

Comparative Effects of Just-In-Time Teaching and Lecture Method on Academic Achievement of Guidance and Counselling Students: Implications for Improved ICT in Schools

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Abstract

The status of ICT for teaching Guidance and Counselling in most universities in the country is below expectation. This problem is made worse by the old method of teaching mostly applied by some lecturers. This therefore calls for a change of attitude. This expected change may result if current methods are applied in teaching the course. One of such methods is the just-in-time teaching. This method has the potentiality of impacting positively on the learners. This, however, can be possible with functional ICT facilities. In the light of the above, this study compared the effects of using "Just-in-time teaching" (JITT) and lecture method on students' academic performance in guidance and counseling. Two research questions guided the study while two hypotheses were tested at 0.05 level of significance. Quasi – experimental research design was adopted. The population of the study comprised 67 respondents made up of 14 male and 53 female second year students in the Department of Guidance and Counselling, Nnamdi Azikwe University, Awka. There was no sampling as the population was not too large. 7 male and 26 female students were assigned control group while remaining 7 male and 27 female students were assigned experimental group. The pre-test and post- test were administered to both the control and experimental group. JITT method was used to teach the experimental group guidance and counseling courses while control group was taught the same lessons using conventional method. Data collected from study were analyzed. The research questions were answered using mean and standard deviation while hypotheses were tested at 0.05 level of significance using ANCOVA. A number of findings were made from the study which include: The achievement grades of students taught guidance and counselling courses using JITT method are greater than those taught using lecture method; there was significant effect of gender on the students' mean achievement scores of students taught guidance and counseling. JITT should be formally adopted for instruction in tertiary schools in order to improve students' performance. It was also recommended that ICT facilities in the higher institutions should be improved in order to enhance formal adoption of JITT as a method of teaching guidance and counseling in tertiary institutions in Nigeria.

Keywords: comparative effects; just-in-time teaching; lecture method; academic achievement; counselling;

INTRODUCTION

Educators have been pressing for reforms in teaching and learning, and one major objective has been to move away from the traditional instructional method that leads to passive learning, to other instructional methods that leads to active learning (Biggs, 2003). Evolving a more effective method for teaching the subjects in secondary schools so that the students' performance will be high, there becomes imperative. The method that comes to mind at this juncture is what is called 'Just-in-time teaching (JITT) method. JITT as a teaching method was developed by Novak, Patterson, Garvin & Christian, (1999). It is a teaching method that combined the use of out - of-class web - based exercise with active learning pedagogy (Simkins, 2006). As a teaching method, JITT addresses two critical issues in teaching and learning activities. These issues include the relative scarcity of active learning based teaching method and the lack of new technology -based instructional innovations (Simkins, 2006). Just-in-Time Teaching (JITT) can also be defined as a pedagogical strategy that uses

feedback between classroom activities and work that students do at home, in preparation for the classroom meeting (Enwere, 2012). The goals are to increase learning during classroom time, to enhance student motivation, to encourage students to prepare for class, and to allow the instructor to fine-tune the classroom activities to best meet students' needs (Enwere, 2012)

Commenting on this method, Novak, Patterson Garvin and Christian (1999) observed that Just -In - Time teaching is a teaching and learning strategy comprising two elements: Classroom activities that promote active learning and web - based activities that are based to enhance the classroom component. The two work together to promote as feedback loop that encourages better class preparation by students, course material, and promote feedback on students conceptual understanding of course material, and promote just - in - time modification of class activities and discussion.

From the above, it is obvious that, in JITT, the work students do at home or outside the school official hours is used to leverage the time they spend in class. The use of JITT as a teaching method is very simple. Between classes, students are given short assignments typically focusing on materials that will be covered in the next class. The students do the assignments and submit them electronically to the teacher. Once submitted, the teacher will review the students' JITT responses prior to the class and use the responses to organize and modify the upcoming classroom session - hence the "Just - In - Time" label. Excerpts from students' submissions are presented during the class as the bases for discussion. This replaces the traditional lecture method and therefore used to develop following exercise that the students would work on in class.

Several studies within the literature coverage reported that most lecturers in the department use lecture method in teaching the students (Ogunu, 2000). Amongst the factors implicated is students' passive participation in teaching and learning activities (Enwere, 2012). The lecture method of is teacher centered with the teacher acting as repertoire of knowledge while the students are passive listeners or dormant recipients of the lessons. Although the lecture method has the advantages of being less tasking and allows for a wide coverage of content within a short time, and in addition allows for teaching large number of students at the same time. It does not always produce positive learning outcomes in many students. This is because it encourages rote learning (mere memorization of basic rules) which does not enhance meaningful learning or student's academic achievement.

