THE EFFECT OF ICT INTEGRATION IN THE USE OF INQUIRY METHOD ON PRE-SERVICE TEACHERS' ACHIEVEMENT IN SOCIAL STUDIES (CITIZENSHIP) EDUCATION IN NIGERIAN COLLEGES OF EDUCATION

by

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LIST OF ABBREVIATIONS

ICT: Information and Communication Technology

UNESCO: United Nations Educational, Scientific, and Cultural Organisation

NPE: National Policy on Education (Nigeria)

TPACK: Technological Pedagogical and Content Knowledge

GPM: Giving, Prompting and Making

NERCD: National Educational Resource Centre and Development (Nigeria)

ETF: Education Trust Fund (Nigeria)

NCE: Nigeria Certificate in Education

B ed: Bachelor of Education

B Sc. Ed: Bachelor of Science and Education

PTDF: Petroleum Technological Development Fund (Nigeria)

ATC: Advance Teachers' College (Nigeria)

TC: Teachers' College (Nigeria)

SSCE: Senior School Certificate Examination

CAI: Computer Assisted Instructions

CBI: Computer Based Instructions

CBL: Computer Based Learning

CAL: Computer Assisted Learning

KESAN INTEGRASI ICT DALAM PENGGUNAAN PENDEKATAN INKUIRI TERHADAP PENCAPAIAN GURU-GURU PELATIH DALAM PENDIDIKAN KAJIAN SOSIAL (KEWARGANEGARAAN) DI KOLEJ-KOLEJ PENDIDIKAN NIGERIA

ABSTRAK

Ilham untuk kajian ini tercetus daripada kebimbangan terhadap kurangnya minat dan penggunaan ICT dalam amalan pendidikan oleh guru-guru di sekolah Nigeria. Menurut sorotan kajian, kurangnya minat guru terhadap penggunaan ICT dalam pendidikan boleh dikaitkan dengan 'kekurangan fokus' dan 'tahap integrasi ICT yang rendah' dalam pendidikan dan latihan keguruan di Nigeria. Kajian ini memperkenalkan dan menguji kesan-kesan integrasi ICT (sebagai satu program intervensi) terhadap tahap literasi dan kecekapan ICT guru-guru pelatih bagi mata pelajaran kajian sosial; pengetahuan asas dalam pendekatan inkuiri; pencapaian (dari segi pengetahuan isi kandungan, pengetahuan pedagogi, pengetahuan teknologi, dan pengaplikasian dalam pengajaran di dalam kelas); serta minat terhadap penggunaan ICT dalam pengajaran dan pembelajaran. Rekabentuk intervensi ini memperkenalkan satu pendekatan pengajaran baru yang memperbaiki model GPM bagi pengaplikasian pendekatan inkuiri berasaskan ICT dalam pendidikan guru-guru kajian sosial. Empat soalan kajian dan hipotesis telah diutarakan bagi tujuan kajian ini. Kaedah campuran berjujukan yang melibatkan rekabentuk *quasi-experiment* digunakan dalam kajian ini. Sejumlah 192 orang guru pelatih (lelaki dan perempuan) bagi mata pelajaran kajian sosial yang terpilih daripada empat buah kolej pendidikan telah mengambil bahagian dalam kajian ini. Teknik persampelan bertujuan telah digunakan dalam pemilihan responden kajian manakala teknik persampelan secara rawak digunakan

untuk membahagikan responden ke dalam tiga buah kumpulan kajian. Kedua-dua data kuantitatif dan kualitatif telah dikumpul dengan menggunakan soal selidik (yang diadaptasikan dari literatur), dan rubrik pemerhatian. Data kuantitatif bagi kajian ini telah dianalisa menggunakan teknik statistik berdasarkan inferens (ANOVA dan ANCOVA); manakala analisa isi kandungan telah digunakan untuk menganalisa data kualitatif yang dikumpul. Hasil analisa data kajian menunjukkan bahawa integrasi ICT (program intervensi) yang diuji dalam kajian ini memberikan kesan yang ketara terhadap tahap literasi dan kecekapan ICT dalam kalangan guru-guru pelatih bagi mata pelajaran kajian sosial; pengetahuan pendekatan inkuiri dalam pendidikan kajian sosial; pencapaian dalam pengetahuan isi kandungan subjek, pengetahuan pedagogi, pengetahuan teknologi, dan pengaplikasian dalam pengajaran di dalam kelas; serta minat keseluruhan terhadap penggunaan ICT dalam pengajaran dan pembelajaran. Salah satu perkara yang boleh dipelajari daripada kajian ini adalah integrasi ICT dalam pendekatan inkuiri untuk mengajar guru-guru mata pelajaran kajian sosial seperti yang dicadangkan di dalam model kajian ini dapat meningkatkan pemahaman guru-guru pelatih tentang pendekatan inkuiri dalam pengajaran dan pembelajaran. Ia juga membantu dalam perkembangan sesetengah kemahiran yang berkaitan dengan pendekatan inkuiri; contohnya, kemahiran mengulas literatur, membina rangka kerja inkuiri, pengumpulan data dan analisis, mengutarakan persoalan/soalan kajian, pemikiran kritis, termasuklah penaakulan dalam proses menafsirkan pengetahuan.

