

## Application of Cognitive Instructional Models and Academic Achievement of Financial Accounting Students in Public Secondary Schools in Uyo Metropolis

<sup>1</sup>Eno Gregory Ukpong, <sup>2</sup>Imeofon I. Udoh,  
&

<sup>3</sup>Iniabasi Thomas Essien<sup>3</sup>

<sup>1,3</sup>Department of Accounting

Faculty of Social Sciences

Akwa Ibom State University

<sup>2</sup>Akwa Ibom State College of Education

Afaha Nsit

### **Abstract**

*Although cognitive apprenticeships readily occur on their own, without intervention, certain instructional strategies are hallmarks of the theory and can be purposely implemented to support learning. This study investigated the effect of scaffolding, modeling and expository method of instruction on students' academic achievement in Financial Accounting in public secondary schools in Uyo metropolis, Akwa Ibom State, Nigeria. 3 specific objectives, 3 research questions and 3 null hypotheses guided the study. A quasi-experimental pretest, posttest with experimental and non-equivalent control group design was used for the study. The population consisted of 803 senior secondary school two students out of which 207 were drawn as sample using simple random sampling technique. The schools were further randomly assigned to Experimental Groups 1 (scaffolding, group 2 (Modeling) and control group (expository method). The experimental and control groups were taught Financial Accounting Achievement Test (FAAT) was used for data collection, and a pilot study of 30 students were used to determine the reliability of FAAT and the results gave a reliability coefficient of .82 using Cronbach alpha. Data generated were analyzed using mean and standard deviation to answer the research questions while Analysis of Covariance (ANCOVA), was used to test the null hypotheses at .05 alpha level. The results revealed that Financial Accounting students taught using scaffolding performed significantly better than their counterparts taught using modeling and expository method. Scaffolding and modeling methods performed better than those taught using expository method. Based on the findings, it is concluded that the use of scaffolding in teaching of Financial Accounting enhance the learning and understanding of Financial Account topics. It is recommended, among others that Financial Accounting teachers in secondary schools should adopt scaffolding method in teaching the subject since it facilitates students' performance.*

**Keywords:** cognitive apprenticeship, control accounts, non-profit accounts, disposal of assets, academic achievement

### **Introduction**

The best form of learning that is closely related to the practical world circumstances arguable is the apprenticeship model that was used from time immemorial. In traditional apprenticeship, the expert models a task for the apprentice, watches as the apprentice practices portions of the task, and then turns over more and more responsibility until the apprentice is

proficient enough to accomplish the task independently. There are four important aspects of traditional apprenticeship: modeling, scaffolding, fading, and coaching (Collins, Brown & Holum, 1991). In modern times, apprenticeship has largely been replaced by formal schooling, Collins, Brown and Holum (1991) proposed an alternative model of instruction that goes back to apprenticeship but incorporates elements of schooling which they call "cognitive apprenticeship".

The concept of a cognitive apprenticeship—defined as “learning through guided experience on cognitive and metacognitive, rather than physical, skills and processes” by Collins et al. (1989, p. 456)—has its roots in social learning theories. One cannot engage in a cognitive apprenticeship alone, but rather it is dependent on expert demonstration (modeling) and guidance (coaching) in the initial phases of learning. Learners are challenged with tasks slightly more difficult than they can accomplish on their own and must rely on assistance from and collaboration with others to achieve these tasks. In other words, learners must work with more experienced others and with time move from a position of observation to one of active practice.

### **Instructional Strategies and Models Associated with Cognitive Apprenticeship**

Although cognitive apprenticeships readily occur on their own, without intervention, certain instructional strategies are hallmarks of the theory and can be purposely implemented to support learning. Intentional teaching and learning through cognitive apprenticeship require making tacit processes visible to learners so they can observe and then practice them (Collins et al., 1989). The basic model consists of the following strategies:

- *Modeling*— demonstrating the thinking process
- *Coaching*— Assisting and supporting student cognitive activities as needed (includes scaffolding)
- *Reflection*—Self-analysis and assessment
- *Articulation*— verbalizing the results of reflection
- *Exploration*— Formation and testing of one’s own hypotheses

These strategies mainly points to the activities of teacher’s or expert’s actions; the learners in cognitive apprenticeships (CAs) are engaged in acts of observation, practice and reflection.

