



EFFECT OF HANDS-ON TEACHING STRATEGY ON STUDENTS' ACADEMIC ACHIEVEMENT IN KEYBOARDING SKILLS ACQUISITION IN FEDERAL POLYTECHNIC, MUBI, NIGERIA

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Abstract:

Keyboarding is a popular business course for many students whose major objectives are to develop touch control of the keyboard and proper typing techniques. It also involves building basic speed and accuracy, and provides practice in applying those skills to the formatting of letters, reports, tables, memos, and other kinds of personal and business communication. The performance of National Diploma (ND) I students in this course seems to be on the decline. The reason for this failure may be tied to the theoretical nature in which this course is being taught. To this end, this study investigated the Effect of Hands-On Teaching Strategy on Students' Academic Achievement in Keyboarding Skills Acquisition in Federal Polytechnic, Mubi, Nigeria. Three hypotheses were formulated and tested in the study. The research design adopted was the quasi-experimental non-equivalent pre-test, post-test, control group design. The sample comprised of 120 ND I students purposively selected from the department of Office Technology and Management, Federal Polytechnic, Mubi. A research instrument titled "Keyboarding Achievement Test (KAT)" was constructed by the researcher and used to obtain data. The instrument was validated and pilot tested. The Guttman statistic was used in calculating the reliability coefficient. This gave a reliability index of 0.72. The independent samples t-test statistic and Analysis of Variance (ANOVA) were used in analyzing data obtained from the study. The Scheffes post hoc test was used to establish

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the magnitude of significance between the experimental and control groups' mean scores. The study revealed that students exposed to Keyboarding skills acquisition through hands-on teaching strategy achieved remarkable results than their counterparts taught using the conventional method. There was no significant effect of gender on academic achievement of students exposed to Keyboarding skills acquisition using hands-on teaching strategy with conventional method. It was concluded that hands-on teaching strategy was effective in teaching Keyboarding skills; hence teachers should be encouraged to use the strategy in teaching Keyboarding from the onset of the ND programme.

Keywords: academic achievement; conventional method; hands-on teaching strategy; keyboarding skills acquisition, keyboarding achievement test

1. Introduction

Throughout the world, and in particular the countries of Sub-Saharan Africa, Governments are renewing efforts to promote technical and vocational education and training with the belief that skill formation enhances productivity and sustains competitiveness in the global economy. The paradigm shift towards practical skills training is increasingly being reshaped to make it more attractive, efficient and effective. One of the most important features of Vocational Education is its orientation towards the world of work with the curriculum emphasizing the acquisition of employable skills. For the simple fact that proficiency testing is required for employment, acquisition of employable skills should be emphasized in the classroom in order to promote sustainable livelihoods and responsible citizenship. Vocational Education will promote skills acquisition through competency-based training. The programmes include numerous occupational areas, such as office skills, agriculture, various trades, health services, and technical training. Keyboarding is a vital and major part of Vocational Education especially in the Polytechnics for the training of Office Technologists.

Ober, Johnson, Rice and Hanson (2002) define keyboarding as the act of entering data by means of designated computer keys. Keyboarding is a popular business course for many students whose major objectives are to develop touch control of the keyboard and proper typing techniques. It also involves building basic speed and accuracy, and provides practice in applying those skills to the formatting of letters, reports, tables, memos, and other kinds of personal and business communication. An effective keyboarding skill is one of the versatile skills possessed by an Office Technologist,

which are absolutely indispensable in the profession. It affords him/her the much needed respect and commendation for professionalism.

The world in which we live is full of challenges for the contemporary teacher in all respects as he/she is faced with situations in which he/she needs to constantly take decisions based on the complexities that modern day societies experience. In the classroom, not only does the teacher take decisions in relation to objectives, content and resources, there is also the need to use appropriate and effective methods and techniques based on informed choices, which have to be made from the myriad of approaches, methods and techniques available. The proliferation of approaches and methods, which could be viewed as a reflection of the commitment of educators to finding more efficient and cost-effective ways of teaching, presents the teacher with a wider variety of methodological options to choose from now than ever before.

