Enhancing pre-service art teachers' ICT skills using ICT integrated teaching model

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Abstract

Teachers are expected to utilize ICT in their daily duties. This is however not usually the case in most developing nations as most of the teachers lack requisite ICT skills. This study is a quasi-experimental study which examined the impact of an ICT Integrated Studio teaching model (here in after IISTM) in enhancing the ICT skills of pre-service art teachers who participated in the study. A sample of 81 pre-service teachers was purposively drawn from intact classes from colleges of education in Nigeria. The instrument used to collect data was Teachers' ICT Skills Questionnaire (TISQ) developed by the researchers. Descriptive and inferential statistics were used to present and discuss the findings. Results revealed that IISTM was effective in enhancing the ICT skills of the participants in the 3 groups with significant differences between groups 1 & 2, 1 & 3 but no significant difference between groups 2 & 3. There was however no significant difference as a result of prior computer training in the groups. Similarly, there was no statistically significant main effect of gender pre-service art teachers in ICT skills mean scores. These findings have far reaching implication for the design and implementation of curriculum and underscore the need for ICT integration in pre-service teacher preparation programs.

Keywords: improving, student art teacher, ICT skills, ICT Integrated Teaching Model

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1. Introduction

The philosophy upon which Nigeria hinges her education practices is premised on the belief that education is an instrument for national development and social change. Nigeria strongly believes that education maximizes the creative potentials and skills of the individual for self-fulfillment and general development of society (FRN, 2013). Education at all levels of the education system is therefore geared towards inculcating in the learner value of the acquisition of functional skills and competencies necessary for self-reliance among others. In order to achieve the aforementioned, instructional activities shall be practical, activity based, experiential and above all information and communication technology (ICT) supported (FRN, 2013).

ICT can be best described as a broad subject concerned with digital technological tools and resources used to, create, store, manage, process and communicate information (Tinio, 2003). Its proliferation has come with tremendous changes in the way human daily activities are carried out. These changes can be felt in all spheres of human endeavor like commerce, banking, health, entertainment and education. Present day teachers are required to acquire the skills that will assist them to make full use of the ICT as a teaching resource to enhance student learning and to prepare them to master high technology society, in which lifestyles, attitudes, and skills are challenged daily (Ministerial Advisory Council on the Quality of Teaching, 2000). The learners on their own part are expected to utilize ICT as a learning tool to continue as lifelong learners. The importance of integrating ICT into teaching and learning became manifest during Covid-19 (Kumari & Naaz, 2021). The knowledge, confidence and skills to use ICT in teaching is expected to be gained in teacher training programs hence there is need to increase the opportunity of pre-service teachers to use ICT (Chu, 2003; Lim, Chai, & Churchill, 2011; Zammit, 1992).

Education is the key vehicle for human capital development in any nation and as such needs to heed to the constant changes in the world of work. In line with the rapid development and usage of ICT in the workplace, it is important that the current generation of pre-service teachers need to be well-prepared with ICT knowledge and skills for them to face the tasks of effectively producing students who are capable of fitting in the world-of-work in the future which is largely ICT driven. Abolade and Yusuf (2005) conceived ICT as essential tools in any educational system. The integration of ICT in teaching and learning relies very much on the teachers' initiatives. The main goal of ICT integration in the school curriculum is to assist students in developing their ability to use, manage and understand ICT. To achieve this however, the teachers themselves have to be well prepared and competent in the use of ICT. For the Federal Republic of Nigeria (2013) states it categorically that no system of education rises above the quality of its teachers.

Integrating ICT into the teaching and learning process starts with a policy statement but does not end there. There must be deliberate effort to convert the policy statement into action plans to be followed to achieve the much desired result. This has not been easy hence Pittman and Gaines cited in Suarez-Rodriguez et al. (2018) maintained that the process of integrating ICT into curriculum is still a challenge despite the plethora of ICT resources in our environment. The challenge of the pedagogical approaches to integrate technology in teaching and the requisite ICT skills required by the teachers and the learners to make a success of it must be faced and surmounted.