Cognitive apprenticeship (CA) models would be suitable for teaching financial accounting concepts to secondary school students. Applying modeling and scaffolding instructional techniques in teaching concepts in financial accounting would greatly improve not only students’ active participation in class work, but academic achievement. Cognitive apprenticeship models allows time for knowledge application instead of just coverage of content. CA may easily be integrated into traditional delivery modes that allows for meaningful engagement and help prepare students for the accounting profession.

Chew & Parkinson (2013) defined financial accounting as the field of accounting concerned with the summary, analysis and reporting of financial transactions pertaining to a business. This involves the preparation of financial statements available for public consumption. Stockholders, suppliers, banks, employees, government agencies, business owners, and other stakeholders are examples of people interested in receiving such information for decision making purposes. Financial accounting, while mainly involves calculations, requires a lot of cognitive process to make sense of the data needed to prepare financial statements. Cognitive apprenticeship models is best suited to help students make sense of

financial accounting, relate with the subject in a more personal and professional ways. However, it is still unclear which of the models is best suited for teaching financial accounting concepts. Hence, this research.

### **Purpose of the Study**

This study determined the effects of modeling and scaffolding instructional models on students' academic achievement in Financial Accounting in Akwa Ibom State. Specifically, the study sought to:

1. examine the difference in academic performance of students taught disposal of assets in Financial Accounting using scaffolding modeling and expository methods of instruction.
2. determine the difference in academic performance of students taught account of non-profit making organization in Financial Accounting using scaffolding, modeling and expository methods of instruction.
3. examine the difference in academic performance of students taught control accounts in Financial Accounting using scaffolding, modeling and expository methods of instruction.

### **Research Questions**

The following research questions were posed to guide the study:

1. What is the difference in academic achievement of students taught disposal of assets in Financial Accounting using scaffolding modeling and expository methods?
2. What is the difference in academic achievement of students taught account of non-profit making organization in Financial Accounting using scaffolding, modeling and expository methods?
3. What is the difference in academic achievement of students taught control accounts in Financial Accounting using scaffolding, modeling and expository methods?

### **Null Hypotheses**

The following null hypotheses were formulated and tested at .05 alpha level:

- H<sub>01</sub>:** There is no significance difference in academic achievement of students taught disposal of assets in Financial Accounting using scaffolding, modeling and expository methods.
- H<sub>02</sub>:** There is no significance difference in academic achievement of students taught account of non-profit making organization in Financial Accounting using scaffolding, modeling and expository methods.
- H<sub>03</sub>:** There is no significance difference in academic achievement of students taught control accounts in Financial Accounting using scaffolding, modeling and expository methods.

### **Methodology**

The study was conducted in public secondary schools in Uyo metropolis, Akwa Ibom State. Quasi-experimental pretest, posttest with experimental and non-equivalent control group design was used for the study. The population of the study comprised 803 Senior Secondary 2 (SS II) students in 12 public secondary schools in Uyo metropolis offering Financial Accounting. Senior Secondary two (SS II) students were used for the study because it was presumed that the students would have chosen Financial Accounting as a subject to be offered in the West African Senior School Certificate Examination (WASSCE) and National Examination Council (NECO). A total sample size of two hundred and seven (207) SS II Financial Accounting students were obtained from six intact classes in the schools that were

used for the study. Simple random sampling technique was used in the selection of six schools for the study. The six schools were randomly assigned to treatment and control groups, with three schools in each group. To gather data for this study, the researcher developed 30 multi choice performance test items titled Financial Accounting Achievement Test (FAAT). FAAT tests were constructed by the researcher to determine the performance of students covering the concepts of control accounts, non-profit and disposal accounts. Instructional packages for Financial Accounting consisted of prepared lesson plans on selected Financial Accounting topics based on scaffolding and modeling method of instruction for the experimental groups while expository method of instruction was given the control group. Each scaffolding and modeling methods lesson plan incorporated at least served the following purposes: (1) providing clear direction to reduces students confusion, (2) clarifying and simplifying (3) motivating the students interest related to task, (4) reducing frustration and risk (scaffolding). For modeling method of instruction, the techniques were: (1) structuring situations of expert practice, (2) externalizing internal and cognitive processes, (3) encouraging students to think like experts and (4) demonstrating how to cope with difficulties.