According to Ruby (2001), Lumpe and Oliver (2001), hands-on teaching strategy as a learner-centred approach is not completely a new idea in the literature but it broadens the meaning from the past terms such as 'laboratories' to cover a variety of setting i.e., from laboratories to classrooms. Like many other terms in educational practice, this term have no standard definition that has one meaning for all practitioners. Hands-on teaching strategy is activities that may or may not be actual experiments, such as observation or measurements, not necessarily carried out in laboratories. Generally, hands-on activities are defined as the activities that allow the students to handle, manipulate or observe scientific processes. In hands-on activities, students interact with materials to observe phenomena. Hands-on teaching is an extremely effective strategy for increasing performance and depth of knowledge and supports the 21st century skills that target learning and innovation abilities in the 4Cs: communication, creativity, collaboration and critical thinking.

Chalupsky, Philip and Danof (2009) assert that the justification for hands-on learning in keyboarding skill acquisition is that it allows students to build understanding that is functional and to develop the ability to be competent and to inquire about phenomenon themselves. In other words, hands-on teaching strategy enables students to become independent learners and competent in keyboarding and perform other related tasks with a high degree of skill. Kegan (2009) and Shymansky (2001) opined that hands-on teaching strategy is used in order to support Problem-Based Learning (PBL). When using hands-on teaching strategy, learners in the classroom become researchers and work together to analyze problems and determine solutions. An activity-based programme has exhibited increase in creativity, positive attitudes towards skills acquisition and logic development.

According to Lee, Penfield and Maertenm-Rivera (2009) and Basista and Matthews (2002), hands-on teaching strategy encourages communication and builds language skills. Hands-on activities use real objects to support multiple modes of communication, linking visual learning to what is being said and discussed. It enables students to discuss, debate, verbalize and explain processes and concepts while working together (Basista and Matthews, 2002). It provides a path to success for disadvantaged students. It has been demonstrated that students who are disadvantaged academically gain the most from activity based programmes (Bredderman, 2003). Bredderman asserts that hands-on teaching strategy teaches teamwork. In the course of doing hands-on project, students learn to work well with their peers who may have different socio-economic backgrounds; different learning styles and different cultures. As a result, students are better prepared to take their place in the business world. Hands-on teaching strategy improves teaching experience. It has being argued that students develop their critical thinking skills as well as discover scientific concepts (Haury & Rillero, 2004, Basista & Matthews, 2002). Furthermore, it adds that students taught using hands-on techniques are likely to learn more than those taught using conventional method. Considering the enormous benefits tied to the use of hands-on teaching strategy, it is expected that these benefits would reflect on students' achievement in Keyboarding skills acquisition.

Keyboarding is one of the courses offered by National Diploma (ND) I students in the Department of Office Technology and Management, Federal Polytechnic, Mubi. The performance of students in this course seems to be on the decline. The teaching of Keyboarding, which requires that students be exposed to hands-on experience, might have been taught theoretically. This could have accounted for the underachievement of students in the course. It is pertinent to note that Keyboarding as a course need to be taught practically, where learners would be exposed to "hands-on keyboarding." This would help to concertized learners' learning experience and enhance achievement. It is based on this assumption that the study was designed to find out the effect of hands-on teaching strategy on Keyboarding skills acquisition.

Studies on the effect of gender on students' academic achievement are numerous. Fabunmi (2004), in a study discovered that gender composition has a significant relationship with students' academic performance and that gender composition has a significant influence on secondary school students' academic performance. Findings on gender and students achievement are inconclusive. It is worthy to note that while some researchers argued that gender cannot be factored in students' achievement (Filgona, Sababa & Filgona, 2016, Dania, 2014), others are of the view that gender could play a significant role in students achievement (Adeyemi &

Ajibade, 2011, Talabi, Emiola & Ogunsakin, 2003). On the basis of these inconsistencies, it becomes necessary to find out how male and female students would perform when exposed to Keyboarding skill acquisition using hands-on teaching strategy.

