EFFECT OF MOBILE TECHNOLOGY INSTRUCTIONAL APPLICATION ON UNDERGRADUATE DISTANCE LEARNERS' ACHIEVEMENT, RETENTION, SELF-EFFICACY AND ATTITUDE TOWARDS COMPUTER SCIENCE IN NIGERIAN UNIVERSITIES

Olugbenga Kunle IBITEYE *(Ph.D)*
E-mail Address: olugbengaibiteye@gmail.com
Institute: Federal University of Technology Minna, Nigeria
Department: Technology Education Faculty: School of Science & Technology Education
Morayo Emitha Awomoyi
E-mail Address: ma8161b@american.edu
Institute: The American University, Washington DC
Designation: Program Coord, SIS Office of Research, The American University Washington DC

Corresponding author: *Olugbenga Kunle IBITEYE
Email: olugbengaibiteye@gmail.com

Aim and Objectives: The main purpose of this study is to determine the effect of mobile technology instructional application on undergraduate distance learners' achievement, self-efficacy and attitude towards Computer science in Nigerian universities. Specifically, the study will:

(i) Determine whether undergraduate distance learners have self-efficacy in using mobile technology applications for learning

(ii) Examine the attitude of undergraduate distance learners towards the use of mobile applications for learning Computer science

(iii) Determine the effect of mobile technology instructional application on the achievement of undergraduate distance learners in Computer science

(iv) Determine whether differences exist between the achievement of undergraduate distance learners taught Computer science through mobile technology instructional application and those taught through printed course manual

(v) Examine the influence of gender on the achievement of undergraduate distance learners taught Computer science through mobile technology instructional application

(vi) Determine the effect of mobile technology instructional application on the retention of undergraduate distance learners in Computer science

(vii) Determine whether differences exist between the retention of undergraduate distance learners taught Computer science through mobile technology instructional application and those taught through printed course manual

(viii) Examine the influence of gender on the retention of undergraduate distance learners taught Computer science through mobile technology instructional application

(ix) determine whether differences exist between the attitude of undergraduate distance learners to Computer science before and after learning through mobile technology instructional application

(x) examine whether gender differences exist between the self-efficacy of undergraduate distance learners in using mobile applications for learning.

(xi) examine whether gender differences exist between the attitude of undergraduate distance learners towards using mobile tech instructional application for learning Computer science.

Research Questions

The following research questions were raised and will be answered:

(i)   Do undergraduate distance learners have self-efficacy for using mobile technology application for learning Computer science?

(ii)   Do undergraduate distance learners have positive or negative attitude towards the use of   mobile technology application for learning Computer science?

(iii)   What is the effect of mobile technology instructional application on the achievement of undergraduate distance learners in Computer science?

(iv)   Is there any difference between the achievement of undergraduate distance learners taught Computer science through mobile technology instructional application and those taught through printed course manual?

(v)   Does gender has any influence on the achievement of undergraduate distance learners taught Computer science through mobile technology instructional application?

(vi)   What is the effect of mobile technology instructional application on the retention of undergraduate distance learners in Computer science?

(vii)   Is there any difference between the retention of undergraduate distance learners taught Computer science through mobile technology instruction application and those taught through printed course manual?

(viii)   Does gender has any influence on the retention of undergraduate distance learners taught Computer science through mobile technology instructional application?

(ix)   Is there any difference between the attitude of undergraduate distance learners to Computer science before and after being taught using mobile technology instructional application?

(x)   Does gender influence the self-efficacy of undergraduate distance learners in using mobile technology for learning Computer science?

(xi)   Does gender difference exist between the attitudes of undergraduate distance learners towards using mobile technology for learning Computer science?

Research Hypotheses

The following Null hypotheses will be tested:

Ho$_1$:   There is no significant difference between the mean achievement score of undergraduate distance learners taught Computer science through mobile technology instructional application and those taught through printed course manual.

Ho$_2$:   There is no significant difference between the mean achievement score of male and female undergraduate distance learners taught Computer science through mobile technology instructional application.

Ho$_3$:   There is no significant difference between the mean retention score of undergraduate distance learners taught Computer science through mobile technology instructional application and those taught through printed course manual.

Ho$_4$:   There is no significant difference between the mean retention score of male and female undergraduate distance learners taught Computer science through mobile technology instructional application

Ho$_5$:	There is no significant difference between the mean attitude of undergraduate distance learners to Computer science before and after being taught using mobile technology instructional application

Ho$_6$:	There is no significant difference between the mean attitude score of male and female undergraduate distance learners towards using mobile technology for learning Computer science?

Ho$_7$:	There is no significant difference between the self-efficacy of male and female undergraduate distance learners in using mobile technology for learning Computer science?

