

# Effects of Access Database Management System Hands-on Experience on Students' Academic Achievement and Self-Efficacy in Database Management

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## **Abstract**

*The purpose of this study is to determine the effect of access database management system's hands-on experience on students' achievement, interest and self-efficacy in database management in economics education. Quasi-experimental design specifying pre-test post-test control group design was adopted. The sample size was 72 students from two purposively selected intact classes. Simple random sampling technique was used to assign the classes, one to control group and the other to the experimental group. Three research questions and two null hypotheses were formulated to guide the study. Validated and trial-tested Databank Management Achievement Test (DMAT) was used for data collection for both the pretest and posttest while Validated Databank Management Interest Inventory (DMII) and Databank Management Self Efficacy Scale (DMSS) were used to collect data on students' interest in Databank Management and students' self-efficacy belief in Databank Management respectively. Mean and standard deviation were used to answer research questions and analysis of covariance used to test the null hypothesis at 0.05 probability level. The result proved that Access Hands-on Experience approach is more efficacious in enhancing students' achievement, interest and self-efficacy believe in Databank Management than the lecture method. It was recommended that Hands-on Experience should be encouraged in teaching Databank Management in tertiary institutions and that its use should be popularized through workshops, seminars and conferences.*

**Key Words:** *Economics education, Databank management, Hands-on-experience, Achievement, Self-efficacy*

## **1. Introduction**

The importance of economics education in an economy cannot be overemphasized. Economics education teaches individuals and the society in general that resources are generally scarce in the society and helps the learners in acquiring the skills that will enable them to manage the limited resources effectively and efficiently. It teaches the learners how to respond to incentives and how to make rational economic decisions as well as advances economic literacy among the general public. It deals with what to teach in economics, how to teach economics effectively and the act

of teaching economics. In the process, it embeds on individual learners the pedagogical skills in economics, the ability to address the problems of what to produce, how to produce, for whom to produce and how resources can be utilized efficiently which are needed by firms and the government for economic policy decisions and implementation. In its educative process, in addition to the explanation of the concepts of scarcity, it attempts to critically explain, efficiency, equity, opportunity cost, rational behaviour, marginal changes, incentives, the market economy, property rights, market failure, externality, market power and trade-offs amongst others. It explains what they are, why they exist, and how they can be managed for optimum benefits of the society (Mankiw, 2007; Onyepunuka, 2016). All of these are the major challenges besetting many economies today, including Nigeria.

Economics Education is a special branch of economics that utilizes educative approaches for the purpose of embedding on the resources within the society (Akarowhe, 2018). It is a field that focuses on state of the economics curriculum, the instructional materials and teaching techniques and making effort to improve them at all levels of education as well as making research into the effectiveness of alternative instructional techniques, the level of economic literacy of various groups, and factors that influences the level of economics literacy (Becker, 2015). Economics Education is the application of educational theories and principles into the science and art of teaching and learning economics contents in order to achieve the instructional objectives in more effective and efficient way. It is the systematic transmission and acquisition of knowledge, skills, attitude, and values that enable one to make rational decisions in relation to the use of scarce resources to satisfy the most pressing wants at the expense of others numerous ones. The behavioural approach is one of the major approaches it uses in studying human behaviour in economics education.

This behavioural approach and some other approaches require collection of authentic data on the relevant variable(s) directly from the source or from a well-managed data repository technically referred to as database or databank. Such data are used to explain or predict the behaviour of one or more variable(s) of interest in terms of the other(s). Databank is considered having the same meaning with database and they are used interchangeably in this work. The database is a structured collection of logically related data for an intended group of users and applications. According to Cathy (2017), it is a repository of related data or information on one or more subjects with a logically coherent structure for easy and quick retrieval whenever needed by the intended users and systems. A databank is as an electronic repository of data built for subsequent access, review, and update of particular pieces of information in a rapid and coherent manner.

Databases are of varying complexity, sizes, and physical organizations. The data contained

in the bank usually represent the partial view of a portion of the real world. Imo (2018) identified four types of databases as an institutional database, national database, regional databases and Non-Governmental Organizations (NGOs)/international agencies database. Imo further explained that institutional database is a repository of research results from institutions and national

database is a central repository for coordinating facilities for scientific publications in various institutions in a country while regional database and NGOs/ international agencies databases are pools of databases from various countries that make up the block referred to as region and pools of databases which are built by NGOs and commercial publishing outfit respectively.

A databank may also be established with the intention of using the information contained within for research and other uses such as grading and reporting, recommendation, promotion, trend identification and the stimulation of ideas for possible future research. Therefore, a reliable and valid database should be the hub of the Economics Education especially in the Information and Communication Technology (ICT) era when electronic databases have become sources of current information for research. If the data and database upon which the principles, theories, and practices of economics education are based are not reliable or valid, subsequent activities and practices will lose their desired reliability and effectiveness. Thus, effective approach in teaching and learning the state of the act databank management in Economics Education is a sine qua non.

Considering the related pieces of literature on databank management and the consequential nature of data generally available in Nigeria, it becomes very disturbing that the reverse has been the case for decades. Education data generally available in Nigeria tends to be inaccurate and unreliable. This is admitted by Udoh (2017) who stated that the demographics and the educational data in Nigeria have suffered a tremendous inaccuracy; and Ololube (2019) who observed that one of the most difficult challenges that are faced in the field of education is the issue of inaccurate statistical data. This situation has been one of the major causes of ineffective and inefficient planning and implementation of economic, economics education and education programs and policies in Nigeria as Okoroma (2006) observed that reliable data have not been a popular feature in planning [and implementing Economics] education [programs] in Nigeria. One of the factors identified to be the cause of unreliable and inaccurate data in Nigeria is the unpopularity of Databank Management in Schools' curricula and the consequential use of mediocre and ill-trained personnel for data collection and databank management.