2. Literature Review

In most related literature, scholars have persistently identified the teacher as the key to the successful integration of ICT into teaching and learning (Abel, et al. 2022; Asianoa, et al. 2022: Carlson & Gadio, 2002; Elsaadani, 2013; Wong et al., 2012) hence the teacher should be adequately prepared in training to use same in

actual practice. Availability of ICT in the learning environment will not guarantee that teachers use it, unless they have the skills and knowledge necessary to infuse it into the curriculum (Gorder, 2018; Hong et al., 2021; Baylor & Ritchie, 2002). The inability of teacher educators to use ICT in teacher preparation programs has been identified as one of the major challenges to ICT integration in teacher education (Ajayi, 2008; Akuegwu, et al., 2011). Scholars have argued that no matter the amount of time and number of ICT trainings given to pre-service teachers, they will not effectively use ICT unless they observed how their instructors made use of them in teaching them (Chu, 2003; Goodison, 2002; Pope et al., 2008; Zammit, 1992). Therefore, for the objectives of the national education policy to be achievable, efforts should not be spared on developing and enhancing the ICT skills of the teachers in the system.

Fine and Applied Arts is a vocational subject at the secondary school level and housed in the school of vocational and technical education in Nigerian colleges of education. Scholars have opined that ICT integration in technical and vocational classrooms would involve using instructional software during the course, making presentations, carrying out the tasks in laboratories or workshops or application services (Kuskaya & Kocak, 2010; Crittenden, 2009). Regrettably the teaching of Fine and Applied Arts in the Colleges lack visible integration of ICT leading to the production of teachers with very limited ICT skills needed for teaching in the 21st century classroom which is supposed to be ICT driven if global competitiveness is to be achieved. The efforts of government in recent times to restructure the curriculum of the colleges of education to produce skilled teachers (Akande & Olorundare, 2011) may not achieve desired results if adequate measures are not taken to improve the level of technology integration in teacher education.

Research evidence points to the fact that teacher educators modelling of ICT use is particularly an effective approach for pre-service teachers' ICT integration training (Divaharan & Koh, 2010; Hare, et al. 2002; Brush, et al. 2003). Similarly, Handler (1993) found that pre-service teachers frequently observing the use of computers in their methods course felt better-prepared to use ICT as teaching tools. When teacher educators' modelling is followed by opportunities for pre-service teachers to practice and apply ICT tools in the design of lessons, it increased their self-reported confidence level for utilizing ICT in the classroom (Pope et al., 2002). In all these studies mentioned above, none made an attempt to measure the pre-service teachers' ICT skills acquisition quantitatively but employed a qualitative approach. This study was an attempt to use ICT as a teaching and learning tool outside the methods course of the pre-service teachers. Application of ICT in teaching all courses to the pre-service teacher gives him more opportunities to observe modelling the use of ICT in different situations and as such makes for better skill acquisition.

Gender has been a recurring factor in most research that investigate ICT acceptance, skills and competencies. It has played an important role in classifying a population. For some time now, research reports have shown males to use more ICT than females and as such developed more skills than their female counterparts (Volman & van Eck 2001; Losh 2004). For example, Danner and Pessu (2013) conducted a study among university teacher candidates and came out with the conclusion that there was no significant difference in perceived computer skills by gender. In a related study, Teck and Lai (2011) also found no significant difference by gender in most ICT competencies among pre-university students in Malaysia. However, they reported differences by gender in favour of the males in one ICT skill. In a related study of teachers' technology acceptance, results indicated that male teachers scored higher than female teachers in the perceived ease of ICT use (Teo, 2014). In another study carried out in University of Ibadan Nigeria, Ogunsola and Adesakin (2020) reported that males are more developed in ICT skills than females. In a review of 36 studies on gender and computer use. In the same manner, Kay (2006) concluded that the males have significantly higher perceived computer mastery than females. From the reports above it seems certain that the gender issue in ICT is yet to be put to rest hence its inclusion as a variable investigated in this study.

On the other hand, initial formal computer training is expected to play a significant role in developing ICT skills of learners. It is expected that students with prior computer training will generally perceive themselves as more skilful in the use of ICT than those without prior formal training. In the study conducted by Danner and

Pessu (2013) it was reported that there was significant difference in the perceived ICT competency among students. Those with formal computer training perceived themselves to be most competent in ICT skills. In a related study carried out by Mahmud and Ismail (2010) it was reported that formal computer training contributed significantly to in-service teachers' ICT literacy.

2.1 Theoretical Underpinning

This study is underpinned by three learning theories as no one learning theory can explain learning in all situations (Shuell, n.d.). The learning theories are Bandura's social cognitive learning theory (1986); experiential learning theory (Kolb, 1984); social cultural theory (Vygotsky, 1962). Social cognitive theory explains that observation of behaviour modelled by an individual is one of the most powerful ways through which students learn (Schunk, 2008). By observing and imitating the teacher educators use ICT in teaching and ICT expert use of computer graphics software in design, they should be able to master and improve their skills in the use of ICT both as teaching and learning tool.

