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Influence of Trainee Teacher Philosophy about Teaching and Learning on Integration of Computer Technology into Future Teaching Practices

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Abstract The study sought to establish the influence of trainee teacher philosophy about teaching and learning on integration of computer technology into future teaching practices. This was done in the light of the fact that the Kenya government has launched the national laptop project in public primary schools which is expected to run from July, 2016.It is expected that the teachers who are undertaking training in Primary school Teacher Training colleges are key to effective implementation of computer use. The study was carried out in five public Teacher Training Colleges in the Rift Valley Province, Kenya. This study employed a correlational research design. The research population for the study was all teacher trainees in pubic teacher training colleges in Rift Valley. The colleges have a total population of 5,075 student teachers. Using a table of random numbers, the researcher then selected proportional samples from each stratum in every Teacher Training College to ensure that there was uniform representation of the different groups. The total sample from the five TTCs was 357 trainee teachers. The primary data was collected using a questionnaire consisting of two scales. The study established that there was a statistically significant influence of trainee teachers' philosophy about teaching and learning on prospective ICT integration. Trainee teachers who believed that learners construct their own knowledge with the teacher as a guide scored highly on intentions to integrate ICT in the classroom than those who believed that the teacher is the source of knowledge. Trainee teachers who intended to use child-centered teaching practices viewed ICT integration positively. It is therefore important that teacher trainers in TTCs emphasize learner-centered teaching methods in order to promote ICT integration.

Keywords: *trainee teacher, philosophy, integration, computer technology, teaching practices*

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1. Introduction

Philosophy is the psychological state in which an individual holds a proposition or premise to be true. Contemporary analytic philosophers generally use the term "belief" to refer to the attitude we have, roughly, whenever we take something to be the case or regard it as true [1]. In this context teacher philosophy refers to beliefs about teaching and learning.

According to [2] each teacher enters the teaching setting with their personal theories about teaching and learning. Teachers might perceive teaching situations differently and based on their beliefs. They make judgments and decisions on how to act, which strategies to implement, and which materials to use. The decision to use and how to use technology in the classroom depends on the teachers' beliefs about teaching and learning and the role of technology [3].

Information and Communication Technology (ICT) is one of the principal drivers of economic development and social change worldwide. However on its own, technology is an enabler of development. The role of electronic technology in promoting economic growth and development has gained prominence globally [4]. Nations that succeed in harnessing the potential of electronic technology can look forward to a greatly expanded economic growth, dramatically improved human welfare and a stronger democratic government [5].

Education is one of the areas where use of electronic technology provides tangible benefits. Use of technology in and for education is now seen worldwide both as a necessity and an opportunity [6]. It plays a great role in the three fundamental aspects of education policy that is access, quality and cost. ICT increases access to education through distance learning. They provide new and innovative means to bring educational opportunities to a greater number of people of all ages, especially those who have historically been excluded such as the population living in rural areas, women facing social barriers and students with disabilities [6].

One of the goals for integrating ICTs in education is to enhance teaching and learning practices thereby improving

quality of education. ICT use in education encourages learners to move away from learning characterized only by memorization of facts towards a process of knowledge creation [2].

Recognizing that an ICT literate workforce is the foundation on which Kenya can acquire the status of knowledge based economy by 2030; the Government intends to make education the natural platform for equipping the nation with these skills in order to create a dynamic and sustainable economic growth [7]. Laptops will be provided to primary school children to enable them acquire digital skills at a young age which they will use to access information and turn into knowledge. Consequently, the national laptop project was expected to run from January 2014 by which time 50,000 teachers need to have been trained on ICT integration in the classroom, besides device assembly, applications uploading, content development and delivery of devices to schools among others. It was envisaged that the teachers training should be done by end of August 2013 before which there should have been induction workshops for technical teams, master trainers and training of trainers.

The teachers are the implementers of the laptop project, and will actually do the groundwork in terms of equipping students with these very vital IT skills. By directly involving them in these preliminary stages, they have a great opportunity to exercise ownership of the project. In August, 2013, Education Cabinet Secretary, Prof. Jacob Kaimenyi launched a harmonized curriculum guide for ICT integration in education as a preparatory measure towards the implementation of the government's one laptop per child initiative [7]. The curriculum was developed out of a need to equip learners with modern ICT skills which is in line with one of the flagship projects in Kenya vision 2030 [7]. However it is not clearly known what is being done in primary teacher training colleges to prepare pre-service teachers both psychologically and in terms of skills.