The academic achievement of students is a major indicator as to whether or not learning has taken place (Ogunu, 2000). According to Enwere and Enwere, (2014), academic achievement involves observable and measurable performance of students that take place in the presence of a standard for measuring academic excellence. It is generally observed that lecturers can enhance students' academic achievement by employing different teaching methods. In this regard, their comparative effects are being determined in this study.

The revolutionary effects of JITT as a teaching method have been documented by a number of authorities such as Simkins and Maier (2004). Marr and Novak (2004); and Marr, Blake and Garvin (2003). The American society for cell Biology in Enwere and Enwere (2014) for instance has reported the following revolutionary effects of JITT method on students' learning and success:

- Increase in classroom interactivity;
- Provision of ongoing formative assessment to students;

- Improvement in class preparation;
- Improvement in students study habits.

Furthermore, Cohen, Kulik and Kulik (2009) found that JITT as a teaching method enhanced students performance in mathematics. Again, Greenwood (2001) found that JITT increased students' performance on standard measures of reading language and mathematics. Lazerson, Brown and Hummel (2008) found out that JITT could be used to check truancy. Again, Briz and Mclaughlin (2008) discovered that the use JITT to teach mathematics resulted in significant cognitive gains for the experimental group. Fitz-Gibon (2010) found that low achieving students improved better when taught with JITT. Goodlad and Hirst (2004) reported accelerated learning for under achieving pupils who were taught with JITT. Richard (2004) in his study reported the influence of gender on JITT students' achievement. This study is therefore motivated by the need to comparatively determine the effects of JITT on students' academic achievements.

Statement of Problem

It is important to mention here that all the students reviewed were conducted outside the country. Secondly, none of them was carried out using guidance and counselling courses. The above state of affairs creates a gap in knowledge as one cannot readily lay hands on any study carried out locally on how JITT could be used to facilitate students' learning or enhance their academic performance. In addition to the above, the state of ICT facilities in some higher institutions in Nigeria may not likely encourage the use of JITT in classroom teaching and learning processes. A gap in knowledge is therefore created by the above state of affairs. This study is therefore geared towards filling this obvious gap in literature, therefore becomes the motivation for this study, as academic achievement of students is a major indicator as to whether or not learning has taken place (Ogunu, 2000).

Purpose of the Study

The main purpose of this study is to ascertain the effects of using JITT method on students' achievement in teaching guidance and counselling courses.

Specifically, this study was aimed at:

1. Finding the achievement grades of students taught guidance and counselling courses using JITT method and those taught the same course using lecture method.
2. Finding the effect of gender on academic achievement of students taught guidance and counselling courses using JITT method and those taught the same course using the lecture method.

Research Questions

The following research questions guided the study:

1. To what extent do the academic achievement grades of student taught guidance and counselling courses using JITT method differ from those of student taught the same course using lecture method?
2. To what extent does gender affect students' mean achievement in guidance and counselling courses?

Hypotheses

The following null hypotheses were tested at 0.05 level of significance.

1. There is no significance in the achievement grades of students taught guidance and counselling courses using JITT method and those taught same course using lecture method.
2. There is no significance effect of gender on the achievement grades of students taught guidance and counselling courses using JITT method and those taught same course using lecture method.

Methodology

The design adopted in the study is quasi experimental, specifically, the pre-test, post test, non equivalent control design. This was used because intact classes were used since it was not convenient for schools used in this to randomly assign students to experimental and control conditions. Pre-tests were administered to all groups. The population of the study comprised 67 respondents made up of 14 male and 53 female second year students in the Department of Guidance and Counselling, Nnamdi Azikwe University, Awka. There was no sampling as the population was not too large. 7 male and 26 female students were assigned control group while remaining 7 male and 27 female students were assigned experimental group. All the second year students in the Department were purposively chosen for the study. There was no sampling because the entire population was studied. The experimental group was assigned to JITT method of teaching while control group was assigned to the lecture method of teaching guidance and counselling courses.

Instrument

The only instrument for the study was JITT guidance and counselling Achievement Test (JIGCAT). JIGCAT is a 30 item multiple choice test developed by the researchers based on guidance and counselling courses for second year students. A test blue print was developed based on the relative emphasis on each of topics in the curriculum. JIGCAT was subjected to both content and face validity. The content validity was accomplished by ensuring that the test reflected the specifications of the test blue print. Face validity was established by evaluating the test items by three experts in test construction the university and three experienced senior lecturers of guidance and counselling. 30 items (out of the initial draft of 50 items) were found suitable in terms of

discrimination and clarity after careful items analysis. A reliability coefficient of 0.82 was established using Cronbach Alpha.