This indicates lapses in the education system since the graduates are observed to be ill-trained and incompetent for employment. These lapses have been attributed to the teaching and learning process in schools and its outcome; indicating the inability of schools to achieve curriculum goals. For an educational goal to be attained, the students are expected to attain high academic achievement (Okoro, 2005). Academic achievement is a concept influenced by multiple factors and hence variously conceptualized by various groups of persons (Santos, Bago, Baptist, Ambroso, Fonseca & Quintas, 2016). The major categories of these influences include socioeconomic status; academic institutional arrangements and students' personal characteristics (Ganyaupfu, 2013). In most studies, it is viewed as successful completion of studies within a given time frame (Higher Education Academy, 2008) and in that case achievement is reduced to rate (Santos at al. 2016). Anastasi and Uraina (2005) stated that achievement is the aspect of measuring the effects of a relatively standardized set of experience. Academic achievement is the level of attainment of predetermined learning objectives by the learner. The level of attainment is determined through the results of internal and external assessments that take the form of

formative and summative evaluations. In postgraduate studies setting, the standardized format for assessing the students' academic achievement is through course work, seminar presentations, end of semester examinations and end of program project or thesis reports.

Numerous studies have shown that student's poor achievement is epidemic in computer science courses (Isman, 2005; Liao, 2007; Wise-Geek, 2013; Anigbo & Orié, 2018) of which Databank Management is one, irrespective of the disciplinary area, such as economics education, in which it is housed. Teaching styles used by lecturers in delivering their lessons have a positive influence on learners' academic achievements (Kang'ahi et al., 2012). The causes of students' poor achievement is traceable to predominant use of lecture method of teaching ICT and computer studies (Lia, 2007; Wise-Geek, 2013) which makes learners become discouraged and passives (Madu & Nwangwu, 2014); an uninspiring method continuously used to teach ICT in Nigeria which had not been effective in classroom delivery (Anigbo & Orié, 2018). This practice may have been negatively impacting the levels of Economics Education students' achievement and self-efficacy in Databank Management as Ossai (2014) observed that the conventional instructional method of 'talk and chalk' is grossly inadequate for teaching a problem-solving approach discipline. Since the conventional teaching method fails to demonstrate an appreciable positive effect on students' achievement, it may be right to pressure that the method cannot help in teaching and learning many ICT skills in Economics Education to the extent of affecting the desirable changes in students' behaviour. So, there is the need to experiment the effect of access database management system hands-on-experience on students' achievement and self-efficacy in database management among economics education students as Margolis & McCabe (2004) stated that teachers can strengthen self-efficacy by linking new work to recent student successes, teaching the needed learning strategies, reinforcing effort and persistence.

Hands-on-experience is a teaching technique in which students are guided to learn by doing. This means providing the opportunity for the students to manipulate the objects they are studying. Caglak (2017) agrees that hands-on experience is an important teaching approach purposively planned to engage the learners in teaching practices in order to facilitate their active learning process and according to (Ekwueme, Ekon & Ezenwa-Nebife, 2015), Haury, & Rillero, (2015) stated that hands-on-approach engages the student in overall learning experience which advances the student's ability to think critically. It has been proposed as a means to increase students' academic achievement and understanding of scientific concepts by manipulating objects which may make abstract knowledge more concrete and clearer (Ekwueme et al.). This is consistence with Rytting, Wright, Shumway and Jenson (2019) who found hands-on experiences as an approach that engages the students and viewed it effective in teaching and learning science subjects such as physics. Empirical studies conducted by on the effectiveness of hands-on approach on students' achievement by Ates & Eryilmaz, (2011), Bigler & Hanegan (2011), Ekmekci and Gulacar (2015), Gaitano and Bogner (2011) and Randier and Hulde (2007) generally disclosed that hands-on approach is an effective method of teaching science disciplines.

Contrary to the positive results from the above empirical studies, the metanalysis of quasi-experimental studies conducted by Schwichow, Croker, Zimmerman, Hoffler, and Hartig (2015)

and intervention studies conducted by (Schwichow, Zimmerman, Croker and Hartig (2016), showed that there is no significant difference between the performances of the students exposed to hands-on-experience and other teaching methods in the first instance and in the second instance, that the achievement of eight grade students exposed to hands-on experience and pen-and-pencil activities is not statistically significant. This to a large extent makes the effect the approach may have on economics education students on databank management using Microsoft Access Database Management system is highly probable and hence needed to be investigated.

The effects of hands-on-experience on some outcome psychological and affective variables have also been investigated by scholars and researchers. Among these variables are science process skills by Bilgin (2006); attitude by Sadi and Cakiroglu (2011) and Koc and Boyuk (2012); and interest by Holstermann, Grube, and Bogeholz (2010, Randier and Hulde (2007) and the results of these researches showed that hands-on-experience is efficacious in enhancing the students cognitive and affective skills relative to the traditional teacher-centred chalk-and-talk method, especially in science disciplines. It was also found to be positively associated with students' interest in sciences (Bulunuz, 2012; Holstermann et al., 2010). However, its impact on self-efficacy in databank management and in ICT generally among economics education students is not clear.

Self-efficacy is the conviction one has about one's competencies (Dinter, Dochev & Segars, 2011). According to Aşkar and Umay, (2001) and Woolfolk (1998) cited in Meltem (2015), the four major sources of self-efficacy are the past successes or failures in a specific area, one's observation of similar success or failure experienced by others, external encouragements, and one's ability to control one's emotions that can make or mar one's self-efficacy belief. Self-efficacy is the self-assurance that one can or cannot execute a particular task successfully in the future based on one's past experiences, encouragement by others, observation of similar success or failure experiences of others and one's ability to controls ones intervening emotional state. Self-efficacy belief differs from the self-concept of ability. Self-concept of ability deals with the way someone feels in respect of his previous achievement compared to that of others while self-efficacy belief measures whether an individual is capable of executing a task in the future or not.

