Effects of Instructional Strategies on the Trainee Teachers'

Learning Outcome in Practical Teaching Skills

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Abstract

This study investigated the effects of three types of microteaching modes as strategies for enhancing trainee teachers' learning outcomes in questioning, communication and stimulus variation skills. The study adopted pretest-posttest, control group, quasi-experimental design with 4x3 factorial matrix. One hundred and thirty-five trainee teachers from three Colleges of Education participated in the study. Instruments used were Practical Teaching Skills Rating Scale and Learning Styles Self-Assessment Inventory. Data were analyzed using Analysis of Covariance, while Sidak post hoc analysis was used to explain the significant difference. There was significant main effect of instructional strategies on trainee teachers' practical teaching skills achievement in microteaching. However, there was no significant main effect of learning style on trainee teachers' and no significant interaction effect of instructional strategy and learning style on students' practical skills achievement in microteaching. The perceptual mode instructional strategy was effective in enhancing trainee teachers' practical teaching skills achievements in microteaching.

Keywords: Learning outcome, perceptual mode, audio mode, symbolic mode, conventional mode, instructional strategy, learning style

1.   Introduction

In recent decades, employers, parents, accrediting agencies and the federal government have begun to demand that teacher education institutions be held more accountable for the education and training they provide to students (Albert, 1991; Eaton, 2003). However, the public perhaps associates the annual mass failure of students in almost all subjects in public examinations, especially Senior Secondary School Certificates Examination (SSSCE), to the manner in which teachers are being trained (Ogunwuyi, 2008). In as much as the teachers are still to be regarded rightly as the main facilitators of learning, it could be assumed that to a large extent, teachers determine the success or failure of the learners. Student learning outcomes are rapidly taking centre stage as the principal gauge of teacher education's effectiveness (Ruhland & Brewer, 2001).

Teaching practice exercise for trainee teachers in teachers' education programmes has attracted several comments regarding its efficiency and effectiveness, particularly in the area of assisting "neophyte" teachers to develop competency in the teaching skills. Obanya (2002) raised issues on ineffective teaching practice and corroborated by Ogonor and Badmus (2006) that supervision of teaching practice is often not thoroughly done as supervisors seem more interested in students' scores thus paying little concern to inter-personal discussion at the end of the teaching period. It is not uncommon for supervisors to assess trainee teachers' performance by mere reading through the prepared notes of lessons. In such a situation the professional classroom teaching has been down placed. Ajayi (2006) reported that teaching practice is a complex set of activities which many beginners normally dread. The implication of this is that efforts should be geared towards enhancing skills of trainee teachers before they are asked to go for the teaching practice exercise. To acquire these competencies, teachers should be given special training before starting professional practice (Sisman & Acat, 2003). Teachers who will guide the youths and will be a factor in shaping the future should possess adequate competencies to perform their duties. Teacher competencies are developed not only through the theoretical aspect of teacher education proramme but through practical applications (Yok, 1998).

An attempt to improve teachers' preparation and equip them with required skills for competence led to microteaching. Microteaching has a rapidly expanding body of literature that has been developed over the past few years. The available literature generally supports the notion that specific behaviours, especially acquisition of teaching skills can be changed and improved upon with the proper use of the microteaching technique. One of the essential features of microteaching is the use of modeling. According to Simon and Werner (2006), the rationale for "modeling" is derived from the theories of imitation which indicate that even complex social behaviour can be acquired almost entirely through imitation. However, researchers have paid little attention to the teaching skills of questioning; communication and stimulus variation that trainee teachers need to enhance their teaching competency (Ogunwuyi, 2009). For qualitative growth in teacher education, pertinent issues in need of further attention include: questioning; communication and stimulus variation skills because of their importance in teaching-learning process.