Lev Vygotsky's social-cultural theory recognizes individual differences with the belief that different learners can under the same situation construct diverse knowledge. Adults (experts) and children (novices) perceive the world differently. The difference between them is the Zone of Proximal Development (ZPD). Social constructivists stress on the need for intentional mediation and interaction within meaningful physical, social and cultural contexts in the learning environment. Learning and development take place as individuals operate within their zone of proximal development (ZPD). The ZPD which is a hypothetical place lies just beyond what an individual can achieve independently but can be approximated with assistance (Moll, 1990). To this school of thought, educators can provide meaningful instruction by finding out where each learner was in his/her development and building on the learner's experience.

The experiential learning theory introduced in 1984 by David Kolb expounded on earlier theories of learning and development postulated by educational theorists such as John Dewey, Kurt Lewin, Carl Jung, Carl Rogers etc. (Shreeve, 2008). Experiential learning is seen as a process that enables the creation of knowledge through the transformation of experience (Kolb, 1984; Kolb et al., 2000). This theory perceives learning as a process rather than a focus on outcome with emphasis on experience as the learning method thereby enabling the learner to achieve from assimilating the experience (Shreeve, 2008). The theory presents a cycle of four components which can be regarded as learning styles or modes engaged by learners to get and afterwards transform experience into knowledge (Kolb et al, 2000, Kolb, 1984). They include:

➢ Concrete Experience (Encounter with a new experience or a reinterpretation of earlier experience)

➢ Reflective Observation (Performed on the new experience)

➢ Abstract Conceptualization (Reflection produces a new idea or rather a reform of an existing mental conception)

➢ Active Experimentation (Planning and trying out the efficacy of what has been learned)

These four components are arranged in a cycle, a continuum that can begin with any one of the four components (Kolb & Fry, 1975). The experience gained from a concluded cycle forms a concrete experience for yet another cycle of learning process. Effective learning only takes place when a learner is able to accomplish all four stages of the model. This implies that no one stage of the cycle is an effective learning procedure on its own. The teaching model was designed based on these three learning theories discussed above.

The purpose of this study therefore was to integrate ICT in the art teacher preparation programme using IITM developed by Onwuagboke, Singh and Fook (2015). The IITM is a 5-phase teaching model designed to integrate ICT in studio teaching in the Fine and Applied Arts. The phases include: inspire; demonstrate; explore; implement and critique. During each phase of the instructional process, ICT is employed as instructional tool as

well as a learning tool to be used by both teachers and the learners. In a design studio setting, the 5 phases must be gone through by a learner for a worthwhile learning to take place. It is at the end of fifth phase can the student have a tangible product to show for the learning experience he or she has passed through. This instructional model is believed to be able to expose them to the design and use of ICT in instruction as well as enhance their skills in the use of ICT as instructional tools.

The teaching model was integrated in instruction so as to ascertain its impact in enhancing the ICT skills of the pre-service art teachers; compare the effectiveness of the three levels of the model in enhancing pre-service teachers' ICT skills and find out if prior formal computer training and gender influences the acquisition of ICT skills. We therefore hypothesize that:

➢ There is a statistically significant difference between the pre-test and post-test ICT skills means scores of the pre-service teachers who participated in the experiment

➢ There are significant differences in ICT skills means scores between the three interventions groups.

➢ There is significant difference in ICT skills means scores according to gender.

➢ There is significant difference in ICT skills means scores between pre-service art teachers who had prior formal computer training and those who had not.

3. Research Methodology

The study employed a quantitative research approach to answer the research questions and test the research hypotheses. The study was a quasi-experimental study conducted using a non-equivalent comparison-groups pre-test post-test design. A sample of 81 pre-service art teachers at 200 level of study from three intact classes was purposively drawn from Fine and Applied Arts departments in the colleges of education in Nigeria. Fine and Applied Arts classes are usually sparsely populated in most institutions in Nigeria (Bada & Fadare, 2002; Okonofua & Ekpo, 2012) hence departments with 25 students' enrolment and above with computer laboratories linked to the Internet were considered for participation in the study. Participation in the study was voluntary; however, no student in the selected schools opted out as a result of the enthusiasm to work with computers in a classroom situation.