In the teaching and learning process self-efficacy deals with the belief in successful mastering a specific task, concept, theory, etc. or success in acquiring a particular skill in future while self-concept of ability deals with the evaluation of the academic performance of an individual relative to others. Self-efficacy developed from Albert Bandura's (1986) human social cognition theories. Bandura explained that self-efficacy is the belief that one is capable of organizing and implementing the sources of action needed for controlling anticipated situations. The theorist singles out self-direction ability and fore-thought; explaining that people plan the process of their actions, set realizable action-guiding goals and objectives and the means of dealing with the besetting challenges; the positive or negative outcome of which determines one's subsequent positive or negative motivation and behaviour respectively. Hence, individuals like to do whatever that gives them satisfaction or self-esteem but avoids whatever that devalues them. Hence behaviour can be predicted by predicting perceived self-efficacy.

It is reported that students' past achievement is the most robust source of self-efficacy belief and that the most robust and direct academic achievement factor is the instructional approach (Usher & Pajares F, 2008; Schunk, Pintrich & Meece, 2008, Artino, 2012). This is in line with Fencl and Scheel (2005) who noted with excitement that instructional approach used in teaching can impact students' self-efficacy and, McCabe (2006) who disclosed that teachers can strengthen self-efficacy by linking new work to recent student successes, teaching the needed learning strategies, reinforcing effort and persistence, and helping students to identify or create personal goal but unfortunately, the Economics education students' level of self-efficacy in databank management seems low due to poor instructional approach and poor academic achievement in ICT courses. Hence the need to investigate the effects of access database management hands-on-experience on students' achievement and self-efficacy in database management. In Databank management class, Access hands-on-experience approach is a process whereby students are actively involved in the process of creating, working on and managing databank during teaching and learning process through the guidance of the teacher or the instructor. This method is a learner-centred approach that allows the learner to see, touch and manipulate the computer system and its application - Access Database Management System while learning Databank Management skills.

Database Management System (DBMS) is a comprehensive database software program that is designed to create and manage databases. According to Anigbo and Orie (2018), it is application software that manages an unlimited number of databases and equally interacts with the users. DBMS is designed to store, manage, change, search, and extract the information contained in the database. The software also protects the information in the database and ensures that the data is accurate and consistent. Therefore, DBMS is used to manage data in the database, manage the database engine by allowing access to the data, enables the data to be locked and modified. It also manages the database schema which defines the database's logical structure. These are done in order to ensure concurrency, security, data integrity, and uniform administration procedures. DBMS administration tasks include change management, performance monitoring, backup and recovery, automated rollbacks, restarts, logging and auditing of activity (Rossi, 2016); accessing data, inserting, updating, deleting data, application-defined rules, triggers, batch-support, on-line programs, optimizing performance, maximizing availability, managing the buffer pools, acting as interface to other system programs and supporting user interface package (Anigbo & Orie). Some of the most well-known database software programs are Microsoft Access, Microsoft Excel, Microsoft SQL Server, My SQL, etc.

The choice of Microsoft Access Management System (Ms. DBMS) is because it is easy to use and inexpensive database management system specially designed to carry out the functions of database management. It is readily available for installation along with other Microsoft packages in computer systems, it is economically suitable for many students to learn and practice database management skills. Ms DBMS is a relational database management system that allows offline usage of the application. This means that all data is organized into (related) tables offline but can be uploaded into the internet. To use this, system, one needs to know the type of data one has and

organize it into a structural table. It can be used to budget monthly expenses, record students' personal and academic information, school statistics, population statistics, etc. One needs to know what one can use to identify each row of the table e.g. sub-title or name and the connecting links among the fields serve as the primary key. Access usually guide and prompt the user to do all these and more as he/she follows the steps.

Comparing Access to Excel, Access is more suitable for tracking and recording data on a regular basis and for displaying, exporting, or printing subsets of that data. According to Microsoft Corporation (n.d.), Access forms provide a more convenient interface than an Excel worksheet for working with data. Access provides more structure for the user's data, for example, the user can control what type of data that can be entered, what values can be entered and he/she can specify how data in one table is related to data in other tables by creating relationship. This structure helps the user to ensure that the only correct type of data is entered thereby ensuring the accuracy of the data.

This study, therefore, focuses on the possible effect of (Microsoft) Access Hands-on-experience on students' academic achievement and self-efficacy in database Management. Scholarly reports and research have observed that high achievement and self-efficacy belief is usually enhanced by a proper instructional approach. This means that the method adopted by any teacher in teaching any particular subject can affect learner's level of achievement and self-efficacy belief. However, the efficacy of Access Hands-on-experience on students' achievement and self-efficacy in Databank Management among Economics Education Students is uncertain. There is, therefore, the need to experiment the effect of access database management system's hands-on experience on economics education students' achievement, interest and self-efficacy believe in databank management.

#### *1. 2. The problem of the study*

Teaching and learning Databank Management in Nigeria seems not to be yielding positive outcomes because of poor academic achievement and low self-efficacy belief in databank management which is showcased in the nature of the available data in Nigeria. Education, demographic and statistical data available in Nigeria tend to be inaccurate and unreliable ( Udoh, 2017; Ololube 2019). Ololube added that Nigerian education systems have failed to effectively plan because of lack of accurate data.

One of the major factors identified to be the cause of unreliable and inaccurate data in Nigeria is the use of mediocre and ill-trained personnel for data collection, data management, and databank management. This further indicates that there are lapses in the education system since the graduates have been termed ill-trained because of their incompetence. These lapses have been attributed to the teaching and learning process in schools and its outcome amongst others. One of the major factors that have been identified that impacts the quality of teaching and learning. In Nigeria's institution of learning, the lecture method of teaching is mainly used in classes for teaching and learning. According to Ekpo (2006) and Nwangwu (2014) poor academic achievements have been attributed largely to the methods of instruction which is predominantly lecture method which makes learners become discouraged and passives.

