

Burkina Faso Secondary School Pre-Service Teachers Technology Skills

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ABSTRACT

The purpose of this research was to evaluate the level of Burkina Faso secondary pre-service teachers' technology skills. To reach the aim of the research quantitative research method has been used. Data was collected from 534 pre-service teachers of different departments with 429 male and 105 female from Burkina Faso secondary school teachers education in two institutes, the High Education School of Norbert Zongo University and Institute of Sciences of Ouaga II University on October 2017. Data were transferred to SPSS 22 for statistical descriptives test; t-test and ANOVA tests were applied. According to the results, Burkina Faso secondary pre-service teachers technology skills were so moderate in general and more particularly in basic computer operation (create, save copy and delete files etc...) in use of productivity software (MS Word, Excel, Power Point) and electronic communication (use of e-mail). But their level were low on multimedia (technique of integrating on same medium data of different natures as sound, text video and images...) and electronic references. Comparative analyzes in relation to some variables results indicted a significant difference between the gender; male were competent than female. Meaningful difference has been found between the pre-service teachers' education level. The results showed that pre-service teachers with personal computers were more competent than those without computer. According to the fields of study the result showed significant differences. Technical department pre-service teachers were more competent compare to science, literature and sport department.

Keywords: pre-service teachers, technology skills, technology in education

INTRODUCTION

The rapid development of technology nowadays makes us living in age calling digital age, this age where technology is center of humans' activities has impact on all different sectors of our life. The sector of education didn't stay on the sidelines. Therefore, the integration of technology in education has attracted many researchers around the world in early 1980's. Research demonstrates the importance of technology in education. The integration of technology in education provides opportunities to improve education level and quality (Livingstone, 2010). Information and communication technology (ICT) provides opportunities for educators to use technology in teaching and learning (Usluel et al., 2007; Herzog, 2004). It facilitates the teaching process to teachers as well as the learning process to students. A study conducted by BECTA found that educators and learners emphasized the positive impact of ICT application on students' access to knowledge (Becta, 2004).

Many studies have been done to investigate on various topics related to ICT in education. Most of those researches about technology integration in education show that teachers play a crucial role in the integration of technology in education and training processes.

However, lot of researches have shown the positive impact of technology on education by facilitating teaching to teachers. The success of integrating technology in education is base on many factors link to teachers. Many factors can affect the effective use of technology in education. One of the factors is teacher's technology skill towards the use of technology in teaching and learning processes. The importance of technology skills and attitudes has been explained in studies related to the topic (Webb and Cox, 2004; Keengwe and Onchwari, 2008; Hew and Brush, 2007). Technology skill plays an import role. The success of ICT integration in the learning and teaching process mostly depends on the qualifications of teachers (Tezci, 2010). Researchers have suggested that technology skills should be integrated throughout the teacher education curriculum in order to provide pre-service teachers with the skills and experiences needed to apply technology to their specific content areas (Jo et al., 2012).

International organizations such as UNSECO (United Nations Educational Scientific and Cultural Organization) and ISTE (International Society for Technology in Education) have been working to develop tools to measure teachers' technology skill towards the use on education field. Laura developed 20 technology skills that every educator should have to be good at with ICT literacy skills (Turner, 2005).

Technology in Burkina Faso Teacher Education

There is technology course in Burkina Faso teacher education curriculum. The technology course name Education Technology in curriculum has been taught as computer lecture. The content is based on basic computer course like hardware, software, operating system and MS office products and basic internet use knowledge. The course is seen to be so limited with 50 hours. The implementation of technology in education is facing some problems like the lack of infrastructure. Technology course has been given in computer lab with large number of student and few computers. To perform computer courses better and more efficiently students are divided into small groups to attend computer course. The minister of education with direction of teachers' education institutes has been working to improve the content of technology course in the pre-service teachers' education curriculum.

STATEMENT OF THE PROBLEM

Today, technology has been using in all sectors in our society. The field of education didn't stay away of this reality. The use of technology in developed countries is so advanced then the less developed countries like Sub-Saharan African countries. There, the use of technology is low. However, those countries try to use technology in education but the level is still limited, especially in teachers' training institutions. In Burkina Faso people are aware of the impact of technology all sectors of life and also the added value that technology can bring as opportunity be add value for the development of education. So what's about pre-teachers technology knowledge and skills?