Scaffolding modeling and expository lesson plans and FAAT were face and content validated by three research experts one from Test and Measurements and two from Department of Vocational Education in the University of Uyo, Uyo. They were requested to assess the content coverage, the suitability of the items, language used, and item arrangement in logical sequence. All their suggestions and comments were implemented and incorporated in the final form of the instruments. The reliability coefficient of the instrument was determined using Cronbach alpha. The items were trial-tested on 30 SS II Financial Accounting students in one of the schools in the study area but not part of the population. The scores obtained from the trial-test were subjected to items analysis to determine the reliability indices of the instrument. The result-showed reliability co-efficient of .82. The research involved two main stages, which were the administration of pre-test and post-test contained the same questions arranged in different order. The study was conducted for a period of three weeks during which 2 topics; vis depreciation and manufacturing account were covered. The pre-test was administered in the first week of the research exercise to the whole student before the experimental groups were subjected to treatments. After the administration of the pre-test, students in the experimental group 1 were taught using scaffolding, while those in experimental group 2 were taught using modeling method of instruction. The third group comprised students in the control group. They were taught with the use of the expository method of instruction. The three groups were taught by their regular teachers. Prior to the teaching exercise, the experimental groups teachers have been trained on the use of scaffolding and modeling method of instruction. Data generated were analyzed using mean and standard deviation to answer the research questions. Analysis of Covariance (ANCOVA) was used in testing all the hypothesis at .05 levels of significance.

## Analysis and Results

**Research Question 1:** What is the difference in academic achievements of students taught disposal of assets in Financial Accounting using scaffolding modeling and expository methods?

**Table 1:** Means of pre-test and post-test of Students’ academic achievements in disposal of assets exposed to Scaffolding, Modeling and Expository Methods

S/N	Teaching Method	Pretest		Posttest	Difference in Mean/Gain
		N	X	X	
1	Modeling	83	3.52	9.43	5.91
2	Scaffolding	63	3.55	11.84	8.29
3	Expository	61	3.05	4.59	1.54

Summary of data analysis in Table 1 shows that Financial Accounting students have mean score gains of 5.91, 8.29 and 1.54 points as a result of teaching the students disposal of assets in Financial Accounting using scaffolding, modeling and expository method respectively. Students taught using scaffolding and modeling methods have higher mean scores than those exposed to expository teaching method.

**Research Question 2:** What is the difference in academic achievements of students taught account of non-profit making organization in Financial Accounting using scaffolding, modeling and expository methods?

**Table 2:** Means of pre-test and post-test of Students academic achievements in account of non-profit making organization exposed to scaffolding, modeling and expository methods

S/N	Teaching Method	Pretest		Posttest	Difference in Mean/Gain
		N	X	X	
1	Modeling	83	3.41	11.43	8.02
2	Scaffolding	63	3.22	12.19	8.97
3	Expository	61	3.07	5.29	2.22

Data analysis in Table 2 indicates the higher mean score gain under scaffolding method (8.97) than the mean score gain under modeling method (8.02) and expository method (2.22). This generally indicates that scaffolding and modeling methods have substantial effects in promoting students’ academic performance when taught non-profit organization in Financial Accounting even though expository method relatively has the least effect.

**Research Question 3:** What is the difference in academic achievements of students taught control accounts in Financial Accounting using scaffolding, modeling and expository methods?