THE EFFECT OF ICT INTEGRATION IN THE USE OF INQUIRY METHOD ON PRE-SERVICE TEACHERS' ACHIEVEMENT IN SOCIAL STUDIES (CITIZENSHIP) EDUCATION IN NIGERIAN COLLEGES OF EDUCATION

ABSTRACT

This study was inspired by a concern over the low level of interest and usage of ICT in educational practices by teachers in Nigerian schools. As established in literature, teachers' low level of interest towards the usage of ICT in educational practices is associated with the 'lack of focus' and 'poor state of ICT integration' in teacher education and training in Nigeria. The study introduces and tests the effects of ICT integration (as an intervention program) on social studies pre-service teachers' ICT literacy and competence; basic knowledge of inquiry approach; achievement (in subject content knowledge, pedagogical knowledge, knowledge of technology; and their application in classroom teaching); and interest towards the use of ICT in teaching and learning. The intervention design introduces a new instruction approach improving on the GPM model for application in ICT-Based inquiry approach in social studies teacher education. Four research questions and hypotheses were raised for the study. Sequential mixed method approach involving quasi-experiment design was used. A total of 192 social studies pre-service teachers' (males and females) selected from four colleges of education participated in the study. Purposeful sampling technique was used in selecting the participants into the study while random sampling technique was used in assigning the participants into the three respective research groups. Both quantitative and qualitative data were collected using questionnaires (adapted from literature) and observation rubrics. The quantitative data collected for the study were analysed using inferential statistics

(ANOVA and ANCOVA); while content analysis was used in analysing the qualitative data collected. Analysis of data in the study has shown that, the ICT integration (intervention programme) tested in the study has significant effects on social studies pre-service teachers' ICT literacy and competence; knowledge of inquiry approach in social studies education; achievement in subject content knowledge, knowledge of pedagogy, technology and their application in classroom teaching; and overall interest towards the use of ICT in teaching and learning. One of the lessons learnt in this study is that, ICT integration in the use of inquiry approach for instructions in social studies teacher education using the proposed model as used in this study helps to improve pre-service teachers' understanding of the inquiry approach in teaching and learning. It also facilitates the development of some skills related to the use of inquiry approach; such as, the skills of literature review, raising inquiry/research questions, building inquiry framework, data collection and analysis; as well as, critical thinking and reasoning in the process of construing knowledge.

Chapter One

Introduction to the Study

1.0 Introduction

During the last three decades, the world has witnessed remarkable development in information and communication technology (ICT *hereafter*). Particularly, advancement in computer and internet technology with its effects widely felt in all aspect of the society (Umar & Maswan, 2007). This development has in the recent times revolutionised the information industry; making information management, access and dissemination process much easier, faster and efficient by means of digital electronic technology. With this technology, time and distance has become no longer a barrier to communication, interaction and economic transactions between people, institutions and nations across the world.

The rapid shift toward the use of this technology has largely been responsible for the emergence of e-transactions between people and institutions in all aspects of human life; making the world a global village and technology driven. This has led to an ever increasing human interaction with the computer, internet and other ICT facilities (Teo, 2008). This trend of development has made the need for ICT literacy and competence a necessity in the emerging technology driven world (Herselman & Hay, 2003). Thus, suggesting an association or correlation between individuals' personal success and occupational proficiency with ICT literacy and competence in any technology driven society (Teo, 2008).

The integration of this technology in socio-economic and political sectors of the society has made ICT literacy (and other forms of 21st century skills) parts of the current labour requirement (UNESCO Bangkok, 2003) . With this development, the education industry needs to redirect educational practices towards assisting learners

to become ICT literate and to acquire 21st century skills; thus, presenting a new challenge that adds to the role of the education industry. For school teachers to cope with the emerging role of helping the learner to acquire the 21st century skills needed; the teachers themselves needs to be ICT literate and competent and must learn to integrate their knowledge of technology and pedagogical skills in teaching their subject-content for 21st century skills.

21st Century Skills is a broad concept that implies the development and acquisition of some skills and values necessary for surviving the challenges of life in the information age that is technology driven (UNESCO, 2003; 2007). Such skills and values includes ICT literacy and competence, life-long learning, critical thinking, collaboration, problem-solving and decision-making (Lai and Viering, 2012). From educational point of view, it refers to the shift in educational goals and practices towards building and developing students' soft skills; focusing on an aim that is directed towards producing digital citizens capable of thinking critically in problem-solving while being rational in their decision-making (Chris, 2009). 21st Century skills within the context of this study therefore, centres around the development of students soft skills (ICT literacy and competence); and, the shift towards pedagogical practices that are students centred 'the use of inquiry and problem solving approaches and project based learning that promotes creativity and independent learning' (Okam, 2002).

