

THE EFFECTS OF COMPETENCY-BASED INSTRUCTIONAL METHOD ON PRACTICAL SKILLS DEVELOPMENT IN WOODWORK TECHNOLOGY AT FEDERAL COLLEGE OF EDUCATION (TECHNICAL), OMOKU

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Abstract

This study examined the effects of competency-based instructional method on practical skills development in woodwork technology. To carry out the study, three objectives were formulated to guide the study. Three null hypotheses were designed to determine the performance of woodwork students taught with competency-based training and demonstration method of teaching. The population for the study consists of all the 80 year II woodwork students of School of Technical Education, Federal College of Education (Technical) Omoku. A sample of 30 students obtained through stratified random sampling technique was adopted to test the hypotheses. The instruments for data collection are instructional package and practical test validated and tested for reliability was administered to the respondents for data collection, t-test was used for data analysis. The study among others revealed that students taught with competency-based training approach performed significantly better than those taught with the demonstration method. Based on the findings recommendations were made.

Competency-Based Training (CBT) is an innovative or alternative teaching method used for developing skills in learners at high level of proficiency as against the traditional instructional methods like demonstration method. It can be defined as a form of education that has well specified instructional objectives which serve as a standard or yard-stick for determining the extent to which learners have mastered a competence (Dike, 2006). Similarly, it is defined as an alternative learning approach that shows in unquestionable terms, the objectives to be achieved (Dike, 2006), and at which the criteria or standards the skills must be performed are stated (Sullivan, 2007). On this basis, CBT is skill-oriented instructional approach for efficient occupational training. As such, CBT in woodwork enhances the acquisition of practical and applied skills in the workshop at high degree of proficiency by learners. This implies that it is a systematic learning approach for training people in different occupations such as woodwork. The instruction is based on the mastery of specific competencies, skills or tasks essential for successful employment. While the traditional time-based approaches to learning practical skills have met varying levels of success over the years, they are ineffective methods when the objective is to train learners to perform specific job-related skills (Sullivan, 2007). A more appropriate approach is CBT which require every learner to progress at his or her rate until high degree of mastery is attained. The benefit is against the traditional system where the unit of progression is time-based, experience-based and teacher centered. In CBT on the other hand, the unit of progression is based on acquisition of knowledge and skills at specific standards of performance, and learner or participant centered.

In view of this presentation, Watson (2000) stressed that competency - based instructional model is mainly useful in teaching and learning situation where learners have to acquire specific and job-related competencies. That is, where perfection, and no defect is the only acceptable standard for good achievement. In other words, quality remains the measure of success.

The use of CBT approach should therefore be mandatory. It does not mean using time-based demonstration method, project method, workshop practice etc. that are ineffective. CBT in woodwork implies training learners practically to perfection and at no-defect standard that will enable them to function effectively in the world of work. It is against this background that the interest to embark on this study was aroused.

Statement of the Problem

The inadequacy of using the traditional method in teaching practical skills and the inability of woodwork teacher to adopt CBT in teaching practical work might be the cause of poor performance

of students in practical work as shown in the summary of 2006-2009 second semester examination on TED 222 results of Woodwork Department, Federal College of Education (Technical), Omoku presented in table 1 below.

Table 1: TED 222 Second Semester Examinations Results.

Year	Course	No of candidates	Later grade							
			A	B	C	D	E	F	ABS	
2006/2007	TED222	119	4	9	20	7	26	43	13	
2007/2008	TED222	99	1	4	18	10	35	29	2	
2008/2009	TED222	167	2	1	33	27	84	89	-	

Source: Woodwork Department Result File, FCE (T), Omoku.

While the traditional time-based instructional approach has met with varying degree of success over the years, it is an ineffective method especially when the goal of is to train students to perform specific job related skills (Sullivan, 2007). This poor performance of students and how to solve it is the problem of the study.

When woodwork teachers use inappropriate traditional lecture method, demonstration method etc. in instructional situation that require CBT, the effect is obvious. The intended instruction is hampered, skills are not acquired at high degree of mastery and the students graduate half-baked and unproductive. For effective practical skills to be developed in learners, the teacher supposes to deliver his instruction with competency-based instructional method against the traditional approach. In view of predominant use of the traditional approach to practical training in technical institutions in the recent time in spite of the emphasis on practical skills development in learners (FRN 2004), there is need to look for solution. Based on this assertion, this study sought to investigate the effects of competency-based instructional method on practical skills development in woodwork technology.

Objectives of the Study

Specifically, the objectives of the study are to:

1. determine the performance of students taught construction of stop mortice and tenon joint with CBT and their counterparts taught with Demonstration Method (DM).
2. determine the performance of male and female students taught construction of stop mortice and tenon joint with CBT.
3. determine the performance of students in delayed practical test when taught construction of stop mortice and tenon joint with CBT and when taught with DM.