The idea that people learn differently is venerable and probably had its origin with the ancient Greeks (Wratcher, Morrison, Riley & Scheirton, 1997). Educators have noticed that some students prefer certain methods of learning more than others. These dispositions, referred to as learning styles, form a student's unique learning preference and aid teachers in the planning of small-group and individualized instruction (Kemp, Morrison & Ross, 1998). Dunn (2000) cites "Learning style is a biologically and developmentally determined set of personal characteristics that make the identical instruction effective for some students and ineffective for others."

A learning style is a student's consistent way of responding to and using stimuli in the context of learning. Keefe (2004) defines learning styles as the "composite of characteristic cognitive, affective, and physiological factors that serve as relatively stable indicators of how a learner perceives, interacts with, and responds to the learning environment". Stewart and Felicetti (2001) define learning styles as those "educational conditions under which a student is most likely to learn." Thus, learning styles are not really concerned with "what" learners learn, but rather "how" they prefer to learn.

Each person is born with certain preferences toward particular styles, but culture, experience, and development influence these preferences (Giles, Pitre, & Womack, 2003). The four most common learning styles are visual, aural, reading/writing, and kinesthetic/tactile. Most people learn through all modalities, but have certain strengths and weaknesses in a specific modality. Some people have an equal propensity for more than one style, which is titled as the multimodal style. This preference can be determined through various testing instruments. Once a person's learning style is ascertained, accommodations can be made to increase academic achievement and creativity, as well as improve attitudes toward learning. There is an abundance of studies that focus on the effect of students' learning style preferences on learning outcomes in traditional classroom settings. Several studies have found academic achievement is positively affected when teaching correlates with students' preferred learning style in the traditional setting (Dunn, Beaudry & Klavas, 1989, Dunn, Dunn & Price, 1977; Mickler & Zippert, 1987; Miller, Always & McKinley 2003). Therefore, an issue that surfaces is how students' learning preferences affect their learning outcomes in a microteaching setting.

This study investigated the effectiveness of perceptual, symbolic and audio presentation modes on trainee teachers' acquisition of teaching skills of questioning, communication and stimulus variation. It also investigated the interaction effect of trainee teachers' learning styles on cognitive achievement and selected practical teaching skills.

1.1 Objectives of the Study

The objectives of this study were:

1. to investigate whether there will be any significant main effect of the perceptual mode (PM), symbolic mode (SM) audio mode (AM) and the conventional method on acquisition of practical teaching skills by trainee teachers in microteaching settings.
2. to investigate the effect of treatment on the moderator variable, learning styles, of the trainee teachers' cognitive achievement in questioning, communication and stimulus variation skills.

1.2 Research Hypotheses

In view of the identified problem, this study tested the following null hypotheses at 0.05 alpha level:

1. There is no significant main effect of instructional strategy on the trainee teachers' practical teaching skills achievement in microteaching.
2. There is no significant main effect of learning styles on the trainee teachers' practical teaching skills achievement in microteaching.
3. There is no significant interaction effect of instructional strategy and learning styles on the trainee teachers' practical teaching skills achievement in microteaching.

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2.   Research Design

The study adopted the quasi-experimental of pretest – posttest control group design, using a 4x3 representation. This study employed three treatment groups comprising perceptual mode (Experimental group 1), symbolic mode (Experimental group 2), audio mode (Experimental group 3) as well as a control group (the Conventional mode group).   The learning outcomes of trainee teachers were investigated with respect to cognitive and practical teaching skills.

2.1   *Sample and Sampling Procedure*

All the NCE Year II students in the three Colleges of Education in Oyo and Ogun States, Nigeria that satisfied inclusive criteria of availability of microteaching projection room and adequacy of qualified Educational Technology lecturers were purposively selected to participate in the study.   These colleges are: Emmanuel Alayande College of Education (EACOE), Oyo (located at Erelu and Lanlate), Federal College of Education (Special) (SPED), Oyo in Oyo State and Federal College of Education (FCE), Abeokuta in Ogun state   formed the population of the study. In all, a total of 135 students (53 males and 82 females) were involved.   The participants were also of varied academic ability levels (GPA at the end of first semester of 200, 25 distinctions, 53 credits, 39 merits, 11 passes, 3 lower passes and 4 fail).   The average age of the students was 19 years.