The implication of this development provides the rationale and a strong base, establishing the necessity of ICT integration in educational practices and pedagogy 'should the education industry strive to meet up with its responsibility of equipping the learner with what it takes to fit into the larger society—the 21st century skills' (Okam, 2002). However, the success of ICT integration in any educational system is

to a large extent dependent on its teachers for there is no education system that can rise above the quality of its teachers (NPE, 2004). For school teachers to effectively integrate ICT in their pedagogical practices, the pre-service teacher training programme must be grounded to adequately prepare the teachers while on training for this emerging challenge.

The teacher is therefore a crucial factor in any educational system whose competence and efficiency has far reaching implications in the attainment of educational objectives and goals (Pelgrum, 2001). Thus, the level of ICT literacy and competence of the teacher is crucial in determining the success of ICT integration in schools (Rosnaini & Mohd. Arif, 2010). However, teachers' competence toward the use and application of ICT in their educational practices is dependent on teacher education and training on one hand; and, teacher educators on the other hand. Workshops and standalone courses on technology integration for in-service teachers may not be enough in ensuring effective use of technology in pedagogical practices (Mishra & Koehler, 2006).

Preparing teachers to integrate ICT in their pedagogical practices need to be rooted deeply and effectively in the teacher education programme from the onset (Teo, 2008); and teacher educators need to integrate and model the use of ICT in their pedagogical practices as well (Borlick, et. al., 2003). However, ensuring effective technology integration in teacher education would require a careful planning and transformational changes in curriculum content and pedagogical practices (Hammond & Munfra, 2009) in addition to having access to ICT facilities. Even though technology integration in educational practices is much appreciated and considered a welcome development by most teacher educations (Baron & Goldman, 1994; Ong, 1999); it is yet to be fully integrated in teacher education curriculum and

pedagogical practices in Nigeria (Onasanya, et. al., 2010). Most often, lack of theoretical and conceptual framework for technology integration in education and pedagogy has always been advanced as a reason for the low level of technology integration in teacher education and pedagogy (Misrah & Koehler, 2006).

In this study, a framework for ICT integration in social studies teacher education curriculum and pedagogical practices was developed in line with the Technology, Pedagogy and Content Knowledge (TPACK *hereafter*) theory. The framework provide a guide for curriculum based technology integration for social studies teacher education; and, the integration of web-based technology resources, smart board and power point in the use of inquiry approach for citizenship instructions in social studies teacher education (ICT based inquiry approach for classroom instruction), in line with the Giving, Prompting and Making (GPM *hereafter*) model. The study is exploratory and quasi-experimental in nature. It explores the pre-service teachers' level of ICT literacy and competence; and their level of basic knowledge of the inquiry approach after attending the 100 level ICT and method courses on one hand. On the other hand, the study test the effectiveness of three different ICT intervention designs on the pre-service teachers ICT literacy and competence; and basic knowledge of the inquiry approach in social studies education. the study also test the effectiveness of the intervention on the pre-service teachers' achievement on subject content knowledge, knowledge of technology, knowledge of pedagogy and the application of the three in classroom teaching. Detail of the research design is provided in the method section (chapter four).

This chapter provides a general background of the study. It discusses the bases upon which the research questions of the study were derived; and presents the research objectives that gave birth to the research questions. This chapter also

discusses the rational and significance of the study; and discuss the meaning of key concepts that relates to the study.

1.1 Background of the Study

Considering the influence of information technology in all sectors of the society (Onasanya et al. 2010); the government and other stakeholders of the education industry in Nigeria consider the integration of ICT in the nation's educational system at all levels of learning a necessity (NPE 2004). This consideration was in recognition of:

a. the prominent role of education as a 'viable instrument' for the attainment of national development (NPE, 1998);
b. the training and development of Nigerian youths into becoming responsible citizens, capable of contributing meaningfully to the socio-economic, political and the overall wellbeing of the society as adults (Okam, 2002);
c. The training and development of required manpower as desired by the society to man all sectors of the economy.

The government consideration for ICT integration in Nigerian educational practices is to empower and strengthen the competence of the education industry towards meeting up with these responsibilities (Yusuf, 2005). Particularly, that of producing ICT literate citizens that can effectively fit into the contemporary information age where information technology has become an integral part of the society (Nwachukwu, 2006).

In pursuit of this consideration the Federal Ministry of Education in conjunction with the National Educational Resource Centre (NERC *hereafter*)

working on government directives introduces 'computer science' as a core and compulsory subject in Nigerian primary and junior secondary schools. Computer labs were built and equipped in most of the federal schools across the nation through the Education Tax Fund (ETF *hereafter*) intervention program. Candidates with Nigeria Certificate in Education (NCE *hereafter*) and specialisation in computer science were recruited to teach the subject in primary schools while university graduate with B Ed; B Sc. Ed and B Sc. (computer science) were recruited to teach the subject in junior secondary schools.