So, in order to improve the academic achievements and overall performances of students, educators continually search for more effective ways to engage their students during the teaching and learning process. Secondly, it has been observed that employers complain that Nigeria graduates [including Economics Education graduates] are half baked and poorly prepared for work that the deficiencies among the graduates are in the areas of, communication, decision making, information and communication technology, and self-defected skills (Oluyemi & Adedeji, 2012; Eneogu & Ugwuanyi 2014). All these are attributed largely to the perennial poor academic achievement that results from inappropriate method of teaching.

The problem of this study expressed in question form therefore, is what is the effect of databank management system hands-on experience on students' achievement and self-efficacy believe in databank management among Economics Education students?

#### *1.4. Purpose of the study*

The general purpose of this study is to determine the effect of databank management system hands-on experience on students' achievement and self-efficacy belief in databank management among Economics Education students. Specifically, it seeks to:

1. Find the mean achievement scores of students taught databank management using Access Database Management System Hands-on-experience and that of those taught using the lecture method.
2. Find the mean self-efficacy scores of students taught databank management using Access Database Management System Hands-on-experience and that of those taught using the lecture method

#### *1.5. Scope of the study*

The study established the effect of access database management system hands-on experience on students' achievement and self-efficacy belief in databank management. Databank Management skills taught are creating databank files, entering data in the datasheet, entering field names, choosing a primary key, editing, sorting, filtering, searching and calculating data; creating relationships and forms; navigating the forms and running query and reports. The study was conducted in south-East Geopolitical Zone, Nigeria using first-year PhD students. The universities used for the study were selected from the zones using a purposive sampling technique.

#### *1.6. Research Questions*

The following research questions formulated by the researcher guided the study:

1. What are the mean achievement scores of students taught databank management skills using Microsoft Access Database Management System Hands-on-experience and those taught using lecture method?
2. What are the mean self-efficacy scores of students taught databank management skills using Microsoft Access Management System Hands-on-experience and that of those taught using lecture method?

### 1.7. Hypotheses

The following null hypotheses were formulated by the researcher and tested at 0.05 levels of significance.

Ho1: There is no significant difference in mean achievement scores of students taught databank management skills using Microsoft access Hands-on-experience and those taught using the Lecture Method.

Ho2: There is no significant difference in the mean self-efficacy scores of students taught Databank Management skills in economics education using Microsoft Access Hands-on-experience and those taught using Lecture Method.

## 2. Research Method

The study adopted quasi-experimental non-equivalent pre-test and post-test control-group design involving two intact groups of one experimental group and one control group. This is in line with Nworgu (2015) who observed that quasi-experimental research design is used where a random assignment of subjects to experimental and controlled groups is not possible in which case, intact or pre-existing groups are used. The two intact groups used are:

Group I: Access database management system hands-on-experience. This group was made up of first-year PhD students of Economics Education.

Group II: Lecture Method. This group was made up of first-year PhD students of Economics Education.

Whereas group 1 is the experimental group, group II is the control group. This is diagrammatically represented below.

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| <b>Group</b>       | <b>Pre-test</b> | <b>Research condition</b> | <b>Post-test</b> |
|--------------------|-----------------|---------------------------|------------------|
| Experimental group | O1              | X or treatment            | O2               |
| Control group      | O1              | - Or control              | O2               |

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Where O1 = pre-test; O2 = post-test;

X = Treatment to be administered to experimental group and

- = the subjects receive a placebo treatment

In recent similar studies, Adene et al (2021), Ejimonye et al. (2020a, b), Offordile et al. (2021), Njoku et al. (2020) have adopted this design. The study was carried out in South-East Geopolitical Zone, Nigeria. The choice of this zone is due to the fact that it is a commercial area where economic data for research and other purposes are indispensable. Moreover, many tertiary institutions and researchers that deal a lot with research and education data are found in this geographical area.

The population of the study was made up of 200 Ph.D. students of Economics Education that offer the course on information and communication technology in public universities in the Southeast Geopolitical Zone, Nigeria. The choice of postgraduate students as the population for the study is because the selected topic is in PhD Economics Education ICT course content. The

sample size is 72 students. Two out of five universities in southeast Senatorial District of Nigeria that offer Economics Education were used for the study. These were drawn using purposive sampling techniques. Simple random was used for assigning the sampled schools to control and experimental groups.

Two lesson plans were prepared by the researchers; one for the Lecture method and one for Access Databank Management hands-on experience. The lesson plans used were face validated by one ICT expert in Economics Education and one expert in measurement and evaluation. A copy of the validated lesson plan was given to the lecturers for the treatment exercise.

The main treatment for the study is teaching using the conventional (lecture) method and using computer systems installed with Microsoft Access database management system 2007, 2010 and 2013 versions and projector hands-on experience approach. The treatment lasted for four weeks. The teacher in teaching the experimental group using Access hands-on-experience projected the information and his/her practical examples while every student use a desktop/laptop each to do whatever they observed the teacher do and what he instructed them to do in the process of creating databank files, entering data in the datasheet, entering field names, choosing primary key, editing, sorting, filtering, searching and calculating data; creating relationships and forms; navigating the forms and running query and reports. The controlled group was taught the same topics using the conventional approach. In using this approach, the Economics Education ITC lecturer in the university taught the students without the students operating the computer in the learning process but just listens to the explanation of the teacher and may take down notes.