Students' low academic achievement in Keyboarding skills acquisition in the Department of Office Technology and Management, Federal Polytechnic Mubi, has been of concern to the researcher. The use of hands-on teaching strategy may enhance students' academic achievement in Keyboarding skills acquisition. The question of whether gender affects students' academic achievement in Keyboarding skills acquisition has been another source of concern. These variables constituted the background on which this study was conducted.

1.2 Purpose of the Study

The purpose of this study was to determine the effect of hands-on teaching strategy on students' academic achievement in Keyboarding skills acquisition in Federal Polytechnic, Mubi, Nigeria. The specific objectives of this study were to:

- i. find out the differences in academic achievement between students taught Keyboarding skills acquisition using Hands-On Teaching Strategy and those taught by the Conventional Method;
- ii. determine the academic achievement of students taught Keyboarding skills acquisition using Hands-On Teaching Strategy, Hands-On Teaching Strategy with Conventional Method and Conventional Method alone;
- iii. determine whether gender is a factor in students' academic achievement in Keyboarding skills acquisition.

1.3 Hypotheses

The following research hypotheses were formulated and tested at 0.05 level of significance:

H₀₁: There is no significant difference in academic achievement between students taught using Hands-on Teaching Strategy and those taught using Conventional Method in Keyboarding skills acquisition.

H₀₂: There is no significant difference in academic achievement among students taught Keyboarding skills using Hands-On Teaching Strategy, Hands-On Teaching Strategy with Conventional Method and Conventional Method alone.

H₀₃: There is no significant effect of gender on academic achievement of students taught Keyboarding using Hands-On Teaching Strategy with Conventional Method.

2. Materials and Methods

The research design adopted for this study was the quasi experimental non-equivalent pre-test, post-test, control group design. This involves students in Department of Office Technology and Management, as respondents in the study. The factorial matrix of the design was based on the level of treatment done on independent variables. The main independent variable treatment was done at three levels (X_1 , X_2 and X_3). There is one moderator variable, which is gender at two levels (Male and Female). The design is thus represented as follows:

O_1	X_1	O_2
O_3	X_2	O_4
O_5	X_3	O_6

where:

X_1 , X_2 and X_3 were treatments that were administered on the subjects. O_1 , O_3 and O_5 were pre-test scores while O_2 , O_4 and O_6 were post test scores.

Table 1: Layout of the Research Treatment

Treatment	Gender
Hands-On Teaching Strategy (X_1)	Male
	Female
Hands-On with Conventional Method (X_2)	Male
	Female
Conventional Method Alone (X_3)	Male
	Female

The study involved the application of an independent variable (method of teaching) manipulated at three levels namely: Hands-on Teaching strategy (X_1), Hands-on Teaching Strategy with Conventional Method (X_2), and Conventional Method alone (Lecture method, X_3). There was one moderator variable which is Gender. Gender as a moderating variable classified into two levels of Male and Female. The dependent variable was achievement in Keyboarding.

2.1 Sample and Sampling Techniques

The population of the study was the finite population made up of all the 273 National Diploma (ND) students in the Department of Office Technology and Management, Federal Polytechnic, Mubi, Nigeria. A sample of 120 ND1 students in the Department of

Office Technology and Management was obtained using a purposive sampling technique. The simple random sampling technique involving the use of balloting without replacement was used to assign students to the experimental and control groups. 40 students were kept in stream one for Experimental Group X_1 (Hands-On Teaching Strategy), 40 students were kept in stream two for Experimental Group X_2 (Hands-On Teaching Strategy with Conventional Method), and 40 students kept in stream three formed the Control Group or Lecture method group (Conventional Method).

2.2 Research Instrument

The data for the study was collected through an instrument titled "Keyboarding Achievement Test (KAT)". The construction of KAT instrument was done by the researcher based on topics that were taught. This instrument was categorised into two sections: Essay and Practical. The essay part examines the practical skills of learners in keyboarding. It was made up of four questions to answer three, and the objectives parts consisted of 15 questions to answer all. The practical consisted of the speed and accuracy test, which contained 150 words to be typed in 10 minutes. The second part of the practical test contained two tasks of manuscripts. Before the administration of the post test, the students in the experiment groups were treated using hands-on learning strategies/conventional method, with the teachers serving as facilitators. While in the control group, the teachers directed the teaching learning process using Lecture Method. Both the experiment and control groups were exposed to the same concepts in keyboarding skills. The tests (pre and post-tests) were scored over 100.