In Polytechnics, Colleges of Education and Nigerian Universities, 'introduction to basic computer knowledge' was introduced as a compulsory course unit for all students under general studies department. The course is meant to expose students towards acquiring basic knowledge, skills and application of word processing; excel; access; and database management. Computer assisted instruction was introduced as a compulsory course unit in educational technology for all pre-service teachers' in Nigerian Colleges of Education. Certificate in computer appreciation and application is made a compulsory requirement of promotion in addition to publication for all serving academic staff in Polytechnics, Colleges of Education and Universities; and a compulsory requirement for all candidates seeking employment as academics in all institutions of higher learning. From the 1990's, series of ICT standalone courses and workshops were organised and sponsored by federal and states government for teachers' consistently throughout the country.

Following these development, the government in 2004 come up with a revised edition of the National Policy on Education, incorporating the integration of ICT in education as part of the policy. The policy statement makes computer science a compulsory subject for all students in primary and junior secondary schools;

making it a duty for the state governments and the private sector to make provisions for computer labs and equipment in all private and state owned schools as part of the accreditation requirement. The policy recognises the teaching of computer science as a necessary step towards ensuring that:

1. Pupils, at the end of their three years of junior secondary education are competent in the use and application of ICT for personal and industrial use;
2. Students at the end of their studies acquire the needed information and ICT literacy skills as a solid foundation for the use of information technology in higher education.

The policy charges the department of secondary education (Federal Ministry of Education) and the National Commission for Primary Education with the responsibility of providing in-service training for school teachers. Such training is to be directed towards preparing teachers to integrate ICT in their pedagogical practices.

The policy makes it compulsory for academic staff in all institutions of higher learning to integrate ICT in their pedagogical practices. Emphasis is particularly made on the integration of ICT in teacher education programmes. The emphasis was to ensure that, pre-service teachers trained in Nigerian Universities and Colleges of Education acquire the contemporary skills and competence needed for teaching with technology in the present information age. Consequent of this policy, desk-top computers for office use and laptops were provided to academic staff in Federal Universities, Colleges of Education and Polytechnics in batches. Additional computer labs, cable and wireless internet services as well as e-libraries were provided for students use by the respective management of the institutions, ETF and

Petroleum Technology Development Endowment Fund (PTDF *hereafter*). Directives were given to private and state institutions to follow suite as requirement for accreditation. However, even with these resources and efforts, level of technology integration in Nigerian educational system at all levels is still very low (Abba Iya, 2012).

1.2 Problem Statement

Despite the facilities provided, school teachers are unable to integrate ICT in their educational practices and pedagogy (Adeyemi & Olaye 2010; Yusuf, 2005). And though, series of workshops on ICT in education were organised for teachers; yet, apart from the computer science teachers, most of the teachers lack the proficiency and competence needed for ICT integration in education (Magawata, Muhammad & Ahmad, 2011; Mezieobi, 2008). Because of the incompetence, most of the teachers developed negative attitudes with little or no interest in the use of ICT (BECTA, 2004; Hara, 1999). The situation is more particular in rural schools owned by the state governments where access to some ICT facilities is limited with over 65% of the teachers having no interest in the use of computer associated technology in their teaching and learning (Adeyemi & Olaye, 2010). In this condition, actualising the goal of producing school leavers capable of utilising ICT in their higher education is likely to remain a mirage (Onasanya et al. 2010; Yusuf, 2005).

This situation is raising a serious concern over the credibility and competence of Nigerian schools towards actualising Nigerian philosophy of education; directed towards producing citizens with competent ICT skills that can function effectively in technology driven society of the information age (Adeyemi & Olaye, 2010). The inability of the school teachers to use ICT in their pedagogical practices is associated

with the poor state of technology integration in teacher education programme (Yusuf, 2005).

Colleges of Education and other institutions of higher learning in Nigeria are yet to fully integrate ICT in their teacher education programme (Mezieobe, 2008). Even though, the impact of ICT integration on students' achievement is highly appreciated by most educators (Umar & Maswan, 2007), teacher educators hardly model the use of ICT in their pedagogical practices (Borlick et al. 2003). Classroom instructions in these institutions are still characterised with the use of conventional white boards and markers using the lecture oriented pedagogy. Hardly would the pre-service teachers see the teacher educators modelling the use of ICT tools in their classroom instructions. Even the lecturers handling the compulsory 100 ICT course and 'computer assisted instructions' as a course unit in Colleges of Education teaches the course using the conventional lecture approach more literally than practical without using technology (Mezieobe, 2008; Nnabuo & Obasi, 2004). With such pedagogical practices, translating the vision and mission of producing teachers with high level competence and proficiency towards the use of ICT in their teaching into reality as envisaged in the National Policy may likely remain a mirage (Yusuf, 2005).