The instrument used in the study was a researcher developed instrument tagged Art teachers ICT skills questionnaire (TISQ). The researcher developed the instrument following literature and based on the ICT skills needed for teaching with the IITM. The instrument is a 25-item Likert scale questionnaire which requires the pre-service students to self-rate their ICT skills. The instrument requires the participants to rate their level of possession of the listed skills using (1 = unskillful, 2 = less skillful, 3 = moderately skillful, 4 = skillful, and 5 = very skillful). The validity of the instrument was established using a panel of experts in educational technology and computer graphic design. Trial testing the instrument yielded an overall reliability coefficient of .87 Cronbach's alpha indicating that instrument is reliable.

The sample was pre-tested using the research instrument and later exposed to three different levels of instructional intervention using the ICT integrated studio teaching model (IITM) developed by Onwuagboke et al. (2015). Research group one was given an intervention that involves the use of ICT, ICT Experts as resource persons to model the use of ICTs as well as scaffold the pre-service teachers towards achieving set learning objectives by the instructor and peers. The learning was designed to also design to enable the pre-service teachers to learn using authentic learning experiences. Research group two were treated to another level of the intervention which had all the features of intervention one but for the absence of ICT Experts to act as a model. The third research group received an intervention that was devoid of modelling and scaffolding by instructor and peers but strictly using ICTs and experiential learning.

Data collected was keyed into IBM statistical package for social sciences (SPSS) version 22 for data

analysis. Normality of data was tested by using histogram, box-plot, normal Q-Q plot, detrended Q-Q plot and the Kolmogorov-Smirnov and Shapiro-Wilk normality test. The results showed that the data was normally distributed. Therefore, parametric tests were used in this research. Descriptive statistics was used to answer the research questions. Inferential statistics (T-test, Analysis of variances and Analyses of covariance) were used to test the research hypotheses at 0.05 levels of significance. In the same vein all the assumptions of ANOVA and ANCOVA tests (homogeneity of regression slopes; homogeneity of variances) were tested and results showed that none of the assumptions was violated.

4. Results

Findings from the study have revealed that there was an increment in the ICT skills means scores of the pre-service art teachers who participated in the study.

Table 1

Pre-test and Post-test ICT skills mean scores of the Pre-service Art Teachers

		Mean	N	SD
Pair 1	Pre-test	38.30	81	3.62
	Post-test	65.46	81	6.94

Their pre-intervention means score (M = 38.3, SD =3.62) was less than their post-intervention means scores (M = 65.46, SD = 6.94) on ICT skills as shown in table 1. A paired samples t-test was conducted to determine if the increase in ICT skills means score was statistically significant.

Table 2

Paired samples t-test of mean differences between pre-test and post-test means scores on ICT

		Mean	SD	T	df	P
Pair 1	Pre-test–Post-test	-27.16	7.88	-31.01	80	.000

Table 2 shows that the result of the paired samples t-test of significance of mean differences between post-intervention (M = 65.46, SD = 6.94) pre-intervention (M = 38.3, SD =3.62) was statistically significant; t (80) = -31.01, $p = < .000$ (two- tailed). The mean increase in the ICT skills scores of the pre-service art teachers who participated in the experiment was 27.16. The eta squared statistic was computed to yield (0.43) which indicates a large effect size following Cohen, (1988) criterion. We therefore fail to reject the alternative hypothesis and conclude that the teaching model was effective in enhancing ICT skills means scores of the participants in the study.

On whether there is difference in ICT scores of the participants in the three intervention groups, the result is presented in table 3.

Table 3

Mean scores of the 3 intervention groups on ICT skills

Intervention Group	N	Mean	SD
Blended Model 1	28	67.68	4.05
Blended Model 2	27	61.56	3.15
Blended Model 3	26	59.77	2.69
Total	81	63.10	4.77

Result presented in table 3 shows that there were differences in ICT skills scores of the pre-service art teachers in the three intervention groups. Blended model group 1 had a mean score of (M = 67.68, SD = 4.06); Blended model group 2 (M = 61.56, SD = 3.15) while Blended model group 3 (M = 59.77, SD = 2.69). The result displayed in the table however does not let us know if the observed difference in ICT skills scores was statistically significant. Sequel to the above, a two-way ANOVA test was therefore conducted to find out if there was a statistically significant difference in the ICT skills scores of the pre-service art teachers in the three

intervention groups.

