age effect as well - asking for further investigation. However, for the sake of this study, it is more likely attested to consider a side that supports younger generations adopt ICTs faster than older generations do.

The findings of the study also illustrate that there is no statistically significant difference between male and female participants both in AASTU and ASTU contexts regarding the attitude towards ICT usage. The finding is not supported by some previous studies. For instance, a significant number of studies showed that females were significantly lower regarding attitude towards ICT than males, and appeared to have fewer positive attitudes towards ICT usage. On the contrary, recent literature findings (Semerci & Aydın (2018) appear to support the study finding that no significant difference was shown by gender according to these prior studies. The findings vividly depict that attitudinal difference by gender comes to disappear through time, explicitly indicating that females are equally favoring ICT use for their teaching task effectiveness. There are also other studies (Bove'e, Voogt & Meelissen, 2007) excitingly demonstrating that females holding more positive feeling towards ICT than males thus far. The findings generally illustrate that gender appears to be a significant variable that needs a close attention as most of male majority showed that female teachers are still dominated by male counterparts due to various imposing factors mostly inherited in a long standing harmful traditional practices and cultures in Ethiopia. As a common concern, females are still underrepresented in some professions and disciplines such as hard sciences, e.g., engineering and medicine.

It is also found that participants' attitudes vary with their years of experience and levels of knowledge. However, the study findings reveal that participants attitude towards ICT does not vary due to academic rank as well as years of working experience. That is, the difference is not significant for both variables in both AASTU and ASTU contexts. It is just

not surprising to explain that teachers' levels of knowledge/ rank and experiences show differences in the previous studies as different to the findings in this particular study. For example, a study conducted by Tezci (2010) indicated that teachers with less professional experiences were more open to work with new technologies.

Finally, regression analysis findings reveal that attitude is a weaker predictor of TPK, teachers' competences in pedagogical ICTs ( $R^2$  appears very low), and as it has shown to hold significant different relationships with this outcome variable, particularly in the AASTU context,  $\beta = .17$ ,  $t = 1.34$ ,  $p = .19$ . It has not significantly varied due to demographic characteristics of teachers, in general, and due to difference within gender, age, rank, and experiences groups, in particular.

### **Conclusions**

From all the discussions made so far, ICT use received a significant amount of positive feeling and opted to bring unparalleled importance to the teaching task in both of AASTU and ASTU participants. It has also partly attracted negative viewpoints, mainly from ASTU interview participants. Attitude towards ICT triggers less repulsive reactions means that there is a promising result and solid foundation upon which expanded ICT integration could be built. Holding most of the positive attitude is one of the basic requirements and favorable condition that is already in place.

The study findings revealed that participants attitude towards ICT does not vary due to academic rank as well as years of working experience. The difference was not significant for both variables in both AASTU and ASTU contexts.

Another conclusion is unlike previous studies attitude does not show a significant effect on ICT integration practices. Yet, the study findings notably do not show meaningful connections between previous studies

and the result of the regression analysis, on the one hand, and there appears a high level of divergence within statistical findings, on the other. There is no precise reason explained by regression model why no significant variability was accounted for by attitude variable. It seems that the relationship between the attitude and TPK variables, as appeared in this study, is the question not fully answered. As also argued by Johnson and Christensen (2017) contradictory findings might be apparent, and this is due the limitations of mixed method research. Thus, it is recommended that interested researchers carry out more in-depth mixed research to clear reasons why contradictory findings surface in this and similar other researches.

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