According to [18] ICT skills prepare pupils for the workplace where they will be required to collaborate with peers across the world to produce new intellectual work that will add value to society. However, in most developing countries like Kenya, the potential of ICTs to support pedagogy is yet to be fully realized. To date most of the attention both on policy and research has been on how the lack of infrastructure and access to technology affects the use of ICT in pedagogy [9]. However, it has also been shown that even in cases where the infrastructure is available, few educators are effectively integrating ICTs in curriculum delivery [10]. Reporting reasons for slow integration [11] categorized barriers to ICT integration into two: first order (external) and second order barriers (internal). It is clear therefore that there are also non-technical factors that affect the adoption of ICTs for curriculum delivery.

The curriculum guide which will be assimilated into the teacher training programs is meant to enhance teacher competency in ICT as Kenya braces to be one of the first African countries to entrench digital learning in its academic system. While presenting 2013/ 2014 national budget, finance cabinet secretary outlined one priority as "improving the quality of education through leveraging on ICT, starting with primary school level" [4]. At the same time, 53.2 billion Kenya shillings was allocated to deploy laptops to class one pupils, development of digital content, building capacity and rolling out computer laboratories. While this indicates serious commitment by the government, it is important to understand the influence of trainee teacher philosophy on prospective ICT integration in their classes.

Actual influences of teachers' philosophy about teaching and learning on classroom activities with or without ICT integration have also been explored by [12]. When considering the interrelationship between teacher beliefs and ICT integration, there is evidence that, teachers' philosophy about teaching and learning are a significant factor in determining patterns of classroom computer use by in-service teachers and pre-service teachers [13]. They found that teachers with student-centered pedagogical beliefs were successful at integrating computer use. Studies reveal that despite availability of hardware [14], school related support for ICT integration [15] and teacher consciousness about benefits of ICT use [16] a small number of teachers have chosen to use ICT in education while majority have not [17].

Reporting reasons for slow integration [11] categorized barriers to ICT integration into two: first order (external) and second order barriers (internal). Most studies on the impact of these internal barriers on ICT integration have been done outside Kenya [18]. Few such studies have been done in Kenya. Besides, there was need for documented empirical evidence indicating the influence of teacher trainee philosophy on ICT integration in primary schools in Kenya as the Government prepares to roll out the lap top project. This study was aimed at filling this gap. The null hypothesis the researcher intended to test was; the trainee teachers' philosophy about teaching and learning has no influence on intention to integrate ICT into teaching practices. The study provides evidence of the influence of teacher trainee teaching and learning beliefs on ICT integration in primary schools in Kenya. The results may be used by the Kenyan Ministry of Education Science and Technology (MoEST) to improve teacher training.

2. Materials and Methods

2.1. Geographical Location of the Study

This study was carried out in five public TTCs in the Rift Valley Province, Kenya. These were Kericho, Mosoriot, Tambach, Narok and Baringo Teachers Training Colleges. The TTCs are five out of the 21 public and 41 private teacher training colleges in Kenya that have been offering candidates for Kenya National Examination Councils summative evaluation after a two year study [7].

2.2. Research Design

This study used correlational research design to investigate the relationship between the trainee teacher philosophy about teaching and learning and future computer use. Correlational Research is also known as associational research. It is a design whereby relationships among two or more variables are studied without any attempt to influence those variables [19]. The design was used to investigate the possibility of relationships between the two variables. The researcher used this design since

the variables to be investigated already existed [20]. There is no manipulation of variables in Correlational Research. Pearson Product Moment Correlation Coefficient was used to establish the strength of the relationship between teacher philosophy about teaching and learning and integration of ICT.

2.3. The Target Population

This study was done in public Teacher Training Colleges in former Rift Valley Province of Kenya. The research population for the study was all teacher trainees in pubic teacher training colleges in Rift Valley. The colleges have a total population of 5,075 student teachers. Out of the total population 2,458 were female while 2,617 were male. Student teachers were divided into two major categories: those in first year of study and those in the second year of study.