The success of the much needed ICT integration in schools depend largely on the teacher's level of ICT literacy (Borlick, et. al., 2003; Paraskeva, Bouta, & Papagianna, 2008), competence, self-efficacy (Brown & Warschauer, 2006; Pelgrum, 2001) and interest (Ely, 1995). Acquiring this competence by teachers on training depends on the quality and effectiveness of ICT integration in teacher education programme (Yusuf, 2005). To ensure this competence, there is the need for effective ICT integration in teacher education curriculum and pedagogical practices (Lim, et. al., 2010; Teo, 2008; Yusuf, 2005). This is lacking in Nigerian Colleges of Education

(Yusuf, 2005). Therefore, this study explores and investigated the impact of the current 100 level compulsory ICT course in Nigerian Colleges of Education on pre-service teachers' level of ICT literacy and competence as a preliminary study; and, also introduced three different intervention designs for ICT integration in social studies teacher education curriculum and pedagogical practices using the TPACK framework and the GPM model.

Although, Mishra and Koehler (2005; 2006; 2009) have captured and discussed 'technology' as another important knowledge component of teacher education in their framework; they however did not provide enough information on how the curriculum of the three knowledge components can best be structured in teacher education in acquiring the seven knowledge components identified as necessary in teacher education. Neither has the framework and theory provided instructional model for the delivery of the seven knowledge components. The GPM model on the other hand is an attempt to bridge this gap. However, the GPM model too did not provide any information on how the curriculum of TPACK knowledge components can be structured for classroom instruction in using the model. Neither do the authors of the model provide information on the pedagogical approaches that best suits the use of the model.

This study therefore attempt to fill this gap by introducing an intervention that considers a new approach to curriculum structuring in social studies teacher education that reflects on the TPACK framework. The intervention also tested the application of the GPM model by building ICT-Based inquiry instruction using the model for classroom instruction in social studies teacher education. Three sets of technology were integrated into the design and their comparative effect on social studies pre-service teachers was tested in the study. The study investigate the

comparative effect of the three interventions on the pre-service teachers' achievement in learning subject content knowledge, knowledge of technology and pedagogy, and their application in classroom teaching; and also compare the effects of the intervention on the pre-service teachers' interest towards the use of ICT in teaching and learning.

1.3 Purpose of the Study

The purpose of this study was to design an intervention program for ICT integration in social studies teacher education curriculum and pedagogical practices. The design of the intervention was guided by a consideration of the Bernstein theory; the TPACK Framework and GPM model. The intervention was designed to address issues relating to ICT integration in social studies teacher education within the context of Nigerian Colleges of Education as identified and discussed in the problem statement; background and rationale of the study. The design of the intervention provided the needed framework to compare and test the use of three sets of technology using the GPM model for social studies classroom instruction using the inquiry approach.

1.4 Objectives of the Study

The study intends:

1. To find out the effect of ICT integration (the intervention) on 200 level Social Pre-service teachers' Basic ICT Literacy and Competence.

2. To find out the effect of ICT integration (the intervention) on 200 level Social Pre-service teachers' Basic Knowledge of Inquiry Approach in Social Studies Education.
3. To find out the effect of ICT integration (the intervention) on Social Studies 200 level Pre-service Teachers' (the participants) Achievement in Citizenship Education, Technology, Pedagogy, and Application in classroom teaching and in the overall total achievement scores.
4. To find out the effect of ICT integration (the intervention) on 200 level Social Studies Pre-service Teachers' (the participants) Interest towards the use of ICT in Teaching and Learning.

1.5 Research Questions

Research Question 1: What is the effect of ICT integration (the intervention) on 200 level Social Pre-service teachers' Basic ICT literacy and Competence; and, Basic Knowledge of the Inquiry Approach in Social Studies Education?

a. ***Research Question 1a:*** *Is there any difference in the Overall Self-rated Knowledge and Competence of Managing Personal and Shared ICT test scores between the three intervention groups, while controlling the covariate?*
b. ***Research Question 1b:*** *Is there any difference in the Overall Self-rated Knowledge of ICT Skills for Teaching and Learning test Scores between the three intervention groups, while controlling the covariate?*
c. ***Research Question 1c:*** *Is there any difference in the Total Overall Self-rated Basic ICT literacy and Competence test Scores between the three research groups, while controlling the covariate?*

Research Question 2: Is there any difference in the Overall Self-rated Knowledge of Inquiry Approach in Social Studies Education test scores between the three research groups, while controlling the covariate?