Research Questions

What are the Secondary school pre-service teachers' technology skills levels of Burkina Faso?

- ✓ Is there any difference between gender?
- ✓ Is there any difference between education level?
- ✓ Is there any difference according to field of study?
- ✓ Is there any difference on the situation to have personal computer or not?

Aim and Objectives of the Study

The aim of this study is to determine Burkina Faso secondary school pre-service teachers' technology skills. The results of the study can be useful for policy to get real information that can help them to take beneficial decision to improve the content of ICT course on pre-service teachers' education curriculum.

METHODOLOGY

To achieve the objectives of this study survey method of quantitative research has been used. Survey research method are procedures in quantitative research in which investigators administer a survey to a sample in order to describe the attitudes, opinions, behaviors or characteristics of the population.

Data Collection Method and Population

The target population for the study was Burkina Faso Secondary School Pre-Service Teachers. The study was conducted in Burkina secondary teacher education public institute. A simple random sampling technique was used

Table 1. Technology Skills Level

Interval	Level
3.00-4.00	High
2.00 -2.99	Medium (moderate)
1.00-1.99	Low

Table 2. Demographic information

Variable	Category	Frequency	Percent
Gender	Male	429	80.3
	Female	105	19.7
	Total	534	100
Education level	Associate degree	263	49.3
	Bachelor degree	271	50.7
	Total	534	100
Field of Study	Science	280	52.4
	Literature	127	23.8
	Technic	67	12.5
	Sports	60	11.2
	Total	534	100
Computer possession	Yes	347	65.0
	No	187	35.0
	Total	534	100

to administer the survey. Data was collected from 534 pre-service teachers of High School of Education (ENS; “Ecole Normale Supérieur”) of Norbert Zongo University and Institute Of Sciences (IDS; “Institut Des Sciences”) of Ouaga II University during 2 weeks on October 2017.

Data Collection Tools

According to the objective of the study, an appropriate data collection tool has been chosen after literature review. So pre-service teachers' technology skill, technology beliefs and technology barriers scales developed by Brush was chosen. This scale is usable as measuring instrument both for pre-service and in service teachers (Brush et al., 2008). Technology skill scale was divided on 6 sub-factors basic computer operation (create, save copy and delete files etc...); productivity software (MS word, Excel, Power Point); electronic communication (use of e-mail), electronic references (cd, usb) , world wide web and multimedia with a total of 32 items on 4 type such as (1) i can't do this, (2) i can do this with some assistance, (3) i can do this independently and (4) i can teach others how to do this. In additional to the scale personal information was included as gender, education level, field of study and computer possession.

Data Analysis

The analysis was done by using SPSS 22 after checking up the cronbach Alpha coefficient test validity and reliability for descriptive statistics. The cronbach alpha coefficient find as 0.95 were higher than 0.75 request for social sciences study validity and reliability. So t-test (Independant Sample test) and ANOVA one way analysis of variance ANOVA with post-hoc (Tukey HSD) test was applied according to research question with $p<.05$ for significance sufficient in relationship difference analysis .

To determine the level of pre-services teachers technology skills, the range of evaluation on arithmetic average of the scores was determined as $(4-1)/4=0.75$ (Kan, 2009) and resume on **Table 1**.

According to **Table 1** average lower than 2 are defined as low level, moderate level between 2 and 3 then averages more than 3 was determined as high level.

RESULTS

In this section, research questions and statistical description results were reported and been analyzed. Demographic information of the participant was made up with variable as gender, education level, field of study and personal computer possession case. Demographic information of the participants is given on **Table 2**.

As shown in the statistical information in **Table 2**, 429 (80.3%) of the participants were male and 105 (19.7%) were female. According to education level 263 (49.30%) associate degree and 271 (50.70%) were in bachelor degree. Field of study science department (mathematics, physics, chemistry, biology) 280 (52.4%), literature (English, French, philosophy, history, geography) 127 (23.8%), technical (Electricity), 67 (12.5%) and sports (Sport and Physical Education) showed 60 (11.2%).The status of those who have a computer were 347 (65%) and 187 (35%) do not own computers.

