Pre-Service Teachers' Attitudes Toward ICT Use and ICT Integration Self-efficacy Beliefs

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Abstract

In this modern world, Information and Communication Technology (ICT) is an effective teaching tool. To effectively incorporate technology into the curriculum, teachers need to have the necessary skills, a positive attitude towards technology, and an understanding of how to integrate it into their teaching. This study, thus, aimed to investigate the pre-service teachers' attitudes towards ICT use for teaching, scrutinize their ICT integration self-efficacy beliefs, and examine the association between the teachers' attitude towards ICT use and ICT integration self-efficacy beliefs. A descriptive survey design was adopted to guide the research process and achieve the objectives of study. Data was collected through a 5 Point-Likert scale questionnaire from eighty-nine pre-service teachers at Arba Minch University. A one-sample t-test and Pearson product-moment correlation statistics were employed for data analysis. The findings of the study indicate that the pre-service teachers had a favorable attitude to ICT use and low to moderate ICT integration self-efficacy beliefs.

Keywords: Attitude to ICT use, ICT integration, pre-service teachers, self-efficacy beliefs

1. INTRODUCTION

Information and Communication Technology (ICT) is technological equipment used for communication to create, and dispense information through computers, the internet, telephone, television, radio, audiovisuals, and others (Olugbenga & Adebayo, 2010; Pernia, 2008; United Nations Report, 1999). In education, ICT has a central role in renovating and resolving problem situations, improving the teaching and learning environments (Alzaidiyeen, et al., 2010). Studies confirmed that ICT enables students' learning and enhances instruction and access to quality education (Kazu & Yavulzalp, 2008; Kirschner & Woperies, 2003).

Attitude is a learned inclination to respond positively or negatively to an object or class of things (Al-Zaidiyeen, et al., 2010). It plays a significant role in shaping people's reactions to situations. Pre-service teachers' attitudes to ICT use determine the success with which they utilize it in educational settings, including classrooms (Albirini, 2006, Baylor & Ritchie, 2002). Studies showed that the pre-service teachers had a positive attitude towards using ICT for teaching (Huda, et al., 2018; Rima, 2017; Sanchez, et al., 2012; Stella, et al 2017; Zaidiyeen, et al., 2010). Since teachers' attitudes to ICT govern the integration of ICT into teaching and learning, teachers' favorable attitudes to ICT are crucial, and they should be given due attention for improved, innovative learning.

Technology integration self-efficacy belief relates to how recurrently and effectively individuals use technology. Effective classroom ICT integration, therefore, relies on teachers' beliefs and adequate capability to adopt and use the ICTs in the classroom (De, et al., 2014). Accordingly, pre-service teachers' ICT self-efficacy beliefs is a creditable indicator of the possibility of using instructional technology in their teaching careers. For novice teachers who graduate with a high sense of ICT integration, therefore, self-efficacy beliefs indicate that ICT is an effective teaching tool (Giles & Kent, 2016).

Studies proved that pre-service teachers had high self-efficacy level on technology integration in teaching (Birisci & Kul, 2019; Giles & Kent, 2016). On the other hand, Rima (2017) disclosed that most pre-service teachers have average ICT self-efficacy beliefs, while the study by Al-Zaidiyeen, et al. (2010) indicated that teachers had a low level of ICT use for educational purposes.

It is argued that a positive attitude to ICT use is an indicator of effective ICT integration in teaching and learning. Thus, insight into pre-service teachers' beliefs and attitudes about educational technologies may shed light on how they are likely to integrate ICT in teaching and learning (Giles & Kent, 2016; Rima, 2017). Studies verified that there is a statistically significant positive correlation between teachers' ICT integration self-efficacy beliefs and their attitudes toward ICT use (Al-Zaidiyeen, et al., 2010).

Different bodies of research works revealed that effective ICT integration in educational settings fundamentally depends on teachers' attitudes toward technology use (Albirini, 2006; Baylor & Ritchie, 2002) since attitude plays an imperative role in shaping people's responses to conditions, showing intention to practice and use technology. Therefore, teachers' attitudes toward ICT use are a predictor of ICT integration in educational settings (Albirini, 2006).

Teachers are innovators and agents of change in education and play fundamental roles in integrating technology into schools' teaching and learning, as ICT integration is helpful in improving the quality of education (Huda, et al., 2018). Understanding pre-service teachers' attitude to ICT use and integration self-efficacy is constructive in anticipating their behaviors in the teaching-learning and reforming their education programs at colleges to prepare them for the demands of 21st century ICT competencies. Therefore, it is hot, relevant, and timely to examine pre-service teachers' attitudes toward ICT use and their self-efficacy beliefs in manipulating ICTs and integration ability for teaching purposes in the educational context at Arba Minch University, Ethiopia, since little is understood so far about the phenomenon to be investigated particularly in this study context.