2.2   *Instrumentations*

Two measuring instruments were used for the study. Learning Styles Self-Assessment Inventory (LSSI) used for classification into groups. The instrument was originally developed by Gardner (1993). It was adapted and re-validated by Farkas (2003) when it was used to examine the relationship between learning styles and learning outcomes using explicit-teaching and peer tutoring instructional strategies.   A reliability co-efficient of 0.73 was established. The instrument was adapted by the researcher. The instrument consists of two parts; Part A – demographic data and Part B – covers statements on the preferred learning styles. The inventory has twenty-one items and each of the categories has seven items that offer reasonably simple and accessible methods to understand and explain people's preferred ways to learn. In each item, the respondent was requested to rank-order four words by assigning *not like me, a little like me, like me and a lot like me* for 1, 2, 3, and 4 respectively; in a way that best describes his or her learning style. The sum of scores represented students preferred learning styles.   Thus, grouping of students into visual, auditory and reading/writing learning styles were based on these scores, that is where they have highest number of scores.

Practical Teaching Skills Rating Scale (PTSRS) measuring achievement in the three teaching skills (post test). This is an adapted format of Microteaching Practicum Assessment (MPA) of Emmanuel Alayande College of Education, Oyo and therefore involved a direct observation of the performance of the trainee teachers in the three teaching skills.   This instrument was designed to assess trainee teachers' achievement in a practical skill demonstration. Twenty-four items are selected for the study based on the skills, namely: questioning, communication and stimulus variation.   Eight specific skill items that are related to each of the three skills are included in the assessment sheet. The instrument consisted of the biographical section which deals with student's name, matriculation number, name of institution and instructional mode.   The skills section consisted of three major sections: A, B and C.   The behavior in each of these sections in form of performance criteria were observed and graded accordingly by awarding scores on a five-point rating (1 – Poor, 2 – Average, 3 – Good, 4 – Very Good and 5 – Excellent).   The total possible obtainable mark for each skill was 40, totaling 120.

The test – retest method was adopted with a time interval of three weeks between the first and second administration of the LSSI instrument. The result produced a reliability estimate of 0.718 for LSSI.   While the PTSRS instrument was re-validated and tested for reliability using a group of twenty (20) professional lecturers in a college of education.   They were asked to use the instrument to grade the videotaped of the trainee teachers' teaching episode. The calculated cumulative Cronbach Alpha value is .9412.

2.3   *Procedure*

Using the intact class method, each campus of EACOE (Erelu Campus – Perceptual and Lanlate – Audio) and SPED (symbolic) was randomly assigned to a mode using simple random sampling, while FCE, Abeokuta was the control group so as to avoid interaction that may occur among the groups. The first week was used to train the lecturers/research assistants on the topics to be treated and also how to use the Practical Teaching Skills Rating Instrument. The pre test took place immediately after assignment to research groups.   After the pre-test, the next four weeks were used for treatment for the groups.   The topics that were taught during classroom teaching, in all of

the groups, were the first three skills of the course (EDU 213: Microteaching: Theory).   This is necessary to make sure that participants have not been exposed to those topics before the investigation.

2.4   *Data Analysis*

Descriptive and inferential statistics were used in analyzing the data collected in this study.   The descriptive statistical tools used include means and standard deviations to show appropriate estimates of the scores for each group and sub group of the independent and dependent variables.   The inferential statistical tool of Analysis of Covariance (ANCOVA) was used to test the three hypotheses raised to guide the study.   The Multiple Classification Analysis (MCA) and the Sidak post-hoc analysis were used to explain the magnitudes of the post test cognitive and practical teaching skills achievements scores of the different categories of trainee teachers who participated in the study.