Research Question 3: What is the effect of ICT integration (the intervention) on Social Studies 200 level Pre-service Teachers' (the participants) Achievement in citizenship Education, Technology, Pedagogy, Application in classroom teaching, and in the overall total achievement scores?

a. ***Research Question 3a:*** *Is there any difference in the post-test achievement scores of citizenship education subject content test between the three intervention groups?*
b. ***Research Question 3b:*** *Is there any difference in the post-test achievement test scores on method/pedagogical knowledge, between the three intervention groups?*
c. ***Research Question 3c:*** *Is there any difference in the post-test achievement scores on knowledge of technology test, between the three intervention groups?*
d. ***Research Question 3d:*** *Is there any difference in the post-test achievement scores on practical application (of technology, pedagogy and content knowledge) in classroom teaching and test, between the three intervention groups?*
e. ***Research Question 3e:*** *Is there any difference in the overall total achievement scores (on knowledge of subject content, pedagogical knowledge, knowledge of technology and practical application in classroom teaching) test, between the three intervention groups?*

Research Question 4: What is the effect of ICT integration (the intervention) on 200 level Social Studies Pre-service Teachers' (the participants) Interest towards the use of ICT in Teaching and Learning?

a. ***Research Question 4a:*** *Is there any difference in the Overall Self-rated Feeling of Confidence test Scores between the three research groups, while controlling for their pre-test scores?*
b. ***Research Question 4b:*** *Is there any difference in the Overall Self-rated Usefulness of ICT in Teaching and Learning test Scores between the three research groups, while controlling the covariate?*
c. ***Research Question 4c:*** *Is there any difference in the Overall Self-rated Control and Willingness to use ICT in Teaching and Learning test Scores between the three research groups, while controlling the covariate?*
d. ***Research Question 4d:*** *Is there any difference in the Overall Self-rated Interest for further Training on ICT in Education test Scores between the three intervention groups, while controlling the covariate?*
e. ***Research Question 4e:*** *Is there any difference in the post-test scores on the Total Overall Self-rated Interest towards ICT in Education test between the three intervention groups, while controlling the covariate?*

1.6 The Hypotheses

The hypotheses listed below were developed for research questions 1, 2, 3 and 4 respectively. Hypothesis Ho1a to Ho1c are the corresponding hypotheses for research questions 1a to 3c; hypotheses 2 for research question 2; hypothesis Ho3a to Ho3e for research questions 3a to 3e while hypothesis Ho4a to Ho4e are the corresponding hypotheses for research questions 4a to 4e respectively.

Ho1a: There is no significant difference in the Overall Self-rated Knowledge and Competence of Managing Personal and Shared ICT test scores between the three intervention groups, while controlling the covariate.

Ho1b: There is no significant difference in the Overall Self-rated Knowledge of ICT Skills for Teaching and learning test Scores between the three interventions groups, while controlling the covariate.

Ho1c: There is no significant difference in the Total Overall Self-rated Basic ICT Literacy and Competence test Scores between the three research groups, while controlling the covariate.

Ho2: There is no significant difference in the Overall Self-rated Knowledge of the Inquiry Approach in Social Studies Education test Scores between the three research groups, while controlling the covariate.

Ho3a: there is no significant difference in the post-test achievement scores of citizenship education subject content test between the three intervention groups.

Ho3b: there is no significant difference in the post-test achievement test scores on method/pedagogical knowledge between the three intervention groups.

Ho3c: there is no significant difference in the post-test achievement scores on knowledge of technology test, between the three intervention groups.

Ho3d: There is no significant difference in the post-test achievement scores on practical application (of technological, pedagogical and content knowledge) in classroom teaching between the three intervention groups.

Ho3e: There is no significant difference in the overall total achievement scores (on knowledge of subject content, pedagogical knowledge, knowledge of technology and

practical application in classroom teaching) test, between the three intervention groups.

Ho4a: There is no significant difference in the Overall Self-rated Feeling of Confidence test scores between the three research groups, while controlling the covariate.

Ho4b: There is no significant difference in the Overall Self-rated Usefulness of ICT in Teaching and learning test Scores between the three interventions groups, while controlling the covariate.

Ho4c: There is no significant difference in the Overall Self-rated Control and Willingness to use ICT in Teaching and Learning test Scores between the three research groups, while controlling the covariate.

Ho4d: There is no significant difference in the Overall Self-rated Interest for further training on ICT in Education test Scores between the three intervention groups, while controlling the covariate.

Ho4e: There is no significant difference in the post-test scores on the Total Overall Self-rated Interest towards ICT in Education test between the three intervention groups, while controlling the covariate.

1.7 Rational of the Study

Human involvement with computers and internet has made ICT an integral part of the human society. Preparing young citizens towards effective use of these technologies in society has been the concern of most educational system around the world (Greenhow, Robelia, & Hughes, 2009). However, the success of every goal oriented innovation and transformational changes in the education industry for ICT integration in schools lies heavily on the school teachers' (Hammond et al., 2009).

Therefore, preparing teachers to use technology in education has been the major challenge of educational administration in most countries. On the other hand, preparing new breed of teachers to use ICT in their teaching has been the focus of teacher education training (Chai, Koh, & Tsai, 2010). Meeting up with these challenges in the teacher education industry would require meaningful and well-directed ICT integration in teacher education curriculum and pedagogy for all disciplines (Gao, et al., 2009).