Table 4

Two-way ANOVA Tests of Between-Subjects Effects on post-test ICT skills scores

Source	Df	F	p (Sig.)
Group	2	38.844	.000
Computer Training	1	.038	.847
Group * Computer Training	2	.386	.681

The result of the ANOVA test displayed in table 4 shows that significant differences exist at the $p < .05$ level between the three intervention groups of pre-service teachers in ICT skills scores: F (2, 78) = 38.84, p =.000. We therefore fail to reject the alternative hypothesis based on the above result. Since there was significant difference between the three intervention groups on the dependent variable, a post-hoc analysis was conducted to determine where the difference lies.

Table 5

Post-hoc comparisons test for post- intervention ICT skill scores

(I) Teaching Model	(J) Teaching Model	Mean Difference (I-J)	p (Sig.)
Blended Model 1	Blended Model 2	6.12*	.000
	Blended Model 3	7.90*	.000
Blended Model 2	Blended Model 3	1.78	.137

Post-hoc comparison using Tukey HSD test indicated that the mean scores of blended group 1 (M = 67.68, SD = 4.06) is significantly different from the mean score of Blended model group 2 (M = 61.56, SD = 3.15) (mean difference = 6.12) and also significantly different from Blended model group 3 (M = 59.77, SD = 2.69) (mean difference =7.91). Blended model group 2 and Blended model group 3 do not significantly differ as displayed in table 5.

On difference in ICT scores of pre-service teachers with prior ICT training and those without, the findings are as presented in table 6.

Table 6

Mean ICT Skills Scores of group with and group without prior computer training

Computer Training	Mean	N	Std. Deviation
No Formal Computer Training	62.76	34	5.22
Formal Computer Training	63.34	47	4.46
Total	63.10	81	4.77

The mean scores on ICT skills of the group of pre-service art teachers with prior computer training and the group without prior computer training are as displayed in table 6. The group with prior computer training (M = 63.34, SD = 4.46) while the group without prior computer training (M = 62.77, SD = 5.22) is an indication that differences exist between the two groups. To determine if the main effect of computer training was significant statistically, the row of computer training (CT) on Table 5was inspected. The table also shows that there was no statistically significant main effect of formal computer training at the p < .05 level: F (1, 79) = .04, p =.847. The researchers fail to reject the null hypothesis of no significant main effect for formal computer training.

Similarly, to determine if there was a difference between male and female pre-service art teachers in ICT Skills scores, the means scores of the two groups were tabulated as shown in table 7. Data presented in table 7 shows that male pre-service art teachers had a mean score (M = 63.33, SD = 4.48) while female pre-service art teachers had a mean score (M = 62.94, SD = 5.01). This shows that there was a difference between male and female art teachers in ICT skills scores. In order to determine if the observed difference was significant statistically, a two-way ANCOVA test was conducted.

Table 7

Mean and Standard Deviation of post-test ICT skills scores by gender

Gender	Mean	N	SD
Male	63.3333	33	4.48
Female	62.9375	48	5.01
Total	63.0988	81	4.77

Table 8

Two-way ANCOVA Tests of Between-Subjects Effects on post-test ICT skills scores

Source	df	F	P
OICTS	1	.107	.744
Group	2	36.336	.000
Gender	1	.733	.395
Group * Gender	2	.038	.963

Table 8 shows that there was no significant interaction effect between gender and the teaching models. there was also no statistically significant main effect for gender at the *p* < .05 level after controlling for their ICT skills pre-test scores: F (1, 79) = .733, *p* = .395. The null hypothesis of no significant main effect was thus retained. This implies that both male and female pre-service art teachers who participated in the study in the three intervention groups equally benefited from the teaching with the teaching model by having their ICT skills scores enhanced.

5. Discussion

Results of the data analysis have revealed that the IISTM was effective in improving the ICT skills scores of the pre-service art teacher who took part in the study. The development of and enhancement of the ICT skills in pre-service teachers can be ensured in the teacher education industry if the use of ICT is integrated in the teaching of all courses at the teacher education institutions. This finding in tandem with Handler's (1993) discovery that pre-service teachers frequently observing the use of computers in their methods course felt better-prepared to use ICT as teaching tools. It has also provided quantitative evidence to support Handler's finding as well as stress the need for ICT use in teaching all courses so as to make it more practicable for the pre-service teachers to use.