2.3 Validation of the Instrument

The instrument of the study was face and content validated by two experts in Keyboarding in the Department of Office Technology and Management, Federal Polytechnic, Mubi. The instrument was further taken to two experts in Curriculum and Instruction and Test and Measurement in the Department of Science Education, Adamawa State University. The validators among other things determined the suitability of the test instrument for the present level of students (ND I), the topics to be taught and the duration of the study. All relevant corrections made by the validators were incorporated in the final body of the instrument.

2.4. Reliability of the Instrument

The reliability of the instrument was ascertained by conducting a pilot test using Keyboarding students in Adamawa State Polytechnic, Numan Campus. The test-re-test

method was used to get data analyzed by the Guttman statistic. The analysis gave a reliability index 0.72. The reliability index of 0.72 shows that the instrument was adequate for use in the study.

2.5 Method of Data Analysis

Data obtained in this study were analyzed using t-Test statistical tool and One Way Analysis of Variance (ANOVA). Null hypotheses One and Three were tested using Independent samples t-Test statistic. ANOVA was used to test null hypothesis Two; and the Scheffes post hoc test was used to establish the magnitude of significance between the experimental and control groups' mean scores. All tests were considered statistically significant at $p < 0.05$.

3. Results

H₀₁: There is no significant difference in academic achievement between students taught using Hands-On Teaching Strategy and those taught using Conventional Method in Keyboarding skills acquisition.

This hypothesis was tested by compiling the post test scores of students exposed to Hands-On Teaching Strategy and Conventional Method in Keyboarding using Independent samples t-Test analysis. The result is presented in Table 2.

Table 2: Summary of t-Test Analysis of Post Test Scores of Students exposed to Hands-On Teaching Strategy and Conventional Method in Keyboarding Skills Acquisition

Variable	N	Mean	SD	df	t	Sig. (2-tailed)
Hands-On Teaching Strategy (X₁)	40	75.14	8.29	78	30.712	.000*
Conventional Method (X₃)	40	29.78	4.29			

*Significant; $p < .05$.

Table 2 shows that the difference in mean scores of the two instructional treatments were statistically significant ($t = 30.712$, $df = 78$; $p = 0.000$). This implies that the treatment X₁ with mean score of 75.14 was significantly higher than that for X₃ which was 29.78. Since, the coefficient of the probability is less than 5%, the decision is to reject the null hypothesis and accept the alternate hypothesis which states that there is a significant difference in students' academic achievement between those taught using Hands-On Teaching Strategy and Conventional Method of Teaching Keyboarding skills acquisition.

H₀₂: There is no significant difference in academic achievement among students taught Keyboarding skills using Hands-on Teaching Strategy, Hands-on Teaching Strategy with Conventional Method and Conventional Method alone.

This hypothesis was tested by compiling the post test scores of students exposed to Hands-On TEACHING Strategy, Hands-On Teaching Strategy with Conventional Method and Conventional Method alone. Data collected were subjected to Analysis of Variance (ANOVA). The result is presented in Table 3.

Table 3: Summary of One-Way Analysis of Variance (ANOVA) of Post Test Scores of Students in Hands-On Teaching Strategy, Hands-On Teaching Strategy with Conventional Method and Conventional Method Alone

Source of Variation	Sum of Squares	df	Mean Square	F	Sig.(2-tailed)
Between Groups	43151.017	2	21575.508	714.209	.000*
Within Groups	3536.850	117	30.209		
Total	46685.467	119			

*Significant; $p < .05$.

The one-way analysis of variance of students' post-test in Keyboarding for all three groups in the study is shown in Table 3. The result shows that the differences in the students Keyboarding skill acquisition in all the three treatment groups were statistically significant ($F(2,117) = 714.209$; $p = 0.000$). This result leads to the conclusion that the alternate hypothesis be accepted. This means that there is a significant difference in the academic achievement among students taught Keyboarding skills using Hands-On Teaching Strategy, Hands-On Teachings Strategy with Conventional Method and Conventional Method alone. But to determine the effect sizes, the mean scores of the students in the three groups were further subjected to Scheffes post hoc test as contained in Table 4.