The teacher of the experimental group was trained on how to use the Microsoft database system for databank management and on how to use a projector and slid by the researchers. A-15 items of a four-point Likert-type Databank Management Self-Efficacy Scale (DMSS) and a 20 item Databank Management Achievement Test (DMAT) developed by the researcher and validated by two experts in the Faculty of Education, University of Nigeria, Nsukka were used for data collection before the final version was developed. The DMSS used was trial-tested and the responses were used to calculate the internal consistency using Cronbach's alpha and reliability coefficient of 0.90 was obtained. The DMAT used was pilot-tested and the scores were used to establish the internal consistency of the test items using Kuder-Richardson formula 20 (K-R, 20) method. Thus an internal estimate of 0.71 was obtained. Pretests using the two instruments were first administered on the subjects by the researchers themselves and the result carefully recorded before the treatment session. A day after the treatment, a post-test was administered on the subjects by the researcher using the same DMSS and DMAT as in pretests.

Mean and standard were used to answer research questions with the aid of SPSS and in Microsoft excel computer applications. Analysis of covariance (ANCOVA) was used to test the hypotheses at 0.05 alpha levels of significance.

### **3. Results**

The results are presented according to the research questions and hypotheses.

*Research question 1:* What are the mean achievement scores of students taught databank management skills using Microsoft Access Management System Hands-on-experience and those taught using lecture method?

*Table 1-* Mean achievement and standard deviations scores of students in the acquisition of databank management skills

| <b>Groups</b>                     | <b>Pre-test</b> | <b>S D</b> | <b>Post-test</b> | <b>S D</b> | <b>Mean Gain</b> | <b>N</b> |
|-----------------------------------|-----------------|------------|------------------|------------|------------------|----------|
| <b>Access Hands-on Experience</b> | 20              | 5.540      | 64               | 8.616      | 44               | 42       |
| <b>Lecture Method</b>             | 18              | 8.079      | 36               | 10.613     | 18               | 30       |

Table 1 shows that the experimental group has a pre-test mean score of 20, a post-test mean score of 64 and a mean gain of 44; while the control group also has a pre-test mean score of 18, a post-test mean score of 36 and mean gain of 18. The experimental group has a higher mean gain than the control group. This shows that the group taught data management skills in Economics Education topics using Access Hands-on Experience achieve better than those taught with the Lecture Method.

Table 1 also shows that in a pre-test, scores in the Access Hands-on Experience group deviated from the mean score with the standard deviation of 5.540. The deviation of the pretest scores of the Lecture Method group from the mean score is more, having a standard deviation of 8.079. In post-test, scores of the treatment group deviated with a standard deviation of 8.616 while the deviation of the posttest scores of the Lecture Method group from the mean score is more, having a standard deviation of 10.613.

*Research question 2:* What is the mean self-efficacy scores of students taught databank management skills using Microsoft Access Management System and those taught using lecture method?

*Table 2-* Mean self-efficacy and standard deviations scores of students in the acquisition of databank management skills

| <b>Groups</b>                     | <b>Pre-test</b> | <b>S D</b> | <b>Post-test</b> | <b>S D</b> | <b>Mean Gain</b> | <b>N</b> |
|-----------------------------------|-----------------|------------|------------------|------------|------------------|----------|
| <b>Access Hands-on Experience</b> | 52              | 9.439      | 89               | 10.468     | 37               | 42       |
| <b>Lecture Method</b>             | 47              | 12.339     | 61               | 13.6.6     | 14               | 30       |

Table 2 shows that the experimental group has a pre-self-efficacy belief mean score of 52, a post-self-efficacy belief mean score of 89 and mean gain of 37; while the control group has a pre-self efficacy believe mean score of 47 a post-self efficacy believe mean score of 61 and mean

gain of 14. The experimental group has a higher mean gain than the control group. This shows that the group taught data management skills in Economics Education topics using Access hands-on Experience have higher self-efficacy score than those taught with lecture method.

Table 2 also shows that in 8self-efficacy believe, scores in the Access Hands-on-experience group deviated from the mean score with the standard deviation of 9.439. The deviation of the pre-self efficacy belief scores of the lecture method group from the mean score is more, having a standard deviation of 112.338. In post- self-efficacy belief, scores of Access hands-on Experience group deviated with a standard deviation of 10.468 while the deviation of the posttest scores of lecture method group from the mean score is more, having a standard deviation of 13.616.

### 3.2. Test of Hypotheses

*H01:* There is no significant difference in mean achievement scores of students taught databank management skills using Microsoft access and those taught using expository instructional strategy.

*Table 3-* Analysis of covariance (ANCOVA) of students' achievement on Access DBMS Hands-on Experience and Conventional Lecture Method

| Source                            | Type III Sum of Squares | Df | F     | Sig  |
|-----------------------------------|-------------------------|----|-------|------|
| <b>Corrected Model</b>            | 17911.66 <sup>a</sup>   | 2  | 174.0 | 0.00 |
| <b>Intercept</b>                  | 6403.15                 | 1  | 124.4 | 0.00 |
| <b>Pre-test</b>                   | 3834.70                 | 1  | 74.5  | 0.00 |
| <b>Access Hands-on Experience</b> | 11218.83                | 1  | 217.9 | 0.00 |
| <b>Error</b>                      | 3551.46                 | 69 |       |      |
| <b>Total</b>                      | 220754.00               | 72 |       |      |

The results shown in table 3 indicate that treatment has a direct effect on students' achievement in Databank Management. This is because the F-value at 217.9 in respect of treatment main effect is shown to be significant at .000. This, therefore, shows that at 0.05 level of significance, the F-value of 217.9 is significant. Therefore, it can be concluded that the research null hypothesis 1 is rejected. The observed difference between the mean scores of students taught some Databank Management Skills using Microsoft Access Hands-on experience and those taught using the Lecture Method is significant and not by chance.

*H02:* There is no significant difference in the mean self-efficacy scores of students taught data management in economics education using Microsoft access and those taught using the lecture method.