However, even though the need for ICT integration in teacher training and education is well established in literature (Chai, Koh, &Tsai, 2010); the present curriculum structure and pedagogical practices in teacher education and training does not adequately prepare the pre-service teachers for ICT integration (Kay, 2006; Swain, 2006). The pre-service teachers are not properly exposed to pedagogical use of ICT by the teacher educators (Brown & Warschauer, 2006; Lim et al., 2010). Therefore, much is still needed in the development and application of frameworks, course designs and instructional models for subject disciplines in pre-service training (Haydn & Barton, 2007; Lawless & Pellegrino, 2007; Mishra, Koehler & Kerekuik, 2009).

Pre-service teachers are only exposed to one or two stand-alone ICT courses in most teacher education programme (Hsu & Sharma, 2006) as the case is with Nigeria. The courses are basically taught for the development of ICT skills without being linked to any pedagogical design and subject content (Mishra, Koehler, & Kerekuik, 2009). This curricular arrangement and practice do not expose the pre-service teachers to any adequate training on relating the ICT skills acquired to pedagogical designs and specific subject content (Lawless & Pellegrino, 2007; Mishra, Koehler, & Kerekuik, 2009). The pre-service teachers are therefore left to

wonder on their own regarding the syntheses of the three knowledge components for classroom application. This situation presents a reasonable research gap in teacher education curriculum and pedagogy (Angeli & Valanides, 2005). Thus, studies are needed to bridge this gap in teacher education. New course designs, frameworks and instructional models for subject disciplines in teacher education need to be developed and tested on pre-service teachers' achievement and interest (Lisowski, Lisowski & Nicolia, 2006). Such studies would provide lead ways for the needed changes in teacher education curriculum and practice that provide room for adequate training in the syntheses and application of these components in classroom teaching (Jonassen et al., 2008; Mishra & Koehler, 2006).

Most of the existing studies related to TPACK focuses on ICT course designs for teachers professional development of ICT skills; and the effects of ICT skills on pre and serving teachers (Chai, Koh & Tsai, 2010). Such studies are built on the ground that proficiency in ICT skills is needed for teachers to effectively integrate ICT in their teaching (Littrell, Zagunmi & Zagunmi, 2005). This is because teachers with high confidence level in their ICT skills tend to use ICT more in their instructional practices (Zhao, Pugh, Sheldon & Byers, 2002). This notwithstanding, because practical application of ICT in classroom instructions requires a balance syntheses of utilising relevant ICT tools in teaching particular subject content using the appropriate pedagogy. This would in turn involve some changes in teacher education curriculum, pedagogical practices, and instructional designs for subject disciplines that need to be guided by theoretical frameworks, course designs and instructional models. Research is therefore needed to guide the development of such frameworks, course designs and models; and, to test the effectiveness of such

frameworks and models for ICT integration in teacher education for respective subject disciplines.

Citizenship education and values is one of the three major curricular components of social studies education in Nigerian schools (Okam, 2002). Teaching the subject in schools is directed toward inculcating the right values, skills and knowledge necessary in helping the child to understand and appreciate the interdependence of man and the environment (Ololobou, 2004); the historical development, cultural and social values of his immediate environment and beyond (Famwang, 1996); and the value of human labour in the attainment of national development for the well-being of all members (Okam, 2002). The overall goal of the subject design is meant to equip the learner with the skills and knowledge needed to function effectively in the larger society as responsible and productive citizen (NPE, 2004). ICT integration in the classroom dispensation of this subject design can facilitate the attainment of this goal and objectives (Mezieobe, 2008); and facilitate students' achievement in the subject area. Yet, social studies teachers are unable to integrate ICT in their teaching because of poor attitudes and interest towards the use of ICT in educational practices due to lack of ICT literacy and skills (Ololube, 2006). Even the social studies pre-service teachers in Nigerian Colleges of Education may at the end of their training lack the skills and competence for ICT integration in their teaching. This is because social studies teacher educators have lagged behind in modelling the use of ICT for pre-service teachers' for reasons associated with lack of frameworks and instructional models for the use of ICT in education (Cooper & Bull, 1997; Handler, 1993).

1.8 Significance of the Study

For the purpose of transforming the education industry into conformity with the current global trend, the government of Nigeria has come up with a policy to encourage the use of ICT at all levels of learning (NPE, 2004). The policy statement recognises the significant role of ICT in facilitating the process of teaching and learning in the education sub-sector. However, the value and benefits of ICT in the education sector can only be felt when they are truly used effectively (Yusuf 2005); if properly used, the integration of ICT in education can improve the effectiveness of the learning process (Mezieobi 2008, Onasanya 2010). Thus, the purpose of ICT integration in education is to improve the quality of teaching, learning and educational research. The utilization of ICT can play an important potential role in improving students' achievement and teachers' performance. Thus, this study would contribute significantly to the government, policy makers, stake holders of the education industry in Nigeria, curriculum planners, educational administrators and supervisory agencies, teacher educators and social studies pre-service teachers in Nigerian Colleges of Education; and the academic community in general.