Procedure

The regular course lecturers in department were used for the study. The lecturers who participated in the experimental treatment were subjected to rigorous training regimen for a period of three weeks at two hours per week. The lecturers were trained on how to conduct instructions in G & C using JITT method. This was done to ensure uniformity and mastery of the teaching strategy. In addition, each lecturer in the experimental group was given a copy of the validated lesson plan and a copy of the instrument to be used for data collection. Those in the control group did not receive any training. They were required to lecture the students using lecture method of teaching. The researcher vetted the lesson plans prepared by the lecturers in the control group ensure that the lesson plans followed the conventional lecture method. In addition, each lecture in the control group was given a copy of the instruments to be used for data collection. JIGCAT was administered as pre-test to experimental and control groups before treatment commenced to assess the students' knowledge of guidance and counselling. Data collected were subject to ANCOVA to determine the homogeneity of the groups.

Treatment

It is important to note here, that JITT in its form was developed for the developed nations. As a result, it may not operate successfully in a developing country like Nigeria where most students do not have access to electronic resources. Hence, there is need for modifications. The following modifications were therefore made:

- The use of web-based resources in replaced with the use of library resources.
- The electronic distribution of warm ups materials to students is replaced with manual distribution during class activities.
- The electronic submission of warm up exercise by students to the teacher is few days before the actual classroom discussion on the JITT material.
- The use of digital projector to present lessons is replaced by the classroom illustration on the chalkboard (Enwere, 2012).

Based on the above modifications, the treatment was as follows: in the experimental group, the JITT students were taught using the JITT materials and procedures. The JITT materials were given to learning activities with the use of library resources to facilitate classroom learning. The JITT materials were given to them in form of "warm-ups". Warm-ups are lesson materials like notes or assignments given to the students to read few days before the class. The

students were required to complete the warm-ups (assignments) individually at their own pace and submit them few days to the lecturer before the lecture sessions. The lecturer read through the students' submissions. Thus, for the experimental class, the lecturer ensured that each lesson was preceded and informed by an assignment made from library resources. The entire class session as characterized by clarification of any confusing concept identified in the students' responses, class discussion of the materials given (warm-ups), questioning, and assignment of the next warm-ups. On the other hand, the control group was taught the same course contents covered in the JITT class session using model lesson plans vetted by the researcher. They were taught the lessons using the conventional lecture method. JIGCAT was again administered to the students as posttest and their scores were recorded.

PRESENTATION OF RESULTS

Mean and standard deviation scores of students on cognitive achievement in JIGCAT were used to answer the research questions (Table 1 and 2) while ANCOVA was used to test the hypotheses (table 3 and 4) at 5% confidence level. ANCOVA analysis on pre-test scores for subjects in the experimental and control group was used to establish that the two groups were equivalent before treatment began.

Table 1:

Table 2: Pre-test and Post-test Mean Ratings and Standard Deviation of Male and Female Students in the Experimental Group.

Source of Variation	N	Pretest mean	Sd	Posttest mean	Sd	Mean Gain	Remark
Treatment Group	7	0.26	0.24	4.53	1.39	4.27	Positive effect
Female Students	27	0.32	0.56	2.41	1.43	2.09	

The result presented in table 2, showed that pre-test mean score of 0.26 and post-test mean score of 4.53 with mean gain of 4.27 for the male students treated with the JITT method. The table also shows pre t-test mean score of 0.32 and post-test means

Pre-test and Post-test Mean Ratings and Standard Deviation of students who received JITT Treatment and those in the Control group.

Source of Variation	N	Pret est mea n	Sd	Postt est mean	Sd	Me an Gai n	Rem ark
Treatm ent Group	3 4	2.14	1. 31	4.94	1. 05	2.8 0	Posit ive effec t
Contro l Group	3 3	0.53	1. 03	1.62	2. 44	1.0 9	

The result as presented in Table 1 showed that with pre-test mean score of 2.14 and post-test mean scores of 4.94 with mean gain 2.80 for the students treated with the JITT method as against pre-test mean score of 0.53 and post-test mean score of 1.62 with mean gain of 1.09 for the students in the control group. JITT method has positive effect in teaching G & C courses. With the mean gain of 2.80 for the treatment group, JITT method has a very positive effect on students' achievement grades.

Table 3: ANCOVA Analysis on the means scores of students taught using JITT and those in the control group.