*Table 4-* Analysis of covariance (ANCOVA) of students’ self-efficacy belief on Access DBMS Hands-on Experience and conventional lecture method

| Source                     | Type III Sum of Squares | Df | F     | Sig. |
|----------------------------|-------------------------|----|-------|------|
| Corrected Model            | 15692.81 <sup>a</sup>   | 2  | 575.2 | .000 |
| Intercept                  | 1432.59                 | 1  | 105.0 | .000 |
| Pre-self-efficacy          | 9838.34                 | 1  | 721.3 | .000 |
| Access Hands-on Experience | 9451.91                 | 1  | 692.9 | .000 |
| Error                      | 941.16                  | 69 |       |      |
| Total                      | 457651.00               | 72 |       |      |
| Corrected Total            | 16633.99                | 71 |       |      |

The results shown in table 4 indicate that treatment has a direct effect on students’ self-efficacy believe in databank management. This is because the F-value at 692.9 in respect of treatment main effect is shown to be significant at .000. This, therefore, show that at 0.05 level of significance, the F-value of 692.9 is significant. Therefore, it can be concluded that the research null hypothesis 2 is rejected. The observed difference between the mean scores of students taught Databank Management skills using Microsoft Access Database Management System Hands-on Experience and those taught using Access Database Management System Lecture Method is significant and not by chance.

#### 4. Discussion

The findings showed that the Microsoft Access Database Management System Hands-on-Experience yielded a significant difference in students’ achievement in Databank Management than the Conventional Lecture Method. The students learned Databank Management skills better as they were actively involved in the teaching-learning process by manipulating their laptop Microsoft Access Management system to experience the various skills that it teaches. This increased their interest and academic achievement because if a lesson appeals to the learners, their interest and academic achievement tend to be high.

This result is in line with Ekwueme, Ekon & Ezenwa-Nebife, (2015) who discovered that Hands-on-experience increases students’ academic achievement and understanding of scientific concepts by manipulating objects which may make abstract knowledge more concrete and clearer, and Rytting, Wrigth, Shumway and Jenson (2019) who found hands-on experiences as an approach that engages the students and viewed it effective in teaching and learning science

subjects such as physics, which now applies to economics education which is a social science education discipline.

The finding is also consistent with the results of the studies conducted by Ekmekci and Gulacar (2015), Ates & Eryilmaz, (2011), Bigler & Hanegan (2011), Gaitano and Bogner (2011) and Randier and Hulde (2007) which discovered that hands-on approach is an effective method of teaching. Hands-on Experience is more learner-centred and makes learners more active than the Conventional Lecture approach. However, the result is not in agreement with the findings of the metanalysis of quasi-experimental studies conducted by Schwichow, Croker, Zimmerman, Hoffler, and Hartig (2015) that revealed that there is no significant difference between the performances of the students exposed to hands-on-experience and other teaching methods; and the intervention studies conducted by Schwichow, Zimmerman, Croker, and Hartig (2016) that discovered that the achievement of eight grade students exposed to hands-on experience and pen-and-pencil activities is not statistically significant. These disagreements could be as a result of the fact that Croker, Zimmerman, Hoffler, and Hartig studies investigated the results of the effects of hands-on approach and other teaching methods, which are quite different from the lecture methods, on students' academic achievement while in the studies conducted by Schwichow, Zimmerman, Croker, and Hartig (2016), the population characteristics of the subjects are quite different from that of this present study. The eighth-grade students the earlier work used as the subject are characterized as social digital generation that is more amenable to ICT and computer usage unlike the adult Ph.D. students used as the subject of this present work who started making use of ICT very late in their life and in their studies and therefore needed a more practical oriented approach in order to boost their self-efficacy and academic achievement than the former. Even outside the classroom, the social digital generation makes use of different kinds of computer and their various applications for games, social interactions and entertainments and so very familiar with the intricacies of the system but the adult learners are too engaged with other life entanglements to play with the computer, so hands-on-approach becomes one of the major approaches by which they can deeply learn the usage of ICT applications.

The findings also revealed that Access Databank Management System Hands-on-experience enhances students' self-efficacy belief in Databank Management than the Lecture Method. This is consistent with Usher and Pajares (2008) and Schunk, Pintrich and Meece, (2008) who stated that instructional approach has a direct effect on academic achievement and the earlier study of Fencil and Scheel (2005) who noted with excitement that instructional approach used in teaching can impact students' self-efficacy. this study also agreed with Margolis and McCabe (2006) who disclosed that teachers can strengthen self-efficacy by linking new work to recent student successes, teaching the needed learning strategies, reinforcing effort and persistence, and helping students to identify or create personal goals. The students' active participation quality of Access Databank Management System Hands-on-experience challenged the students to learn. It impressed and challenged them; and made Databank Management real to them. It enabled them to understand learning as both science and an act and then have confidence that they cannot only improve in their learning but can effect such improvement through

experiential learning and so leading to the increase their level of self-efficacy belief because success in successful completion of a process in databank management activities boosts the students motivation to complete the subsequent process successfully. With a good teaching strategy, students' self-efficacy in a particular subject can be improved upon. This, in turn, will lead to a better understanding, high academic achievement and further increase in self-efficacy belief.

The conventional lecture method has been described as being boring and uninteresting to the students and also ineffective due to its teacher-centeredness and poor student activities relative to Access Databank Management System Hands-on-experience. This is in line with Liao (2007), Wise-Geek, (2013) and Nwangwu (2014) who observed lecture Method is ineffective in teaching and learning computer and ICT courses because it makes learners become discouraged and passives are not. Hence, students' low achievement, interest, and self-efficacy believe in Databank Management are traceable to the predominant use of the Lecture Method in teaching Databank Management.

## **5. Conclusion**

Microsoft Access Database Management System Hands-on-experience proved efficacious in enhancing Economics Education Ph.D. students' achievement in Databank Management. This means that in an effort to promote high achievement, interest and self-efficacy believe in Databank Management; Databank Management skills should be tonight using Hands-on Experience. The conventional method had been proved to be ineffective in enhancing students' achievement, interest and self-efficacies believe in Databank Management.