3.   Results

3.1   *Hypotheses Testing*

Ho1:   *There is no significant main effect of instructional strategy on the trainee teachers' practical teaching skills achievement in microteaching.*

Table 1:   Summary of Analysis of Covariance of Students' Practical Teaching Skills Achievement According to Treatment and Learning Style Preferences

Source of Variation	Sum of Squares	Df	Mean Square	F	Sig. of F
Covariates (Pretest)	872.920	1	872.920	52.603	.000
Intercept	1449.982	1	1449.982	87.377	.000
Treatment Group	419.519	3	139.840	8.427	.000*
Learning Style	10.100	2	5.050	.304	.738
2 Way Interaction					
Treatment X L. Style	114.516	6	19.086	1.150	.338
Explained	1774.000	12	147.833	8.909	.000
Residual	2024.526	122	16.594		
Total	**3798.526**	**134**			

* Denote Significant F at p<0.05   Rsquared = .467 (Adjusted R^2 = .415)

Table 1 revealed the result of the main and interaction effects of treatment and learning style on students' practical teaching skills achievement in microteaching.   The table revealed significant main effect of instructional strategy on the students practical skill achievement ($F_{(3,122)}$ = 8.427, p<0.05).   This implied that the post practical mean achievement scores of the students exposed to the different instructional strategies are significantly different. Therefore, the null hypothesis one is rejected.

In order to determine the magnitude of the post practical mean achievement scores of the students exposed to the different instructional strategies, the result of the Multiple Classification Analysis (MCA) presented in table 2 was used.

Table 2:   Multiple Classification Analysis of Students' Practical Skills Achievement Scores According to Treatment   and Learning Style

S/N	Variable + Category Instructional Strategy	N	Unadjusted Deviation	Eta	Adjusted for Independent + Covariates	Beta
	Grand Mean = 85.669					
1	Perceptual	33	0.372		3.301	
2	Audio	30	-0.333		2.794	
3	Symbolic	33	-1.959		1.277	.68
4	Conventional	39	-4.064	.17	-1.390	
	Learning Style					
1	Aural	39	-1.047		1.677	
2	Visual	40	-1.254		1.331	
3	Reading & Writing	50	-1.439	.01	0.730	.05
	Multiple R Squared					.467
	Multiple R					.683

The result in table 2 revealed that, with a grand mean of 85.669, the students exposed to the perceptual mode recorded the highest adjusted post practical teaching skills mean achievement score of 88.970 (85.669 + 3.301). The students exposed to the audio mode had the next highest adjusted post test practical mean achievement score of 88.463.   The students exposed to the symbolic mode recorded the next highest post test practical mean score of 86.946 while the students exposed to the conventional method obtained the lowest mean practical score of 84.279. This outcome showed that the perceptual instructional strategy had the greatest potency at effecting students' practical skill achievement in microteaching.   The result in table 2 further revealed that while treatment (strategy) alone accounted for 46.24% $(0.68)^2$ of the variance in the students' practical skill acquisition scores, the independent and moderator variables jointly accounted for 46.7% $(.683)^2$ of the variance observed in the dependent measures.
In order to trace the source of the significant difference recorded in table 1, the Sidak post-hoc analysis presented in table 3 was carried out.

Table 3:   Sidak Post-Hoc test of Students' Practical Skills Achievement on Treatment Groups

Treatment Groups	Mean	Perceptual	Audio	Symbolic	Conventional
Perceptual	87.505				*
Audio	86.899				*
Symbolic	85.328				
Conventional	82.942	*	*		

Denote pairs of groups that are significantly different at p<.05
The result in table 3 showed that the source of the observed significant difference in strategy reported in table 1 is due to the significant difference between the pairs of perceptual and conventional strategy as well as audio and conventional strategy.   The difference between the mean practical skill achievement scores of the pairs of perceptual and audio; perceptual and symbolic; and symbolic and conventional strategies are not statistically significant at the .05 level of confidence.