Table 3. Descriptive Statistics of Pre-service Teachers' Technology Skills

	X	Ss	n:534
Basic Operation	2.23	.66	
Productivity Software	2.21	.72	
Electronic Communication	2.08	.86	
Electronic References	1.81	.76	
World Wide Web)	2.19	.58	
Multimedia	1.93	.63	
	2.11	.55	

Table 4. Results of Techonology Skills According to Gender

	Gender	n	x	Ss	Sd	t	P
Basic Operation	Male	429	2.28	.67079	532	5.37	.000*
	Female	105	2.03	.58734			
Productivity Software	Male	429	2.26	.73280	532	5.65	.000*
	Female	105	2.00	.65116			
Communication	Male	429	2.11	.87788	32	6.82	.000*
	Female	105	1.95	.79806			
Electronic References	Male	429	1.83	.78339	532	4.47	.000*
	Female	105	1.73	.70743			
World Wide Web	Male	429	2.23	.57331	532	2.22	.026*
	Female	105	2.02	.62148			
Multimedia	Male	429	1.96	.62650	532	2.25	.025*
	Female	105	1.80	.65619			
Technology Skills	Male	429	2.15	.56685	532	2.25	.000*
	Female	105	1.94	.54527			

P<.05***Table 5.** Results of Techonology Skills According to Education Level

	Education level	n	x	Ss	Sd	t	P
Basic Operation	Associate degree	263	2.05	.56738	532	6.1	.000*
	Bachelor degree	271	2.39	.70480			
Productivity Software	Associate degree	263	2.06	.61910	532	4.82	.000*
	Bachelor degree	271	2.35	.78717			
Communication	Associate degree	263	1.82	.73202	532	7.16	.000*
	Bachelor degree	271	2.33	.90880			
Electronic References	Associate degree	263	1.65	.69769	532	9.12	.297
	Bachelor degree	271	1.97	.80351			
World Wide Web	Associate degree	263	2.10	.54459	532	3.25	.020*
	Bachelor degree	271	2.27	.61821			
Multimedia	Associate degree	263	1.86	.57503	532	2.51	.003*
	Bachelor degree	271	2.00	.68268			
Technology Skills	Associate degree	263	1.98	.46977	532	5.47	.000*
	Bachelor degree	271	2.24	.62362			

P<.05*

Following the research question the result of the main research question is given on **Table 3**.

When statistical information on **Table 3** are examined technology skill general average ($x=2.11$) show that Burkina Faso secondary school pre-service teachers feel moderately competent. When we look on details it seems that on basic operation ($x=2.23$), productivity software ($x=2.21$) and World Wide Web ($x=2.19$) and electronic communication ($x=2.08$) sub-factors the pre-service teachers level were moderated but on multimedia ($x=1.93$) and electronic references ($x=1.81$) technology sub-factors indicated that pre-service teachers level were low. These results show that Burkina Faso secondary school pre-service teachers need to improve their skills in technology.

Regarding to reach question if there is a different on gender variable t-test was applied and the descriptive statistics results is given on **Table 4**.

As the t-test results in **Table 4** are examined, the technology skills and details with sub-factors show a significant difference according to the gender variable [$t(532) = 2.25, p <.05$]. The technological skills values of male ($x = 2.15$) were found to be statistically high than female ($x = 1.94$). Male pre-service teachers were more confident with technology than female. This situation can be explained by social and cultural reasons in Africa. In Sub-Saharan African countries men are so closer to technology than women.

Result related to education level is given on **Table 5**.

Table 6. Results of Technology Skills According to Field of Education

Field of Education	n	x	Ss			
A- Science	280	2.05	.47792			
B- Literature	127	2.02	.56130			
C- Technic	67	2.74	.56805			
D- Sports	60	1.74	.52945			
Total	534	2.11	.56805			
Variance source	Sum of squares	Sd	Means of squares	F	P	Means
Inter group	30.732	3	10.244	38.346	.000*	A-C
Within group	141.257	530	.267			C-B
Total	171.990	533				C-D