**Table 3:** Means of pre-test and post-test of Students academic achievements control account exposed to scaffolding, modeling and expository methods

S/N	Teaching Method	Pretest		Posttest	Difference in Mean/Gain
		N	X	X	
1	Modeling	83	4.03	10.97	6.96
2	Scaffolding	63	3.74	11.43	7.69
3	Expository	61	3.02	6.05	3.03

Data analysis in Table 3 indicates that the mean score gain of students exposed to scaffolding method (7.69) is greater than the mean score gain of students exposed to modeling method (6.96) and expository method (3.03). Scaffolding and modeling teaching method

therefore have greater effects on students' performance when taught control account in Financial Accounting.

**Testing of Hypothesis**

**H<sub>01</sub>:** There is no significance difference in academic achievement of students taught disposal of assets in Financial Accounting using scaffolding modeling and expository methods.

**Table 4:** Analysis of covariance of difference in Students' Academic achievement when taught disposal of assets in Financial Accounting using scaffolding, modeling and expository methods of instruction

Source	SS	Df	MS	F <sub>cal</sub>	F <sub>cri</sub>
Covariate (pretest)	114.74	1	114.74	9.68*	3.34
<u>Main Effect</u>					
Teaching Method	258.98	2	129.49		
Residual	2441.10	246	11.85	10.23	3.00
Total	2700.08	248			

N = 207

\*Significant P < .05

Data analysis in Table 4 indicates a larger computed F-value (10.23) than the table of critical F-value (3.00). This result leads to the rejection of the null hypothesis under 2, 204 and at P = .05 in favour of alternative hypothesis which states the existence of differences among students' mean performance under the three methods under investigation. This implies that the three teaching methods (scaffolding, modeling and expository) differed significantly in their enhancement of students' mean performance in Financial Accounting.

**H<sub>02</sub>:** There is no significance difference in academic achievement of students taught account of non-profit making organization in Financial Accounting using scaffolding, modeling and expository methods.

**Table 5:** Analysis of covariance of difference in Students' Academic Achievement when taught account of non-profit making organization in Financial Accounting using scaffolding, modeling and expository methods of instruction

Source	SS	df	MS	F <sub>cal</sub>	F <sub>cri</sub>
Covariate (pretest)	104.95	1	104.95	11.99*	3.34
<u>Main Effect</u>					
Teaching Method	219.36	2	109.68		
Residual	1802.50	246	8.75	12.53*	3.00
Total	2021.86	248			

N = 207

\*Significant P < .05

Data analysis in Table 5 indicates a larger computed F-value (12.53) than the table or critical F-value (3.00). This result leads to the rejection of the null hypothesis under df 2, 204 and at P = .05 in favour of alternative hypothesis which states the existence of differences among students' mean performance under the three methods under investigation. This implies that the three teaching methods (Scaffolding, modeling and expository) differ significantly in their enhancement of students' mean performance in Financial Accounting.

**H<sub>03</sub>:** There is no significance difference in academic achievement of students taught control accounts in Financial Accounting using scaffolding, modeling and expository methods.

**Table 6:** Analysis of covariance of difference in Students' Performance when taught control account in Financial Accounting using Scaffolding, Modeling and Expository methods of instruction

Source	SS	Df	MS	F <sub>cal</sub>	F <sub>cri</sub>
Covariate (pretest)	129.73	1	129.73	13.54*	3.34
<b>Main Effect</b>					
Teaching Method	274.49	2	137.24		
Residual	1973.48	246	9.58	14.33*	3.00
Total	2247.97	248			

N = 207

\*Significant P < .05

The summary of data analysis in Table 6 indicates a larger computed F-value (14.33) than the table or critical F-value (3.00). This result leads to the rejection of the null hypothesis under df 2, 204 and at p = .05 in favour of alternative hypothesis which states the existence of difference among students' mean performance under the three methods under investigation. This implies that the three teaching methods (Scaffolding, Modeling and Expository) differ significantly in their enhancement of students' mean performance in Financial Accounting.

Based on the significance observed, it was pertinent to prepare post hoc test in order to determine the groups between which the significant difference lies.

**Table 7:** Post hoc test least significance difference (LSD) of difference in the performance of students in Financial Account after being taught using modeling, scaffolding and expository methods.