The observed differences that exist between the three intervention groups in favor of the group that emphasized teacher educators modelling of ICT use is particularly an effective approach for pre-service teachers' ICT integration training. This is supported by (Divaharan & Koh, 2010; Hare et al., 2002; Brush et al. 2003) who recommend it as an effective method for ICT integration in pre-service teachers' training. The IITM provided opportunities for pre-service art teachers to follow expert/teacher educators' modelling of ICT use by practicing and applying ICT tools in the design of posters and other graphic designs. This is similar to the finding that when teacher educators' modelling is followed by opportunities for pre-service teachers to practice and apply ICT tools in the design of lessons, it increased their self-reported confidence level for utilizing ICT in the classroom (Pope et al., 2002). This finding further supports Bandura's social cognitive theory which explains that observation of behavior modelled by individuals is one of the most powerful techniques through which students learn (Schunk, 2008). By observing and imitating the teacher educators use ICT in teaching and design, they were able to improve their skills in the use of ICT.

Gender was found to have no significant main effect on the ICT skills scores of the pre-service art teachers who took part in the study. This finding is at variance with that of (Volman & van Eck 2001; Losh 2004; Kay 2006) who found that males developed more ICT skills than females. However, this result is in tandem with Danner and Pessu (2013) that report no significant difference in ICT skills of teacher candidates according to gender. It is also similar to the findings of Teo (2014) that reported no significant difference by gender in almost all the ICT skills constructs under study. Though significant differences as a result of gender was observed in the

pre-test scores in favor of males, however it was absent in the post-test scores. This means that males and females do not differ in terms of their ICT skills scores as a result of instruction using the IISTM. This makes it imperative to use the teaching model if it is desirable to close the gender gap in ICT skills.

Prior formal computer training was found to have no significant main effect on the ICT skills scores of the pre-service art teachers who participated in the study. This result is at variance with Danner and Pessu (2013) who reported that pre-service teachers with formal computer training perceived themselves to be most competent in ICT skills. It is however at variance with Mahmud and Ismail (2010) that reported that formal computer training contributed significantly to in-service teachers' ICT literacy. The implication of this finding is that if ICT is seamlessly integrated into curriculum not just teaching about ICT but giving the learner the opportunity to use ICT in learning as well as learning through it, the initial difference in ICT skills if any among the learners will be narrowed down to a point of not being significant.

5.1 Implication for Teaching and Learning

The study was carried out to ascertain how ICT skills of pre-service art teachers can be enhanced by teaching them with the IITM. The result of the study has revealed some facts that have far reaching implications for teaching and learning of Fine Art in colleges of education. Some of these implications include the following:

Firstly, the use of the IITM has been found to improve the ICT skills of the pre-service teachers who participated in graphic design activities. This implies that the model is a worthwhile teaching approach that has the capability of allowing the pre-service teacher to continually use ICT in the teaching and learning process as it allows them to learn cooperatively and collaboratively in developing their design potentials and ICT skills.

Secondly, the IITM is now another innovative teaching strategy available to art teachers for effective integration of ICT in their daily teaching job in order to be relevant in the 21st century classroom where teaching and learning is ICT driven. More so, the model improved the ICT skills of all irrespective of gender and initial computer training.

6. Conclusion

Based on the findings, the following conclusions were reached by the researchers. The teaching model was effective in improving the ICT skills of pre-service art teachers who participated in the study. Prior computer training was also found to have no significant impact on the ICT skills mean scores of the participants. In the same vein, gender was also found to have no significant effect on their ICT skills means scores.

ICT skills are required for teachers to function effectively in the 21st century classroom which is getting digitalized by the day if global competitiveness is to be maintained. It behaves on the teacher education institutions to impart these skills on the pre-service teachers. For effective fulfillment of this duty, the teacher education institutions should as a matter of necessity endeavor to integrate ICT not only in the methods course for the pre-service teachers to learn how the ICTs can be used but also in all courses taught to them so that they learn and improve their ICT skills through observation, imitation and continuous practice. The study employed IISTM to determine its effect in the enhancement of the ICT skills of pre-service art teachers. For higher effectiveness in enhancing pre-service art teachers' ICT skills, there is a need for effective modelling of the use of ICT in teaching the pre-service teachers by teacher educators. In situations where the teacher educator lacks the skills needed for a particular learning encounter, experts in that area of specialization can be brought in as resource persons from time to time for students to acquire the required skills first hand. The IISTM was equally effective in the enhancement of ICT skills of pre-service art teachers irrespective of gender.

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