Ho2:   There is no significant main effect on learning style on the trainee teachers' practical teaching skills achievement in microteaching

The result in table 1 revealed no significant main effect of learning style on the students' practical teaching skills achievement in microteaching ($F(2,122) = 0.304$, $p>0.05$). This means that the post-test mean practical teaching skills achievement scores of students preferring aural, reading/writing, and visual learning styles are not significantly different. Thus, the null hypothesis five cannot be rejected. However, the result of the MCA in table 2 revealed that in the order of performance, the students who preferred the aural learning style recorded the best adjusted post test mean practical skill achievement score of 87.346; which was closely followed by the student preferring the visual style of learning who recorded post-test mean score of 87.000 while the students who preferred the reading/writing learning style recorded the lowest post-test practical skill achievement score of 86.399. The result in table 2 further revealed that students' learning style alone accounted for just 0.25% $(0.05)^2$ (less than 1%) of the variance observed in the students' practical skills achievement in microteaching.

Ho3:   There is no significant interaction effect of instructional strategy and learning style on trainee teachers' practical teaching skills achievement in microteaching.

The result of the 2-way interaction on effect in table 1 revealed no significant interaction effect of instructional strategy and learning style on the students' practical skills achievement in microteaching ($F_{(6,122)} = 1.150$, $p>0.05$). This result showed that students' practical teaching skills achievement in microteaching, after exposure to different instructional strategies, do not vary significantly among aural, visual and reading/writing learning style learners. As a result, the null hypothesis six is not objected. Hence, students with different learning styles do not differ significantly in their practical teaching skills achievement in microteaching.

4.   Discussion of Findings

Hypothesis one was used to investigate the effect of four instructional strategies on the trainee teachers' practical teaching skills achievement in microteaching. The findings of the study revealed the significant main effect of instructional strategy on the students' practical teaching skills achievement. The direction of significance shows that the mean achievement score of the students exposed to the perceptual mode was the highest followed by that of the students exposed to the audio strategy. The mean achievement score of the students exposed to the symbolic mode came next while the students exposed to the conventional mode recorded the lowest mean practical teaching achievement score.

The outcome of this findings showed that the perceptual instructional mode had the greatest potency at effecting students' practical skills achievement in microteaching. With this situation therefore, one would expect those who received instruction through perceptual mode to not only retain for long but recall better the subject matter as presented by the lecturer than either those who just received the information through the other modes. The finding might not be unconnected with the enthusiasm to which video use provided. The participants were helped to perceive critically what they watched on the screen with active participation of the students in the programme. The mapping method used might also provided the viewers the opportunity of having a mental model after the viewing session. The result of this study agreed with Jimoh's (2002) study on the effects of videotaped feedback. Also, this study corroborates the claim of Ayo-Obiremi (2008) that the students treated with video and question and answer feedback performed significantly better than their counterparts treated with the question and answer feedback only. Findings of the study also agreed with Salawu (1999) who carried out a study on the effects of three instructional modes on student-teachers' learning outcomes in selected teaching skills. He found out that a combination of direct mode and video-taped mode was found superior in students' achievement in cognitive and practical teaching.

Hypothesis two was presented to investigate the effect of learning style on the trainee teachers' practical teaching skills achievement in microteaching. The result revealed in order of performance that the students who preferred the aural learning style achieved highest adjusted post test mean practical skill achievement score which was closely followed by the students preferring the visual style of learning, while the students who preferred the reading/writing learning style recorded the lowest post test practical skill achievement score. However, no significant effect was found.

With this finding, one is tempted to believe that there is the tendency for a mixture of preference in the modes of presentation the instruction which must have incidentally influenced students' performance across the board. Also, the findings of the present study might not be unconnected with the notion held in some quarters that learning styles are not really "styles" but rather "preferences" in that we do NOT learn best by using one style of learning. That is, we prefer one or more styles over others. Learning styles can vary in different situations; and learning styles research has produced mixed results as reported by Ayo-Obiremi (2008) in her study. For example, some researchers have found correlation between a learning style and achievement while others have found no significant

link.   The result of this study agreed with Smith, Cavanaugh, Jones, Venn and Wilson (2006) when they discovered that learning styles had no significant effect on student performance following instruction in clinical skills via interactive multimedia.