A Group	B Group	Mean Difference	Std error	Sign.
		A – B		
Modeling	Scaffolding	.245	2.75	.84
	Expository	7.43*	2.75	.04
Scaffolding	Modeling	.245	2.75	.67
	Expository	7.39	2.75	.05
Expository	Modeling	.122	2.75	.04
	Scaffolding	2.75	2.75	.05

The post hoc test shown in Table 7 shows that significant difference occur between scaffolding and expository (7.43) and between modeling and expository method (7.39). The mean difference between scaffolding and modeling is .245 and is less than .84 critical value, hence there is no significant difference between scaffolding and modeling methods of instruction.

### Discussion of Findings

#### Scaffolding, Modeling, Expository methods and Students' Performance when taught disposal of asset in Financial Accounting

The findings of this study reveal that there was significant difference in students' performance taught disposal of asset in Financial Accounting in secondary schools with scaffolding, modeling and expository methods. The results in Table 1 showed that Financial

Accounting students taught using scaffolding did better than those of modeling whereas student taught using expository method gained few point. The findings of this study agree with Berryman (1990) when he asserted that like scaffolding in the construction industry, it helps students to bridge the gap between the current abilities and then intended goals. Instructional scaffolding are tools, such as written guidelines, cue card, techniques and prompt by the teacher (Berryman, 1990). It could be observed that there is lack of written guidelines, cue card, modeling and prompt by the teacher in the expository method of teaching Financial Accounting hence the poor performance of students in both external and internal examinations.

### **Scaffolding, Modeling, Expository methods and Students' Performance when taught account of non-profit making organization in Financial Accounting**

From the results in Table 2, it was observed that students taught account of non-profit making organization in Financial Accounting using scaffolding method performed better than those taught using modeling and expository methods. This indicated that there was significant difference in students' performance when exposed to the three teaching methods. The findings of this study are in line with the findings of Rogoff (1990), who asserted that major responsibilities of the teacher during scaffolding stage of cognitive apprenticeship are structuring situation of expert practice and demonstrating the expert's thinking process in a manner that does not overwhelm the students. This approach is lacking in expository method of instruction. Scaffolding and modeling methods of instruction enhance students' performance in Financial Accounting because students taught using these two methods motivates the child's interest in related task and students of Financial Accounting are encourage to think like experts, modeling their performance in difference context.

### **Scaffolding, Modeling, Expository methods of instruction and Students' Performance when taught control account in Financial Accounting**

The result of the data analysis revealed that there was significant differences in students' performance when taught control account in Financial Accounting using the three different methods under investigation. The result in Table 3 showed that scaffolding had a higher mean score compared to those with modeling and expository methods. The results indicates that students taught using scaffolding method had the best performance followed by modeling method. This findings are in line with the findings of Brush and Saye (2002) who explained that scaffolds are developed in order to assist students with a difficult task. The key is that the assistance is planned in advance. For example, when Financial Accounting students are mastering some accounting principles in the class, the teacher may identify hints or cues to help the student reach an even higher level of thinking. In this situation, the idea of "expert scaffolding" is being implemented (Holton & Clarke, 2006).

### **Conclusion**

Cognitive apprenticeship (CA) models help students acquire the necessary knowledge and skills in financial accounting. CA also assist Financial Accounting teachers to model the strategies and activities necessary to solve problems while providing appropriate scaffolds (organizational strategies and other supporting materials) to support the students' own efforts.

### **Recommendations**

On the bases of study findings, discussion and conclusions, the following recommendations may be proffered:

1. Scaffolding method of instruction should be used by the teachers in teaching students Financial Accounting in the secondary school.
2. Teachers' should ensure the use of specific techniques as presented in cognitive apprenticeship approach to enhance students' ability to perform better in examination and ultimately transfer these skills to real life situations or the world of work.
3. More time should be allotted to the teaching periods by the school administrators since cognitive apprenticeship instructional models especially modeling and scaffolding require more time, efforts and money.

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