Scope of the Study

Significance of the Study

Operational Definition of Terms

Achievement:

Attitude:

Distance Learners:

Mobile Learning:

Mobile Technology Instructional Application:

Self-Efficacy:

Undergraduate:

Research Methodology

Research Design

The study will involve the use of mix-method (both qualitative and quantitative) for analysis. To determine the effectiveness of mobile technology instructional application on undergraduate distance learners in computer science, an experimental procedure (pretest, posttest, randomized, experimental and control groups) with two levels of independent primary variable will be used. The independent variables will be Mobile Technology Instructional Application (MTIA) and Conventional Printed Courseware (CPC), the dependent variable will be the post-test achievement score, retention score and attitude score of students while gender will be the moderating variable.

Computer Achievement Test (CAT) will be administered on both the Experimental and Control groups as pretest, posttest and delayed-posttest. Also, Computer Attitudinal Questionnaire (CAQ) will be administered on both groups before and after the administration of treatments. The Experimental Group will be taught computer science using MTIA while their colleagues in the Control Group will be taught the same concepts using CPC. The design layout is as shown in Table.

Table 4: Experimental procedure layout

Group	Pretest	Treatment	Posttest	Retention
Experimental	O_1 , A_1	X_1	O_1, A_1	O_1
Control	O_2, A_2	X_0	O_2, A_2	O_2

Where,

O_1 represents administration of Computer Achievement Test to the Experimental Group,

O_2 represents administration of Computer Achievement Test to the Control Group,

A_1 represents administration of Computer Attitudinal Questionnaire to the Exp. Group,

A_2 represents administration of Computer Attitudinal Questionnaire to the Control Group,

X_1 represents administration of Treatment (Mobile Tech. Instructional App.) to Exp. Group,

X_0 represents No Treatment

Population, Sample and Sampling Techniques

The population for this study will consist of all undergraduate distance learners in Nigerian Universities. The target population shall be made up of all year one (100L) distance learners. Purposive sampling will be used to select two Nigerian Universities operating dual-mode programmes (where distance learners can be sampled) and that have Computer science as courses offered. These two universities will be randomly assigned to experimental and control groups. Also, year one students offering Computer science courses will be purposively sampled based on the fact that the Computer science concepts selected are taught in their level. A total of two hundred and forty (240) distance learners comprising of 120 students in each of experimental and control group will be sampled for the study. Finally, stratified sampling technique will be used to obtain 60 male and 60 female learners in each of the groups.

Research Instruments

Three research instruments will be used for this study. They are Mobile Technology Instructional Application (MTIA), Compter Achievement Test (CAT) and Computer Attitudinal Questionnaire (MAQ). MTIA be developed using mobile device supported applications. The content of the instruction will be well structured undergraduate Computer science topics that are supported with working examples, illustrations, videos, audio, animations, computational equations, annotations to ensure its' interactivity. CAT will consist of multiple choice objectives question items. The items shall test all the levels of Bloom's taxonomy. Each of the items of the test will be provided with five options (A-E) out of which students will select the correct one. MAQ will be used to collect responses of distance learners regarding their attitude toward computer science. It shall consist of two Sections (A & B). Section A will be designed to collect demographic information of the respondents while Section B will be designed using 4-point scale of Strongly Agree (rated 4 points), Agree (rated 3 points), Disagree (rated 2 points) and Strongly Disagree (rated 1 points).

Validation of Research Instrument

The three research instruments will be validated by appropriate experts. Mobile Technology Instructional Application will be validated by four instructional design experts, four Mobile Technologist and four computer experts. Computer Achievement Test will be validated by four Computer science experts who are currently teaching the subject in Nigerian universities and two test and measurement experts. Also, the Computer Attitudinal Questionnaire will be validated by two test and measurement experts and two behavioral psychologists. The suggestions of these experts will be followed to improve the quality of the instruments.

Reliability and Pilot Testing

The research instruments will be subject to pilot study and data gathered will be analyzed using Kuder-Richardson formula and Cronbach Alpha formula in order to ascertain their reliability after single administration.

Data Analysis Technique

The data gathered to answer the research questions and test the null hypotheses stated will be analyzed using descriptive and descriptive statistics. Mean and Standard Deviation will be used to answer the research

questions. Analysis of Covariance (ANCOVA) and Kruskal-Wallis H Test will be used to test the null hypotheses using Statistical Package for Social Science (SPSS version 20) and the significance of every statistical analysis will be ascertained at 0.05 alpha levels.

Expected Result

It is expected that at the end of this research, the researcher would have been able to successfully develop mobile technology instructional application for learning Nigerian undergraduate Computer science concepts. The developed application is also expected to improve distance learners' attitude towards computer science and produce effect on such students' achievement in computer science while influence of gender would also have been determined.