To this effect, this study sought to investigate (a.) pre-service teachers' attitudes toward ICT use; (b.) their ICT integration self-efficacy beliefs; and (c.) the relationship between the teachers' attitudes toward ICT use and their beliefs on ICT integration self-efficacy.

1.1 Conceptual Framework

The theoretical background of this study is based on social cognitive theory and constructivist learning theory. ICT is situated on the constructivist learning theory, and there is a corresponding

connection between the two. Learners are more motivated to learn and are engaged when ICT is linked to learning and teaching. Further, learners actively participate and interact with each other and the learning materials if the instruction is supported with ICT. Therefore, this study is based on the constructivist theory of learning for pre-service teachers vigorously participate and interact to make sense of meaning and gain knowledge supported by ICT. Besides, it is also built on Bandura's (1977) self-efficacy theory about a particular concern.

Accordingly, one aspect of the study was to examine the pre-service teachers' attitude to ICT use. Attitude to ICT use is one's feelings, beliefs, and inclinations towards its application in an educational context. Similarly, pre-service teachers' ICT integration self-efficacy belief is the perceived capability the pre-service teachers have regarding ICT integration as a pedagogical tool for quality teaching (Huda, et al., 2018). The possibility of successfully completing a particular task depends on an individual's perception of his or her capabilities to effectively perform the task (Sure, 2009). This study attempted to examine pre-service teachers' attitudes toward ICT use, ICT integration self-efficacy beliefs, and the association between the teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs.2.

2. RESEARCH METHODOLOGY

This section illustrates the research design, sample and sampling procedures, data collection tools, and data analysis methods.

2.1. Research Design

The purposes of this study were to investigate the pre-service teachers' attitudes toward ICT use; ICT integration self-efficacy beliefs and to examine the association between the teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs. To address these objectives, a descriptive survey design was adopted. Using descriptive research, researchers are able to clearly show the attitudes of pre-service teachers toward ICT use and integration situations, as well as collect quantitative data from large samples, so they can derive statistically inferable conclusions about the population. This is because the very aims of the study were to examine attitudes toward ICT use and ICT integration self-efficacy beliefs held by pre-service teachers at Arba Minch University in the 2022 academic year. The data was collected through a close-ended questionnaire of a Five-

point Likert scale ranging from strongly disagree (1), disagree (2), undecided (3), agree (4), and strongly agree (5).

2.2. Participants of the Study

The study was conducted on pre-service teachers attending their postgraduate diploma in teaching (PGDT) for a year at Arba Minch University in the 2021/22 academic year. The data was collected between March and April 2022. The total population of the pre-service PGDT trainees was 168. Among these, 102 were selected for this study through a simple random sampling technique to give all individuals equal chance of selection since all the participants were pre-service teachers. However, only 100 participants, which constituted 98%, filled out and returned the questionnaire. Besides, data from 11 participants were removed as the data were found to be outliers. Therefore, data only from 89 participants were considered in the analysis.

The participant teachers for the questionnaire were drawn from all the fourteen disciplines. The number of the participants as per their fields of study were from the English language (n=15), physical health education (n=5), Amharic and other local languages (n=16), Mathematics (n=17), Physics (n=12), Chemistry (n=12), Biology (n=12), Geography (n=12), History (n=10), Civic & Ethical education (n=11), ICT (n=8), Technical Drawing (n=5), General Business (n=5), and Economics (n=6).

2.3. Data Collection Instrument

The questionnaire for the pre-service PGDT teachers had three parts. The first section intended to get the biodata of the participants. The second part had (n=15) items on a Five-point Likert scale ranging from strongly disagree (1), disagree (2), undecided (3), agree (4), and strongly agree (5). This section aimed to examine the pre-service PGDT teachers' attitudes toward ICT use. The third part had (n=10) items on a five-point Likert scale. Its purpose was to draw quantitative data from the participants on their self-efficacy beliefs about ICT integration in teaching.

Item Content Validity Index (I-CVIs) for clarity, relevance, and appropriateness were between acceptable content validity of 0.79–1.00. The Content Validity Indices (S-CVI/Ave) for attitudes

toward the ICT use scale and ICT integration self-efficacy beliefs were 0.94 and 0.96, respectively above the cutoff value of ≥ 0.90. Therefore, both scales appear appropriate and content valid.

The internal consistency reliability tests of the questionnaire subscales were computed for the pre-service PGDT teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs subscales. The internal consistency values were found to be (α=. 88) for the attitude toward ICT use and (α=. 76) for the ICT integration self-efficacy beliefs subscales, respectively. This result implies that the tools are internally consistent in measuring pre-service teachers' attitudes toward ICT use and integration self-efficacy beliefs.