Table 4: Scheffes Post Hoc Multiple Comparisons Test Results of Post Test Scores of Students in Hands-On Teaching Strategy, Hands-On Teaching Strategy with Conventional Method and Conventional Method Alone

Independent Variable (I) Instructional Treatment	Independent Variable (J) Instructional Treatment	Mean Difference (I-J)	Sig. (2-tailed)
Hands-On Teaching Strategy	Hands-On Teaching Strategy with Conventional Method	7.20	.211
	Conventional Method Alone	33.40	.000*
Hands-On Teaching Strategy with Conventional Method	Hands-On Teaching Strategy	-7.20	.211
	Conventional Method Alone	26.20	.000*
Conventional Method Alone	Hands-On Teaching Strategy	-33.40	.000*
	Hands-On Teaching Strategy with Conventional Method	-26.20	.000*

*Significant; $p < .05$.

It could be seen from the results in Table 4 that there is a significant difference in the mean scores of students taught keyboarding skills using Hands-On Teaching Strategy and those taught using Conventional Method in favour of those taught with Hands-On Teaching Strategy ($p = 0.000$). Similarly, there is a significant difference in the mean scores of students taught Keyboarding skills acquisition using Hands-On Teaching Strategy with Conventional Method and those taught using Conventional Method alone ($p = 0.000$). However, there is no significant difference in the mean scores of students taught Keyboarding skills acquisition using hands-on teaching strategy and those taught using hands-on teaching strategy with conventional method ($p = 0.211$). This show that the experimental treatment administered to the groups using hands-on teaching strategies enhanced students' achievement in Keyboarding skills acquisition.

H₀₃: There is no significant effect of gender on academic achievement of students taught Keyboarding skills using Hands-On Teaching Strategy with Conventional Method.

This hypothesis was tested by compiling the post test scores of students exposed to Hands-On Teaching Strategy with Conventional Method in Keyboarding skills acquisition using gender as the moderating variable. The t-Test result is summarized in Table 5.

Table 5: Summary of t-Test Analysis of Post Test Scores of Gender Differences in Hands-On Teaching Strategy with Conventional Method

Variable	N	Mean	SD	df	t	Sig. (2-tailed)
Male	21	49.450	22.051	38	.917	.365
Female	19	43.350	19.974			

Not significant; $p > .05$.

The independent samples t-Test of hypothesis three contained in Table 5 shows no statistically significant effect of gender on academic achievement of students taught Keyboarding skills using Hands-On Teaching Strategy with Conventional Method ($t = 0.917$, $df = 38$; $p = 0.365$). This result implies that Male and Female students in this experimental group did not differ in their academic achievement in keyboarding skills acquisition.

4. Discussion

There is plethora of benefits adduced to the use of hands-on teaching in respect to this study. These benefits among others include: increased learning; increased motivation to learn; increased excitement in the teaching learning process; increased skill proficiency, including communication skills etc. Probably, this could be responsible for the improved academic achievement of students observed in the experimental groups.

A. Effects of Hands-On Teaching Strategy and Conventional Method on Students' Academic Achievement in Keyboarding Skills Acquisition

The finding from this study showed that students taught keyboarding using hands-on teaching strategy achieved highest in the post test than those taught keyboarding using the conventional method. The differences in the scores in the post test points to the singular fact that the method of instruction used by teachers makes or mars the academic achievement of students. Students instructed by this strategy gained a highest achievement with t-statistic ($t = 30.712$, $df = 78$; $p = 0.000$). The importance of providing students with direct experiences with materials, objects and phenomena is supported by experience and understanding of how learning takes place. This is in line with the views of Rutherford (2003) who asserts that while information can be remembered if taught through books and lectures, true understanding and the ability to use knowledge in new situations requires learning in which students study concepts in-depth, and over time and learning that is founded in direct experience like mastering of the keyboard faster, operating a speed and accuracy that is required of them. In the same vein, Bruner (2003) opines that people improve in the art and technique of inquiry