2.4. Sample Size and Sampling Procedure

The study purposely selected all the five public TTCs in Rift Valley province, Kenya. These are Kericho, Mosoriot, Baringo, Narok and Tambach. The choice of the colleges took into account the fact that admission into public teacher colleges in Kenya is done jointly through a computerized system therefore likely to have trainee teachers from all counties in Kenya. To determine sample size in the study Krejie and Morgans' table (1970) of determining sample size was used [21]. Accordingly a sample size for a population of 5000 was 375. To obtain a representative sample from the five TTCs the researcher used stratified simple random sampling. This is a process in which certain sub-groups or strata are selected from the sample in the same proportion as they exist in the population [19].

Using a table of random numbers, the researcher then selected proportional samples from each strata in every TTC to ensure that there was uniform representation of the different groups. From Kericho TTC 25 males and 20 females in first year of study and 24 males and 20 females in the second year of study were selected. The total sample from Kericho was therefore 89 trainee teachers. From Mosoriot TTC, 22 males and 22 females in first year of study and 21 males and 20 females in the second year of study was selected giving a total sample of 85 trainee teachers. From Tambach TTC, 16 males and 20 females in first year of study and 22 males and 10 females in the second year of study was selected giving a total sample of 68 trainee teachers. From Narok TTC, 10 males and 19 females in the first year of study and 18 males and 20 females in the second year of study were selected giving a total of 67 trainee teachers. From Baringo TTC, 13 males and 14 females in the first year of study and 10 males and 11 females in the second year of study were selected giving a total of 48 trainee teachers. The total sample from the four TTCs was 357 trainee teachers.

2.5. Research Instruments

The instrument that was used for data collection was student teachers' questionnaire. The questionnaire was a convenient tool for data collection because of the large number of participants in the study. Questionnaires facilitate easy and quick derivation of information within a short time [22]. Use of questionnaires also ensured that confidentiality was upheld so that participants would have no reason to be dishonest [23]. Student teachers' philosophy about teaching and learning was measured through the 'Teacher philosophy about teaching and learning' scale [24] and used by [25]. The participants were asked to rate their level of agreement with specific statements (from 1– strongly disagree to 5 – strongly agree). Internal consistency was measured using Cronbach's alpha.

Teacher education programs in Kenya require student teachers to be involved in teaching practices for four weeks in the first year and two sessions of four weeks each during their second-year academic career [7]. Since this offers limited opportunities for student teachers to actually experience classroom computer use, and also due to the fact that the computer project is not yet fully in place in most schools, student teachers' reported prospected educational computer use was examined as a dependent variable. The Prospective Computer Use Scale was used that was derived from the 'Computer Use Scale' of [25]. The scale uses a 5 point Likert scale format from strongly disagree 1 to strongly agree - 5. Cronbach's alpha was calculated to determine internal consistency. The scale was studied in detail to ensure their reliability and validity. The selection of the scale as a tool for data collection was guided by the nature of data to be collected and objective of the study. The questionnaire was used since the proposed study was concerned with variables that cannot be directly observed.

2.6. Data Analysis and Presentation

After data collection, the data obtained from student teacher sample was cross-examined to facilitate coding and entry into the computer in preparation for analysis. Data processing exercise commenced with the coding of all the responses obtained to facilitate easy analysis using computer Statistical Programme for Social Sciences (SPSS 12.5) package. A master codebook was designed to ensure that both questionnaires were coded uniformly. The second stage involved tabulating the obtained scores. This assisted the researcher to determine the level of significance of differences of effects of teacher trainee philosophy on dependent variable prospective computer integration in primary school.

3. Research Results

3.1. Influence of Trainee Teacher Philosophy about Teaching and Learning on Integration of Computer Technology

The objective of the study was to establish the influence of trainee teacher philosophy about teaching and learning on integration of computer technology into future teaching practices. This was established using the both descriptive and inferential statistics.