2.4. Methods of Data Analysis

The data gleaned through the questionnaire was encoded into SPSS version 21 for analysis. Average values of (the observed mean) and expected mean at both items and scale levels were used as units of study. One sample t-test was applied to analyze whether there was a statistically significant difference or not between the observed mean and expected mean (3.00) values of the pre-service teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs at both items and scale levels. In other words, a one-sample t-test tool was found suitable to look at if the levels of the pre-service teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs significantly deviated above or below the observed mean values (neutral point). Finally, Pearson product-moment correlation was applied to examine the association between the teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs.

Prior to applying both the one-sample *t*-test and the Pearson product-moment correlation, the data were checked for the assumptions of both inferential statistics to avoid possible flaws that might have originated from violation of the suppositions. Consequently, the data were checked for normality of distribution before running the analysis. The skewness and kurtosis values were checked on the distributions of the scores obtained from the scales. The Skewness value was found to be .387 (SE=0.255), while the Kurtosis value was determined to be -.993 (SE=0.506) for teachers' attitudes toward ICT use. Similarly, the Skewness value was -.975 (SE=0.255), while the Kurtosis value was determined to be 1.299 (SE=0.255) for the pre-service teachers' ICT integration self-efficacy beliefs. Moreover, Kolmogorov-Smirnov tests also indicated (p>.05) for both

subscales suggesting that the data revealed a normal distribution, and parametric statistics were decided to be used.

The other assumption was the distribution of scores and the nature of the underlying relationship between the variables. One way of checking normality assumptions is by examining the scatter plot. Hence, the plot lies along the straight diagonal line implying no deviations from a normal distribution. Also, a five percent ($\alpha = 0.05$) significance level was used throughout the study.

2.5. Ethical Considerations

In research works, keeping ethical standards enables being responsible and avoiding misconduct and conflicts of interest. As a result, the Arba Minch University ethical approval committee approved the study's design and the use of questionnaire to collect data. Furthermore, before data collection, study participants were consulted to obtain their permission to participate and agreed to respond to the questions through questionnaire.

3. RESULTS OF THE STUDY

This study investigated pre-service PGDT teachers' attitudes toward ICT use, ICT integration self-efficacy beliefs, and the relationship between teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs in the 2021/22 academic year at Arba Minch University. The data analyses have been presented in the subsections below.

3.1. Pre-service PGDT Teachers' Attitudes toward ICT Use

Table 1: One-sample t-test results on teachers' Attitudes toward ICT Use (n=89, df=88)

	Items Test value=3	X	t	p
1	I feel comfortable using technological devices	2.92	-.48	.631
2	Using technological devices is enjoyable	4.22	12.64	.000
3	I like using technological devices in teaching	4.19	10.55	.000
4	Technological devices save my time and effort	4.28	15.72	.000
5	Students must use technological devices in all subject matters	3.61	6.32	.000
6	Learning about technological devices is not a waste of time	3.95	10.12	.000
7	Technological devices would motivate me to do more study	4.22	16.82	.000
8	Technological devices are efficient means of getting information	4.11	15.79	.000
9	Technological devices can enhance students' learning	4.29	14.73	.000

Items	X	t	p
Test value=3			
10 Technological devices are more valuable than harm	3.92	9.21	.000
11 I would like to learn more about technological devices	4.38	16.79	.000
12 I like to use technological devices in the future	4.55	22.25	.000
13 The use of technology increases my interest in learning	4.28	17.09	.000
14 The use of technology increases my participation in learning	4.20	14.70	.000
15 The use of technology makes learning more student-centered	3.78	7.38	.000
Sub-scale	4.06	23.25	.000

As shown in Table 1, a one-sample t-test was performed to examine whether the observed mean scores of the pre-service PGDT teachers' attitudes toward ICT use were significantly different from the expected mean scores (3.0). The findings revealed that all the items and the attitude scale for ICT use had statistically significantly observed mean values than just the anticipated mean values of 3.00 (at p.000). As a result, the pre-service PGDT teachers had favorable attitudes toward ICT use for educational purposes, which clearly indicates that teachers had an optimistic tendency to use ICT.

3.2. Pre-service PGDT Teachers' ICT integration self-efficacy beliefs

Table 2: One-sample t-test results on teachers' ICT integration self-efficacy beliefs

Test value=3			
(n=89, df=88) Items	X	t	P
16 I understand the capabilities of technological devices in enhancing learning	3.06	.349	.73
17 I have the skills necessary to use the technological devices for instructions	3.03	.23	.82
18 I can teach relevant subject content with the appropriate use of technology	2.65	-2.45	.02
19 I feel confident in my ability to evaluate the software for teaching and learning	2.85	-1.03	.31
20 I can consistently use educational technology in practical ways	2.73	-1.84	.07
21 I can regularly incorporate technology into my lessons when appropriate	2.82	-1.34	.18
22 I can select the appropriate technology to support instruction	2.49	-3.63	.000
23 I can use technology resources to improve instructional practices	2.76	-1.57	.12
24 I feel confident that I will be comfortable using technology in my teaching	2.66	-2.08	.04
25 I feel confident that I can teach effectively by using technology	2.36	-4.24	.000
Sub-scale	2.74	2.49	.014