Source of Variation	SS	Df	MS	Cal.F	Crit. F	P.> 0.05
Corrected Model	2353.72	2	11768.36			
Intercept	958.69	1	958.69			
Pretest Scores	38.09	1	38.09			
Treatment Models	3124.45	1	3124.45	183.80	3.99	S
Error	1172.94	66	17.00			
Residual	193587.00	69				
Corrected Total	24709.65	68				

In table 3, it was observed that at 0.05 level of significance, 1 df numerator and 65df denominator, the f-calculated 183.80 is greater than the f-critical 3.99. Ho is therefore not accepted. This implies that

JITT method has significant effect on students' achievements in G & C.

It can be concluded that JITT method of teaching enhances achievement of G & C students than lecture method. This finding is in agreement with Cohen, Kulik and Kulik (2009) who found that students taught mathematics with use of JITT scored 66th percentile ahead of those taught the same lesson with lecture method. The relationship between the above

findings with the current study indicate that JITT can improve students' performance no matter the subject area or geographical location. This is evident in fact that the study in Nigeria on JITT has shown some similarities with those outside the country.

Table 4: ANCOVA Analysis on the Effect of Gender on the Achievement Grades of Student taught using JITT and those in the control group

Source of Variation	SS	df	MS	f-cal	f-crit	P. \geq 0.05
Corrected Model	42.40	1	42.40			
Intercept	23.14	1	23.14			
Pre-test Scores	44.60	1	44.60	6.14	2.87	S
Error	403.08	33	12.18			
Residual	28496.00	35				
Corrected Total	448.69	34				

In the table 4, it was observed that at 0.05 level of significance, 1 df numerator and 34 df denominator, the F - calculated 6.14 is greater than the f-critical 2.87 by the result. Ho is not accepted. Therefore, there is significant effect of gender on the students' mean achievement scores among students taught using JITT method and those taught using lecture method. According to results in table 2, the use of JITT has very high effect on male students with mean gain of 4.27. The method also has high effect on female students with mean gain of 2.09. Thus, the method has a very high effect on the male students with a mean difference of 2.18 against female students.

DISCUSSION OF RESULTS

The discussion of results is done under the following sub-headings:

- Effect of JITT on the Achievement Grades of students
- Effects of Gender on the use of JITT Method.

Effect of JITT on the Achievement Grades of students

One of the variables investigated in the study was the effect of JITT on the achievement grades of students in G&C. The results in Table .1 show that the achievement grades of students taught using JITT method are greater than the achievement grades of those taught the same lesson using conventional method. In specific term, the experimental group had a mean gain of 2.80 against 1.09 mean gain of the control group. This shows a mean difference of 1.71 in favour of the experimental group.

The above findings are in agreement with Chen, Kulik and Kulik (2009) who found that students taught mathematics with the use of JITT scored 66th percentile ahead of those taught the same lesson with conventional method. In support of the same findings, Greenwood (2010) found that JITT

increased students' performance on standardized measures of reading Language and mathematics. The relationship between the above findings with the current study indicates that JITT can improve student's performance no matter the subjects' area or geographical location. As noted earlier, this is evident in the fact that the study in Nigeria on JITT has shown some similarities with those conducted outside the country.

Effects of Gender on the use of JITT Method

One of the variables investigated in the study was the effect of gender on the use of JITT method in teaching G & C courses. Results in table2, show that gender has a very high positive effect on the academic achievements of students in G &C. According to the results in the table, male students have mean gain of 4.27 against female students with mean gain of 2.09.

The above findings are in agreement with Good and Brophy (1984) who found that boys receive more critics in class and perform high than girls in class. The predominant use of lecture method in teaching in schools is ineffective because it does not enhance achievement for all students and does not promote meaningful learning of the subject. The use of JITT is a powerful innovation in the teaching and learning of G & C which is capable of increasing the achievement grades of instruction. It implies that environmental factors (be it a developed or non-developed) do not form any obstruction in the application of this relatively new method of instruction. As such it is strongly recommended for instruction in G & C and other related areas, at all levels of education.

RECOMMENDATIONS

Based on the findings of this study the following recommendations were made.

1. JITT should be formally adopted in schools in order to improve students' performance.
2. Several workshops and seminars should be organized for lecturers on the use of JITT method in order to make it popular among them.
3. University libraries should be upgraded electronically to give students access to electronic data-base in order to fully utilize JITT in teaching and learning processes.
4. Lecturers should undergo training in computer application so that they can fully utilize JITT method in teaching their students.
5. When utilizing JITT method, lecturers should act as facilitators of knowledge in order to maintain the students-centered nature of the method.

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