3.2. Descriptive Results of Teaching and Learning Philosophy

The respondents were requested to give their views with respect to teaching and learning philosophy and the

results were as summarized in (Table 1). On whether they will make it a priority in the classroom to give pupils' time to work together while not directing them,(n= 154, 49.5%) of the respondents agreed, (n= 139, 44.7%) disagreed while (n= 18, 5.8%) were undecided. This represents a mean score of 2.96.This means that although majority of trainee teachers would encourage pupils to work together on their own without guidance, a similar number either disagreed or were undecided. This implies that while slightly over half of trainee teachers have embraced student centered teaching practices, a significant number still hold onto traditional teacher-centered teaching methods and beliefs. From the results in Table 1, (n= 186, 59.8%) of the respondents agreed that they will involve pupils' in evaluating their own work and setting their own goals, (n= 109, 35.1%) disagreed and (n= 16, 5.1%) were undecided. This is supported by a mean score of 3.34. This means that while majority of trainee teachers will involve learners in evaluating their own work, a good number of them still belief in teacher-centered evaluation and goal setting.

Table 1. Descriptive statistics table of Teaching and learning philosophy

Statement	Strongly agree		Agree		Undecided		Disagree		Strongly Disagree		Mean	Std dev
	Freq	%	Freq	%	Freq	%	Freq	%	Freq	%		
I make it a priority in my classroom to give pupils' time to work together when I am not directing them	48	15.4	106	34.1	18	5.8	65	20.9	74	23.8	2.96	1.46
I involve pupils' in evaluating their own work and setting their own goals	84	27.0	102	32.8	16	5.1	54	17.4	55	17.7	3.34	1.48
I believe that expanding on pupils'' ideas is an effective way to build my curriculum	134	43.1	125	40.2	19	6.1	16	5.1	17	5.5	4.10	1.09
I prefer to cluster pupils'' desks or use tables so they can work together.	66	21.2	126	40.5	32	10.3	46	14.8	41	13.2	3.42	1.33
I prefer to assess pupils' informally	52	16.7	132	42.4	28	9.0	54	17.4	45	14.5	3.30	1.33
I often create thematic units based on the pupils'' interests and ideas.	81	26.0	116	37.3	38	12.2	40	12.9	36	11.6	3.53	1.31
I invite pupils' to create many of my teaching aids.	58	18.6	80	25.7	13	4.2	93	29.9	67	21.5	2.90	1.47

Results of this study further show that most of the respondents (n= 259, 83.3%) agreed that they believe expanding on pupils ideas is an effective way to build their curriculum, (n= 33, 10.6%) disagreed, while (n= 19, 6.1%) were undecided. This was supported by a mean score of 4.1.This implies that majority of teacher trainees belief in incorporating student ideas into the curriculum and therefore likely to successfully integrate computer use in the classroom. It should be noted however that 10.6% do not agree that expanding on pupils' ideas is an effective way to build their curriculum and teacher trainers should seriously look into this.

On whether teachers prefer to cluster pupils' desks or use tables so they can work together (n= 192, 61.7%) agreed, (n=87, 28%) disagreed, while (n= 32, 10.3%) were undecided as shown in Table 1. This was supported by a mean of 3.42. Also, (n=184, 59.1%) agreed that they prefer to assess pupils informally through observations and conferences, (n= 99, 31.9%) disagreed while (n= 28, 9.0%) were undecided. Most of the respondents (n=197, 63.3%) agreed that they would create thematic units based on the pupils' interests and ideas, (n= 76, 24.5%) disagreed, while (n= 38, 12.2%) were undecided. This was supported by a mean score of 3.53, (n =136, 44.3%) of the respondents agreed that they would invite pupils to create many of their teaching aids, (n= 160, 41.4%) disagreed while (n= 13, 4.2%) were undecided. This was supported by a mean score of 2.9.

From the study about half of sampled trainee teachers would involve pupils in evaluating their own work and setting their own goals, and would prefer to cluster pupils' desks or use tables so they can work together. About an average number of them preferred to assess pupils' informally through observations and conferences and would create thematic units based on the pupil's interests and ideas. The implication is that while about half of sampled trainee teachers have embraced learner-centered teaching and learning philosophies, almost a similar number are still stuck in teacher-centered philosophies which are a hindrance to ICT integration [13]. There is need for teacher trainers to foster learner-centered philosophies if integration of ICT in primary schools is to succeed. However most of trainee teachers believed that expanding on pupils ideas is an effective way to build their curriculum.