1.8.1 Significance to Teacher Educators

This study would help teacher educators:

1. To understand how critical their role is, in preparing pre-service teachers for ICT integration;
2. To understand that, they are largely responsible for the infectiveness of the 100 level ICT course taught in Nigerian Colleges of Education; and
3. In particular, it would help the course lecturers handling the 100 level ICT course in understanding the implications of their pedagogical practices on the

development of pre-service teachers ICT skills, and their interest towards the use and application of ICT in teaching and learning;

4. To understand how ICT integration in teacher education (using the TPACK and GPM model) can effectively improve the pre-service teachers' achievement and understanding in learning subject content knowledge, knowledge of technology and pedagogy, and the syntheses and application of the three components in teaching.
5. To understand that preparing the pre-service teachers for ICT integration need to be directed towards the development of 21st century skills among the learners.

The intervention designs of the study provide a practical guide that can help teacher educators in utilising the GPM model to practice the integration of ICT based instruction in their pedagogical practices; therefore, modelling the use of ICT practically for the pre-service teachers to learn better, the use of technology in educational practices.

1.8.2 Significance to Pre-service Teachers

Findings of the study would help pre-service teachers:

1. To understand that the success of ICT integration in Nigerian schools is largely dependent on them;
2. To understand and consider their ICT literacy and competence and their interest towards the use of ICT in teaching and learning as critical factors needed in the education industry;

3. To appreciate the need of acquiring the professional skills and competence that can help them in synthesising their knowledge of technology and pedagogy in teaching their subject content;
4. To understand that teaching in the present information age needs to be directed towards the development of 21st century skills using activity oriented and student-centred approaches; and
5. To understand that teaching for 21st century skills requires teachers' to use technology and the inquiry oriented approaches.

1.8.3 Significance to National Commission for Colleges of Education

The study would help the academic planning unit of the commission:

1. To understand that teaching the 100 level ICT course in Nigerian Colleges of Education has not made much impact on preparing pre-service teachers' for ICT integration in Education;
2. To understand the factors responsible for the ineffectiveness of the 100 level ICT course in Nigerian Colleges of Education;
3. Recommendations made in the study would help the commission in strategizing how to improve and address the issues that rendered the teaching of the 100 level ICT course less effective;
4. To understand that curriculum-based integration of ICT can yield better result in helping the pre-service teachers' to learn how to integrating ICT in teaching their subject content for 21st century skills; than the stand-alone 100 level ICT course.

8.1.4 Significance to Policy Makers and other Stakeholders of the Teacher Education Industry

The study would help policy makers and other stakeholders of the teacher education industry in Nigeria to understand:

1. That, teaching the 100 level ICT course as a stand-alone course for pre-service teachers' in Nigerian Colleges of Education may not be enough to prepare the pre-service teachers for ICT integration;
2. To understand that, teaching for 21st century skills has now become an integral part of educational goals in the world; and
3. To appreciate the need for some meaningful changes in content and structure of teacher education and schools curriculum that can facilitate ICT integration in teaching subject contents for 21st century skills.

1.8.5 Significance to Further Research

Findings of this study would add to existing literatures on researches relating to ICT integration in education. Researchers intending to study further on the issue of ICT integration in social studies teacher education would find the content of this study useful for their literature review. The limitations of the study may likely provide research gaps that may attract further related researches. Further researches can be initiated using the intervention designs.

In particular, the findings of this research would:

a) Assist in portraying the effects and benefits of ICT integration in social studies teacher education curriculum and pedagogical practices;

b) Assist in portraying the critical role of teacher educators in preparing social studies pre-service teachers for ICT integration in education;

c) Assist in portraying the benefits of ICT integration in teaching for 21st century skills;

d) Assist in identifying the effects of ICT integration on pre-service teachers' achievement in learning subject content, technology and pedagogy;

1.9 Limitation of the study

Limitations are those conditions beyond the control of the researcher that may place restrictions on the conclusions of the study and their application to other situations (Best & Khan 2006). This study has certain limitations that need to be taken into account when considering the study and its contributions.

1. The study was limited to investigating the effect of three different ICT intervention designs (using the inquiry method) on social studies pre-service teachers' achievement in citizenship education; within the framework social studies curriculum design only. On the other hand, the study also investigates the effect of the interventions on the pre-service teachers ICT literacy and competence; and the pre-service teachers' interest towards the use of ICT in teaching and learning. This implied that, the study covers only:

a) The inquiry learning approach as a pedagogical design intrinsic in social studies education (the pedagogical limitation);

b) The citizenship aspect of social studies curricular content (the subject-content limitation);

c) The Power Point, Smart Board and web-based resources only as used in the intervention designs (the technological/ICT limitation);