Research Hypotheses

The null hypotheses that guided this study are:

1. Ho: There is no significant difference between the mean performance score of students taught construction of stop mortice and tenon joint with CBT and their counterparts taught with DM.
2. Ho: There is no significant difference between the mean performance score of male and female students taught construction of stop mortice and tenon joint with CBT.
3. Ho: There is no significant difference between the mean performance score of students in delayed practical test when taught construction of stop and tenon joint with CBT and when taught with DM.

Methodology

Research Design

The research design adopted to test the hypotheses formulated for the study was quasi-experimental design. Quasi-experimental design was adopted because the subjects were randomly assigned to the Experimental Group (EG) and Control Group (CG) to determine the cause-and-effect relationship between the independent and dependent variables.

Population of the Study

The population for the study was all the 80 year II woodwork students in School of Technical Education, Federal College of Education (Technical) Omoku, Rivers State. These students have been in the college for one year and have been doing practical work.

Sample and Sampling Technique

A sample of 30 students out of 80 woodwork students obtained through stratified random sampling technique was used to test the hypotheses formulated for the study. The population was first stratified into males and females in which 15 males and 15 females were pre-tested, randomly selected from each group and assigned to the experimental and control groups obtained by tossing a coin. Experimental group was the CBT group while the control was the DM group.

Instrument for Data Collection

The instrument used for data collection was the performance or practical test used to determine the practical skills acquired by learners in the construction of stop mortice and tenon joint.

Validity and Reliability of the Instrument

The draft copies of the practical test were given to two woodwork lecturers in School of Technical Education, Federal College of Education (Technical) Omoku who vetted and edited them. Their corrections were used to revise and modify the practical test which confirmed it valid before it was tested for reliability.

On the other hand, a test-retest method of establishing the reliability of a test was adopted to ensure the consistency of the test in measuring what it was designed to measure. The practical test was administered to five randomly selected respondents. After two weeks, the same test was administered to the same group of respondents and the scores of the two tests were correlated using Pearson Product Moment correlation and obtained the correlation coefficient of 0.98 which indicated that the test was reliable, and administered to the experimental and control groups.

Administration of the Instrument

The topic, stop mortice and tenon joint were first taught to the experimental group untimed until all of them mastered the skills taught at predetermined standard of performance. They were then post-tested and re-tested after two weeks. The re-test was to determine how they can retain the skills learnt. Secondly, the control group was taught the topic in the same workshop under lesson period of two hours. They were then tested and re-tested after two weeks in the same manner with the experimental group. The data obtained was used for data analysis.

Method of Data Analysis

Inferential statistics t-test was used for testing the hypotheses at 0.05 level of significance to compare the performance of experimental, and control groups.

Decision: The null hypotheses with calculated t-value greater than the critical table value were rejected, while the hypotheses with the calculated t-value less than the critical table value were not rejected.

Hypothesis 1

Ho 1: There is no significant difference between the mean performance score of students taught stop mortice and tenon joint with CBT and their counterparts taught with DM.

Table 1: t-test Comparison of EG and CG in Practical Test when Taught with CBT and DM

Group	N	X	SD	Df	t-Cal	Cri Value	Decision
EG	15	95.93	1.18	28	6.56	2.048	Rejected
CG	15	45.2	9.47				

Data in table 1 shows that the calculated t-value of 6.56 is greater than the critical table value of 2.048 at 0.05 levels of significance and 28 degree of freedom. The null hypothesis is therefore rejected. This indicate that the students taught stop mortice and tenon joint with CBT performed significantly better then those taught with DM.

Hypothesis 2

Ho 2: There is no significant difference between the mean performance score of male and female students taught stop mortice and tenon joint with CBT.

Table 2: T-Test Performance of Male and Female Students In Test When Taught With CBT Practical

Gender	N	X	SD	Df	t-cal	Cri Value	Decision
Male	15	96	1.32	28	0.317	2.048	Accepted
Female	15	96.13	0.88				

Data in table 2 shows that the calculated t-value of 0.317 is less than the critical table value of 2.048 at 0.05 levels of significance and 28 degree of freedom. The null hypothesis is therefore not rejected. This indicates that both male and female students taught with CBT performed significantly well.

Hypothesis 3

Ho 3: There is no significant difference between the mean performance score of students in delayed practical test when taught stop mortice and tenon joint with CBT and when taught with DM.