by any means other than engaging in inquiry. Bruner further stressed that the principal emphasis in education should be placed in skills – skills in handling, in seeing and imaging and in symbolic operations. This is also in line with the works of Flick (2003) Engel (2002) who said that well designed hands-on activities focus learners on the world around them, spark their curiosity, and guide them through engaging experiences. Students who have difficulty in the learning arena for reason of English as Second Language (ESL) barriers, auditory deficiencies, or behavioural interference can be found to be on task more often because they are part of the learning process and not just spectators.

B. Effects of Hands-On Teaching Strategy, Hands-On Teaching Strategy with Conventional Method and Conventional Method on Students' Academic Achievement in Keyboarding Skills Acquisition

The study revealed that there was a significant difference in students' academic achievement in these three methods of teaching as was revealed in the statistical analysis of ANOVA. The main effect of the three treatment groups demonstrated a significant result ($F = (2, 117) = 714.209; p = 0.000$). This shows that hands-on teaching strategy has the most effect on students' academic achievement in keyboarding skill acquisition. This is in line with the works of Mazur (2008) who said that learning of various skills like Keyboarding content are enhanced through hands-on teaching. Hands-on teaching strategy is an innovation in teaching and learning which enhances students' achievement in a wide range of subjects. Hands-on teaching strategy provides requisite practical skills for the job market that promotes the campaign about the benefits of technical and vocational education. Using other teaching methods like the conventional method has not yielded the expected result.

C. Male and Female Students Academic Achievement in Hands-On Teaching Strategy with Conventional Method

The finding of the study shows that there is no significant difference in the mean achievement scores of males and females students in keyboarding achievement test. This could be seen from the value of ($t = 0.917, df = 38; p = 0.365$). This shows that there is no significant difference on students' academic achievement according to gender. This contradicts the view of Eccles (2001) who said that boys' interests are professional in nature and technical occupations, whereas girls were interested in office and entertainment services. This finding is also in concomitance with the works of Filgona, Sababa and Filgona (2016), Dania (2014) which noted no significant influence of gender on students' academic achievement. By implication, this means that hands-on teaching strategy was consistent across gender in achievement in Keyboarding skills. These varying findings indicate that controversy on the differential achievement between

males and females is inconclusive. It simply means that academic achievement in students can be as a result of intelligence, family background, instructional materials, instructional methods, interests etc. A study by Lassen, Steele and Sailor (2006) on factors that can improve academic performance, it was observed that positive and socially appropriated students' behaviours such as independence, appropriate classroom conduct, compliance with school rules, and socially appropriate interactions with peers, contribute to positive academic outcomes and not gender. Hands-on learning environment does provide students with ample opportunities to freely express themselves. This might have enhanced the achievement of both male and female students in this group.

5. Conclusion

The Hands-On Teaching Strategy has been shown to be more effective than Conventional methods of teaching Keyboarding skills. This strategy enhanced students' academic achievement in Keyboarding skills acquisition because it exposed the students to the practical experience of keyboarding presentation, skill building and production development involved in mastery. The strategy has also shown to be gender friendly as both male and female students taught Keyboarding skills did not differ in their academic achievement. Moreover, an activity based approach like the hands-on teaching strategy would promote first-hand knowledge and experience needed to enable students acquire skills in Keyboarding.

6. Recommendations

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

Teachers should be encouraged to use hands-on teaching strategy in the instruction of keyboarding from the onset of the ND programme. Keyboarding teachers need to be dynamic to accept any changes. The teaching of keyboarding should be made effective than it has been. Government should increase funding in education to support Technical and Vocational Education which is practical oriented.

The Management of Federal Polytechnic, Mubi should encourage the acquisition of employable skills by providing instructional materials for the teaching and learning of Keyboarding. Team teaching is recommended and enough time should be allocated for independent studies because Keyboarding teachers need to teach students for the sake of employability, problem solving and decision making.

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