A one-sample t-test (Table 2) was run to notice whether the observed mean values of the pre-service PGDT teachers' ICT integration self-efficacy beliefs were significantly different from the expected mean values (3.0). It was found that the observed mean values were statistically significantly lower than the expected mean values (3.00) for items 18, 20, 22, 24, and 25 as well as the subscale as to their self-efficacy beliefs in the integration of ICTs. However, pre-service PGDT teachers were significantly indecisive on items 16, 17, 19, 21 & 23 ($p > 0.05$). As a result, teachers appeared to lack confidence in integrating ICT into their teaching and to be uncertain about the integration of ICT.

3.3. The relationship between teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs

Table 3 Pearson product-moment correlation between attitudes toward ICT use and ICT integration

		Attitude to ICT use	ICT integration self-efficacy beliefs
Attitude to ICT use	Pearson Correlation	1	-.066
	Sig. (2-tailed)		.542
	N	89	89
ICT integration	Pearson Correlation	-.066	1
	Sig. (2-tailed)	.542	89
	N	89	

The association between Attitude to ICT use and ICT integration was examined using Pearson product-moment correlation coefficient. The result showed there was a negative and yet, statistically non-significant correlation between the two variables [r= -.067, n=89, p > 0.05),

4. DISCUSSION AND CONCLUSIONS

This section introduced the discussion and conclusions of the study. Besides, it forwarded some recommendations to the concerned stakeholders.

4.1. Discussion

This study aimed to investigate the pre-service PGDT teachers' attitudes toward ICT use, ICT integration self-efficacy beliefs, and the relationship between teachers' attitudes toward ICT use

and ICT integration self-efficacy beliefs. To this effect, the current study disclosed that pre-service PGDT teachers had favorable attitudes towards ICT use. Early works also corroborated this finding that the pre-service teachers had positive attitudes towards using ICT for teaching (Huda, et al. 2018; Rima, 2017; Sanchez, et al., 2012; Stella, et al., 2017; Zaidiyeen, et al., 2010).

The findings of this study also showed that the teachers exhibited poor to average ICT integration self-efficacy beliefs in their teaching. In the same vein, the survey by Al-Zaidiyeen, et al. (2010) indicated that teachers had a low level of ICT use, while Rima (2017) disclosed that most pre-service teachers had average ICT self-efficacy beliefs for educational purposes. Nevertheless, some studies indicated that pre-service teachers demonstrated high levels of technology integration self-efficacy beliefs (Birisci & Kul, 2019; Giles & Kent, 2016). Since pre-service teachers' ICT integration self-efficacy is a creditable indicator of the possibility of using educational technology tools in their careers, the poor to the average sense of ICT integration self-efficacy may indicate the teachers' less likely to use ICT as an effective teaching tool in their careers.

Concerning the relationship between teachers' attitudes toward ICT use and ICT integration self-efficacy beliefs, the present study found a negative and yet a statistically non-significant correlation between the two variables. Although pre-service teachers' attitudes to ICT use define the accomplishment with which they apply it in educational settings, including classrooms, the current study failed to show this. Contrary to the findings of the present study, early works revealed a statistically significant positive correlation between teachers' attitudes towards ICT use and ICT integration self-efficacy beliefs (Albirini, 2006; Al-Zaidiyeen, et al., 2010; Baylor & Ritchie, 2002; De, et al., 2014; Giles & Kent, 2016).

There are several reasons which contribute to this outcome. Some of these are technological competencies (Huda et al. 2018) and experience of teachers (Huda et al., 2018; Wang et al., 2004), physical facility of schools (Ertmer, 2005), time to integrate ICT into the curriculum, home access to the internet (Curts et al., 2008), and amount of training (Watson, 2006).

4.2. Conclusions

The study evidently depicted that the pre-service teachers had a positive attitude toward ICT use in educational contexts, including classrooms. This implies that teacher education institutions have

fertile ground to equip the trainees with the necessary ICT skills for teaching and learning to enhance the quality of education expected of them in the 21st century. However, the pre-service teachers were not sufficiently prepared with ICT integration as tools for educational purposes as they had stumpy and middling self-efficacy beliefs about ICT inclusion for teaching.

It is hence suggested that much has to be done by the teacher training colleges and the ministry of education to develop the capacity of the trainees with ICT as a pedagogical tool for effective instruction. Besides, the institutional factors that may negatively influence ICT integration are expected to be addressed to maximize ICT incorporation.

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