P<.05*

Table 7. Results of Techonology Skills Regarding Computer Possession

	Computer	n	x	Ss	Sd	t	P
Basic Operation	Yes	347	2.46	.62892	532	12.91	.000*
	No	187	1.79	.46945			
Productivity Software	Yes	347	2.43	.70863	532	10.56	.000*
	No	187	1.80	.55490			
Communication	Yes	347	2.28	.87770	532	7.64	.000*
	No	187	1.71	.70431			
Electronic References	Yes	347	1.94	.79712	532	5.27	.021*
	No	187	1.58	.65568			
World Wide Web	Yes	347	2.33	.57572	532	8.12	.135
	No	187	1.92	.51557			
Multimedia	Yes	347	2.09	.63753	532	8.43	.005
	No	187	1.63	.51322			
Technology Skills	Yes	347	2.29	.55303	532	11.49	.000*
	No	187	1.76	.41436			

P<.05*

When results of the t-test on **Table 5** are examined, it is seen that there is a significant difference technology skill in general between the pre-service teacher according to education level [$t_{(532)}=5.47$, $p<.05$], expect on sub-factor electronic references. The technological skills values of bachelor degree ($x = 2.24$) were found to be statistically higher than associate degree ($x = 1.98$). So pre-service teachers with bachelor degree were more confident with technology than associate degree.

Results question related to field of education regarding technology skills ANOVA test is given on **Table 6**.

When **Table 6** is examined, the distribution of pre-service teachers according to the technology skill was found as science ($x=2.05$), literature ($x=2.02$), technic ($x=2.74$) and sports ($x=1.74$). Significant differences [$F (5-.530) = 38.346$, $p <.05$] was found between the pre-service teachers on technology skills regarding of the field of study. It is seen that technic department pre-service teachers were more competent than the sciences, literature and sports. This difference can be explained by the fact that in technic department teachers are not only very close to technology tools but also use them more than the other departments.

Result related to computer possession is given on **Table 7**.

When results of the t-test in **Table 7** are examined, it is seen that there is a significant difference on technology skills in general between the pre-service teachers with computer and those without computer [$t (532) = 11.49$, $p <.05$], expect on World Wide Web and multimedia sub-factors. The technological skills values of pre-service teachers with computer ($x=2.29$) were found to be statistically high than those without computer ($x=1.76$). So pre-service teachers with computer were more confident with technology than those without computer on their possession. This difference is due to the fact that pre-service teachers who have computers use them frequently and developed technology skills through their proximity with computer.

CONCLUSION

At the end of this study the results revealed that Burkina Faso secondary school pre-service teachers technology skills were so moderate in general and more particularly on basic computer operation (create, save copy and delete files...) , in use of productivity software (MS Word, Excel, Power Point) and electronic communication (use of e-mail). However, on World Wide Web and multimedia the result has indicated that the pre-service skills were low. Similarly study done on Sub-Saharan African countries share almost same result. A study made in Nigeria on teacher candidates skills on ICT literacy indicted that teachers ICT literacy were low (Garba, 2014). A study on

ICT qualifications, perceptions and practices of secondary school social science teachers in Ghana, concluded that the teachers' ICT literacy skills and competences were low (Andoh, 2012). In another study, it was reported African francophone countries teachers had low ICT competencies (Tamboura, 2010) . Comparative analyzes on gender education level, field of education, possession of computer showed differences. Male pre-service teachers were more competent than female. Bachelor degree pre-service teachers have advanced on associate degree. Technic department pre-service teachers had high level than other department science, literature and sports. Pre-service teachers with computer on their possession seem to be more confident with technology skills those who don't have personal computer.

RECOMMENDATION

As the results revealed that Burkina Faso secondary school pre-service teachers' technology skills were so moderate. An important recommendation is to ask minister in charge of education and the directorate of education institutes to work to improve the content of technology course in the pre-service teachers' education.

This study was limited to secondary school pre-service teachers; so research can be extended also in service teacher. Future research may include qualitative research method (e.g., interviews, case studies) to examine the teachers technology skills in depth. Similar study can be expanded other factors affecting teachers' use of technology in education like pre-service and in-service teachers' attitudes, belief and barriers regarding technology integration in education. Academicians on field of teacher education institute should develop a special technology skill standard evaluation instruments as UNESCO, ISTE and some country developed their own instrument.

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