## **6. Recommendations**

Based on the findings of the study, the following recommendations are made:

1. ICT lecturers in Economics Education should adopt the use of a hands-on approach to teaching Databank management.
2. The school authorities should equip their institutions with the state of the art multi-facilities such as computers with database management systems installed in each of them, overhead projectors and ensure regular electric power supply.
3. Enlightenment campaign, seminars, workshops and conferences for use Access Databank management system hands-on experience and other Databank management system hands-on experience in teaching and learning Databank and data management should be organized by faculties, schools, and relevant professional associations.

## **REFERENCES**

Adene, F.M., Umeano, E.C., Adimora, D.E., Ugwuanyi, C.S., Okeke, C.I.O., Offordile, E.E., Amaeze, F.E., Uzodinma, U.E., Abdullahi, Y., Ejiofor, J.N. & Ishiwu, E.N. (2021). Effectiveness of Peer Collaborative Learning Strategy on Self-Esteem of Pupils with Behaviour Problems in Nsukka Education Authority. *Journal of Critical Reviews*, 8(1), 1055-1069. <http://www.jcreview.com/fulltext/197-1615692041.pdf?1615708380>

- Akarowhe, K. (2018). Roles of economics education in sustainable national development. *Journal of Global Economics (06)* 3, p, 298. Available at: <https://doi.org/10.4172/2375-4389.1000298>
- Anastasi, A. & Uraina, S. (2005). Psychological testing. India: Pearson Education.
- Anigbo, L. C. & Orié, J. M. (2018). Effect of PowerPoint instruction on students' academic achievement in computer science (database management system) in colleges of education in River State. *Computer Engineering and Intelligent Systems*, 91. Available at: [www.iiste.org](http://www.iiste.org).
- Ateş, O. & Eryılmaz, A. (2011). Effectiveness of hands-on and minds-on activities on students' achievement and attitudes towards physics. *Asia-Pacific Forum on Science Learning and Teaching*, (12)1. pp. 3-22.
- Bandura, A. (1986). Social foundation of thoughts and actions: A social cognitive theory. Englewood Cliffs, N.J: Prentice-Hall. Availa <http://www.wikied.uiucaed/index.php/self-efficacy.168>
- Becker, W.E. (2015). Economic education. *International Encyclopedia of Social & Behavioural Sciences (2nd Ed.)*. Available at: <http://www.sciencedirect.com/topics/socialsciences/economic-education>
- Bigler, A. M., & Hanegan, N.L. (2011). Student content knowledge increases after participation in a hands-on biotechnology intervention. *Journal of Science Education and Technology*, 20(3): 246-257.
- Bilgin, I., (2006). The effects of hands-on activities incorporating a cooperative learning approach on eighth-grade students' science process skills and attitudes toward science. *Journal of Baltic Science Education*, (1) 9 pp. 27-37.
- Bulunuz, M. (2012). Motivational qualities of hands-on science activities for Turkish pre-service kindergarten teachers. *Eurasia Journal of Mathematics, Science & Technology Education*, (8) 2. pp. 73-82.
- Cathy, R., (2017). What is database management? In IT management (Ed). *Software, technology, and management insight for IT professional: capture IT Management blog*.
- Caglak, S. (2017). Does hands-on science practices make an impact on achievement in science? A meta-analysis. *Journal of Education in Science, Environment, and Health (JESEH)*, (3)1. pp. 69-87
- Dinter, M.V., F. Dochey & Segars, M. (2011). Factors affecting students' self-efficacy in higher education. *Education Research Review* 6, 95 – 108.
- Ejimonye, J.C., Onuoha, J.C., Ugwuanyi, C.S., Eneogu, N.D., Ugwuanyi, B.E & Ogbuehu, S.N (2020a). Effectiveness of Two-Dimensional Animation Technique in Enhancing Students' Motivation in Quantitative Economics Concepts. *International Journal of Future Generation Communication and Networking (IJFGCN)*, 13(1):27-38.
- Ejimonye, J.C., Ugwuanyi, C.S., Okeke, C.I.O., & Nwoye, M.N. (2020b). Two-Dimensional Animation and Students' Achievement in Mathematical Economics: Implications for