Table 3: T-Test Performance of EG And CG in Delayed Practical Test When Taught With CBT And When Taught With DM

Group	N	X	SD	Df	t-Cal	Cri Value	Decision
EG	15	96.07	0.93	28	10.873	2.048	Rejected
CG	15	39.2	21.02				

Data in table 3 indicates that the calculated t-value of 10.873 is greater than the critical value of 2.048 at 0.05 levels of significance and 28 degree of freedom. The null hypothesis is therefore, rejected. This shows that the experimental group (CBT) performed significantly better than the control group (DM).

Summary of Major Findings

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- significantly better than those taught with DM.
2. Both male and female students exposed to competency based training performed significantly well.
 3. Competency-based training students exposed to delayed practical test two weeks after teaching performed significantly better than the demonstration method students exposed to the same delayed practical test

Discussion of the Findings

The findings for hypothesis 1 shows that woodwork students taught construction of stop mortice and tenon joint with CBT approach performed significantly better than those taught with DM. This is indicated t-test analysis in table 1. This finding is consistent with the earlier report of Richards and Rodgers (2001), and kathleen (2006) who observed that CBT is focused on outcome and achievement of high performance standard. This is because CBT addresses what learners are expected to do rather than what they are expected to learn as it requires each trainee to perform tasks to high level of proficiency in job-like setting, receiving credit for mastering tasks. Though DM has met varying degree of success over the years, it is an inefficient method especially when the objective is to train individuals to perform specific job skills, Foyster (1997), Sullivan (2007) and Northon (2007) maintained. The finding is also in line with that of Me Roberts and Leitch (1998) who stated that almost all the students studied rated CBT well from good to excellent, and that all but three respondents maintained that they will recommend the programme to others. Examining the effectiveness of CBT in practice and production of superior skills performance of studer:s, Billett (1999) found that students generally believed that CBT enhanced thei ability to solve problems and apply their knowledge and understanding it industry and home. This is CBT in action because it is focused on delivering training which is responsive to the needs of students and work place.

The findings in hypothesis 2 (Table 2) revealed that both male and female woodwork students exposed CBT performed significantly well. In order words, there is no significant difference between the performance of male and female woodwork students taught with CBT approach as indicated in the tables. This result might be attributed to the fact that CBT is gender insensitive as it treats ai! genders equally in performance of practical tasks. This confirmed the report of Foyster (2000), Delker (2000), Dike (2006) and Northon (2007) who observed that CBT involves mastery learning and allows each trainee enough time to master each task fully before allowed to move to the next task. The mastery of practical skills at high level of proficiency for all genders or large number of trainees is therefore 90 - 95%. But if the trainees perform according to the expected pre-set standard, they will all score 100% each.

The result for hypothesis 3 in table 3 shows that woodwork students taught with CBT performed significantly better in the delayed practical test than those taught with DM. This performance is as a result of high level of practical skills acquired during training. This implies that delayed practical test has no negative effect on the performance of CBT students unlike their DM counterparts that are half-baked. This finding is in line with earlier report of Kathleen (2006) that CBT actually train individuals to retain task learnt for long period of time which makes them competent on the job. Watson (2000) maintained that CBT is mainly useful in instructional situation where learners have to acquire specific job-related practical skills. That is, where perfection, no defect is the only measure of success.

This study has revealed that CBT is an appropriate instructional method for developing adequate practical skills in woodwork learners at high level of proficiency in training institutions. It also revealed that CBT is gender insensitive, and that practical skills acquired through this approach can be retained for a very long time. These findings are in line with the report of US Office of Education (1998) in Kathleen (2006) that CBT is performance-based process that leads to demonstrated mastery for the individuals to function proficiently in the world of work. Many people think that the conventional model such as the demonstration method used in educational institutions today is the best approach to practical training. This impression is contrary to the finding of Foyster (2000) who

stressed that the conventional approach is inefficient particularly when development of practical skills and training of competent workers is the major concern of a training programme.

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Competency-based training, a functional approach to education is outcome based and focused on competencies or what learners are able to do at high level of performance as defined by employers and the profession. The adoption of CBT in training institutions is therefore a welcome idea.

Conclusion

The study has established that:

1. Competency-based training enables learners to acquire practical skills at high level of proficiency.
2. CBT enables both male and female students to acquire practical skills at the same level of mastery. CBT is therefore gender insensitive.
3. Practical skills acquired through CBT can be retained for a long period of time.

Recommendations

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

1. Competency-based training should be used in teaching and learning practical skills. This will enable woodwork students to acquire adequate practical skills and competencies that will make them functional in the world of work.
2. Both male and female students should be encouraged to offer woodwork since CBT is gender insensitive and equips both genders with adequate practical skills required for self or public sector employment.
3. Government through the ministry of education should introduce CBT in technical educational institutions since it has been tested and confirmed fit for adequate practical skills development in delayed practical test with woodwork learners. This will enable training institutions to produce practical skilled manpower of high level of proficiency needed in the economy.

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