3.3. Correlation between Trainee Teacher Philosophy about Teaching and Learning and Integration of Computer Technology

Pearson product moment correlation was used to establish the influence of trainee teacher philosophy about teaching and learning on integration of computer technology (Table 2). There was a positive influence of trainee teacher philosophy about teaching and learning on integration of computer technology (r =.296, *n*=311, p<.05) as shown in Table 2. This implies that as the trainee teacher philosophy about teaching and learning improved the intention to integrate computer technology increased. Teacher training colleges and institutions should inculcate teaching philosophies that promote learner construction of their own knowledge among trainee teachers. This will promote ICT integration in teaching and learning.

Table 2. Correlation between Trainee teacher philosophy about teaching and learning and integration of computer technology

		Integration	Philosophy
Integration	Pearson Correlation	1	.296**
	Sig. (2-tailed)		.000
Philosophy	Pearson Correlation	.296**	1
	Sig. (2-tailed)	.000	

**. Correlation is significant at the 0.01 level (2-tailed).

4. Discussion

The results indicated that most trainee teachers agreed that they would involve pupils in evaluating their own

work and setting their own goals, believed expanding on pupils ideas is an effective way to build their curriculum and that they would prefer to cluster pupils' desks or use tables so they can work together. This implies that most trainee teachers would apply student -centered pedagogical approach in their teaching in future. Studies show that teachers who practice student -centered philosophy innovatively use ICT in their teaching [12]. These trainee teachers are therefore likely to innovatively use computers being introduced in Kenyan primary schools by the Government. Also, [16] pointed out that, with computer use, teachers role should no longer be that of a traditional lecturer, rather be that of a coach or co-learner. Moreover activities in the classroom should become learner-centered and flexible in order to help learners undergo self-initiated exploratory learning processes. The introduction of ICT in the Kenyan primary education system would call for a redefinition of the role of teachers. Most agreed that they preferred using student-centered approaches to learning such as assessing pupils informally through observations and conferences and creating thematic units based on the pupil's interests and ideas.

Correlation analysis further indicate that there was a weak positive relationship of trainee teacher philosophy about teaching and learning and integration of computer technology ($r = .296$, $n=311$, $p<.05$).As the value of trainee teacher philosophy about teaching and learning improved the integration of computer technology increased. From the results of regression, the p value of student teachers philosophy about teaching and learning is ($p = 0.019 < 0.05$).This implies that trainee teacher philosophy about teaching and learning significantly influenced integration of computer technology. $\beta 1= 0.124$ ($p < 0.05$), indicates that for each unit increase in the student teachers philosophy about teaching and learning, there is 0.124 units increase in integration of computer technology. Furthermore, the influence of student teachers philosophy about teaching and learning was stated by the t-test value = 2.36 which implies that the parameter is over 2.4 times that of the error associated with it. These are statistically significant.

The finding agrees with [12] views that there are actual influences of teachers' philosophy about teaching and learning on classroom activities with ICT integration. When considering the interrelationship between teacher beliefs and ICT integration, there is evidence that, teachers' philosophy about teaching and learning is a significant factor in determining patterns of classroom computer use by in-service teachers and pre-service teachers [13]. Ertmer found that teachers with student-centered pedagogical beliefs were successful at integrating computer use. The findings agree with [4] that "As learning shifts from the "teacher-centered model" to a "learner-centered model", the teacher becomes less the sole voice of authority and more the facilitator, mentor and coach from "sage on stage" to "guide on the side".

5. Conclusion

The study established that there was a statistically significant influence of trainee teachers' philosophy about teaching and learning on prospective ICT integration. Trainee teachers who believed that learners construct their own knowledge with the teacher as a guide scored highly on intentions to integrate ICT in the classroom than those who believed that the teacher is the source of knowledge. Trainee teachers who intended to use child- centered teaching practices viewed ICT integration positively. It is therefore important that teacher trainers in TTCs emphasize learner- centered teaching methods in order to promote ICT integration.

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Statement of Competing Interests

The authors have no competing interests

List of Abbreviations

I C T: Information and Communications Technology

MoEST: Ministry of Education Science and Technology

T T Cs: Teacher Training Colleges

UNESCO: United Nations Education Scientific and Cultural Organization.

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