- Science Teaching. *International Journal of Engineering Research and Technology*, 13(6), 1220-1230
- Ekmekci, A., & Gulacar, O. (2015). A case study for comparing the effectiveness of computer simulation and a hands-on activity on learning electric circuits. *Eurasia Journal of Mathematics, Science & Technology Education*, (77) 4. pp. 765-775.
- Ekpo, J. (2006). TIPS on teaching difficult concepts in senior secondary school chemistry. *Review of Education*, (17) 1. pp. 1 – 8.
- Ekwueme, C. O., Ekon, E.E. & Ezenwa-Nebife, D.C. (2015). The Impact of Hands-On-Approach on Student Academic Performance in Basic Science and Mathematics. Higher Education Studies, *Canadian Center of Science and Education*, (5).6 Available at: <http://dx.doi.org/10.5539/hes.v5n6p47> DOI:10.5539/hes.v5n6p47
- Eneogu, N. D & Ugwleanyi, B.E. (2014). Potentials of education in managing the economic implications of skills mismatch in the Nigerian labour market. *International Journal of Education Research* (13) 1. pp. 253-269.
- Fencl, H. & Scheel, K. (2005). Research and Teaching: Engaging Students -- An Examination of the Effects of Teaching Strategies on Self-Efficacy and Course in a Nonmajors Physics Course. *Journal of College Science Teaching* (35)1: 20-24
- Holstermann, N., Grube, D. & Bogeholz, S. (2010). Hands-on activities and their influence on students' interests. *Research in Science Education*, (40)5. 743-757.
- Koc, A., and U. Boyiik, (2012). The effect of hands-on science experiments on attitude towards science. *Journal of Turkish Science Education*, (9) 4. pp. 102-118.
- Higher Education Academy. (2008). National Plan for Equity of Access to Higher Education. Dublin: Author
- Imo, N. (2018). Electronic resources- a vehicle to expanding the frontiers of information access. Paper presented at synopsis and research grant-write workshop PGC 701 University of Nigeria, Nsukka, Nigeria.
- Liao, Y.C. (2007). Effects of Computer Assisted Instruction on student' Achievements in Taiwan! A Meta-Analysis; *Computer and Education*, 48: 216-233.
- Margolis, H. & McCabe, P.P. (2006). Self-efficacy: A key to improving the motivation of struggling learners. *The clearing House* 77 (24). Available at: [http://enikipedia.org/wiki/Reading Comprehension](http://enikipedia.org/wiki/Reading%20Comprehension).
- Mankiw, G.N. (2007). Principles of macroeconomics (4<sup>th</sup> edition). New York: South-west.
- Meltem, G. B. (2015). The effect of special teaching methods class on the level of teachers' self-efficacy perception of the pre-service teacher. *Educational Research and Reviews* (10) 8. Pp 1165-1190, Available at <http://www.academicjournals.org/ERRDOI:10.5897/ERR2015.2146>
- Njoku, M.I.A., Nwagbo, C.R., & Ugwuanyi, C.S. (2020). Effect of Peer Tutoring and Peer-Led Team Learning on Students' Achievement in Biology. *International Journal of Database Theory and Application (IJDTA)*, 13(1),1-10. <https://doi.org/10.33832/ijdta.2020.13.1.01>.
- Nworgu, B.G. (2015). Educational research. Basic issues and methodology (3<sup>rd</sup> edition). Nsukka:

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- Offordile, E.E., Umeano, E.C., Adene, F.M., Obi, M.C., Ugwuanyi, C.S., Okeke, C.I.O., Adimora, D.E. (2021). Improving the academic achievement of low achieving secondary school students in physics using peer tutoring learning strategy: Implications for Engineering Career. *International Journal of Mechanical and Production Engineering Research and Development (IJMPERD)*, 11(3), 201–212. ISSN (P): 2249–6890; ISSN (E): 2249–8001. <http://www.tjprc.org/publishpapers/2-67-1618048208-15IJMPERDJUN202115.pdf>
- Okoro, C. (2005). Study habits and academic performance of junior secondary school students in Uyo metropolitan schools. *Delsu Journal of Educational Research and Development*, (4) 1, 136-139.
- Okoroma, N. S., 2006. Educational policies and problems of implementation in Nigeria. *Australian Journal of Adult Learning*, (46) pp. 2 243–262. Available at: <https://files.eric.ed.gov/fulltext/EJ797605.pdf>.
- Ololube, N. P. (2009). Understanding teachers’ professional competencies for educational effectiveness. Owerri, Nigeria: Springfield.
- Oluyemi, S.D. & Adedeji, S.O. (2012). Skill mismatch among university graduates in Nigeria labour market. *Us-china education review 1*. pp. 90-98.
- Onyepunuka, M. I. (2016). Effect of meta-cognitive instructional strategy on students’ achievement, interest and retention in secondary school economics in Asaba Education Zone of Delta State, Nigeria (unpublished masters thesis). University of Nigeria, Nsukka, Nsukka, Enugu State, Nigeria.
- Ossai, J.N. (2014). Effects of three instructional strategies on academic achievement in junior secondary school In J.C. Onuoha et al. (Eds.). *Nigerian Journal of social studies and civil education*, (6) 1: 151 – 154.
- Randier, C & Hulda, M. (2007). Hands-on versus teacher-centred experiments in soil ecology. *Research in Science & Technological Education*, (25) 3: 329-338.
- Rossi, B. (2016). How to manage your data before it manages you. Bonhill London EC2A 4BX: Information Age.
- Rytting, M., Wright, G. Shumway, S. & Jenson, J. (2019). Comparison of simulation and hands-on lab in helping high school students learn physics concepts. *International Journal of Education (11)* 1. Available at: <https://doi.org/10.5296/ije.v11i1.14017>.
- Sadi, O & Cakiroglu, J. (2011). Effects of hands-on activity enriched instruction on students' achievement and attitudes towards science. *Journal of Baltic Science Education*, 10 (2): 87-97.
- Santos, L., T. Bago, A. Baptist, S. Ambroso, M.A.C Fonseca and H. Quintas, 2016. The academic success of matured students in higher education: a Portuguese case study. *European Journal for Research on Education and Learning of Adults* (7) 1: 57-73. Available at: <http://www.ep.liu.se> URN: urn: NBN: de: 0111-pics-120147.

- Schwichow, M., Croker, S., Zimmerman, C., Hoffler T. & Hartig, H. (2015). Teaching the control-of-variables strategy: A meta-analysis. *Developmental Review*, 39. pp. 37-63.
- Schwichow, M., Zimmerman, C., Croker, S. & Hartig, H. (2016). What students learn from hands-on activities? *Journal of Research in Science Teaching*, (53) 1: 980-1002.
- Schunk D. H., Pintrich, P.R & Meece, J. L. (2008). *Motivation in Education: Theory, Research and Application* (3rd Edition). Upper Saddle River, NJ: Merrill-Prentice Hall.
- Udoh, U. S., (2017). Planning Nigerian Education: Problems, Issues, and Proposed Solutions in writing from the author. Available at: <https://doi.org/DOI:10.13140/RG.2.2.35646.48965>.
- Usher E. L., & Pajares, F. (2008). Sources of self-efficacy in school: a critical review of the literature and future directions. *Review of Education Research* 78, pp. 751–796. 10.3102/0034654308321456
- Wise-Geek, G. (2013). What is Computer-Based Learning? Available at <http://www.wisegeek.com/whatis-computer-based-learning.htm>