Hypothesis three was used to investigate the interaction effect of instructional strategy and learning style on the trainee teachers' practical teaching skills achievement in microteaching.   The result of the 2-way interaction effect revealed no significant interaction effect of instructional strategy and learning style on the trainee teachers' practical teaching skills achievement in microteaching.   This finding suggested that matching students' learning style preferences with instructional strategy compatible with those preferences would not increase their practical teaching skills achievement.   This result confirmed that learning style and instructional strategy do not interact in a way that could affect learning outcome.

One possible explanation of this situation is that since all the students irrespective of their learning style preferences were taught by the same lecturer under the same classroom environment using the same scheme of work, irrespective of the presentation modes, all of them could be inspired to perform at the best of their ability.   The researcher was unable to locate a study that investigated interaction effect of instructional strategy and learning style on the trainee teachers' practical teaching skills achievement.   There are however other studies that investigated the impact of learning styles and instructional strategy using trainee teachers in higher institutions of learning.

The finding of this study is consistent with the investigation conducted by Korhonen and McCall (2004).   The authors investigated the effects of learning style and learning environment on achievement of students on a basic computer-programming course and concluded that there was no significant interaction effect of the learning style and learning environment in post test mean score.   The result of this study agreed with that of Noppe, Achterberg, Duquaine, Huebbe, and Williams (2007) where they reported an investigation that sought to assess whether the receipt of PowerPoint handouts was moderated by learning styles.   Learning styles were not predictive of improved test performance as a function of receipt of handouts.   These results question the efficacy of presentation software handout for student learning outcomes.   On the contrary, the result is not in agreement with John's (2002) study who found significant interaction effect of the learning style and learning environment in post test mean score of participants.   From these findings, one can conclude that the influence of learning style on performance is inconclusive and may depend on some other factors.   This calls for further investigation.

5.   Conclusion

This study has investigated the potency of perceptual, symbolic and audio modes as strategies for enhancing trainee teachers' learning outcome in teaching skills of questioning, communication and stimulus variation.   The quasi-experiment involved 135 NCE II students in three Colleges of Education.   Intact classes were exposed to these modes and conventional method in microteaching setting.   Effects were assessed in practical teaching skills. Microteaching modes hold qualities that can enhance practical teaching skills achievement.   However, they could do so at different levels.   Perceptual mode will promote practical teaching skills best. Audio mode will promote practical teaching skills after perceptual. The students exposed to symbolic came next and conventional mode students came last.   Learning styles and the instructional strategies work equally harmoniously to enhance practical teaching skills achievement in microteaching.

6.   Recommendations

Based on the findings of this study, the following recommendations are suggested:

- Trainee teachers should be exposed to microteaching modeling strategies.   This will provide trainee teachers with teaching encounters prior to the actual teaching practice in normal classroom situation thereby motivating and enhancing their confidence.
- Teacher educators are to be encouraged to use perceptual mode in microteaching strategy to reduce the difficulties that may be encountered by trainee teachers in teaching practice exercise.
- Teacher educators are to be encouraged to use the combination of models, since all the instructional modes proved to be effective in the post test achievement, in order to enhance a rewarding microteaching session.
- The National Commission for Colleges of Education (N.C.C.E.) should ensure that microteaching laboratories are well equipped with good number of: close circuit television, digital video camera, plasma television sets, video disc of model teaching skills, detailed written transcripts of teaching skills, and detailed recorded audio packages of teaching skills in all teacher education institutions in Nigeria.   This will allow teacher trainers an opportunity of carrying out microteaching

- Equally, it is recommended that a replicated study of this work using other teaching skills apart from those used in this study could be worthwhile venture as this would increase the scope to which the perceptual mode could cover in teacher education programme particularly teaching skills based instructional programmes.

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