Assessing Effect of Self-Evaluation Method and Counselling Intervention on PGDE Students Performance in Educational Statistics

Aminu Yusuf and Muhammad Adam
Abubakar Tafawa Balewa University, Bauchi-Nigeria

Abstract
Determining what didn’t go well with Post Graduate Diploma in Education (PGDE) student in educational statistics class; the difference in the mean scores performance between experimental and control groups were among the objectives of the study. Post-only (with no pre-test administered to any of the groups) non equivalent control group design was adopted as the design of the study. The population of the study consisted of 25 (18 male and 7 female) PGDE students from the Department of Education Foundation (DEF), Faculty of Technology Education, Abubakar Tafawa Balewa University, Bauchi (ATBU). Proportionate stratified random sample technique was used. The sample of the study constituted all the 13(9 male and 4 female) PGDE students specializing in Educational Administration and Planning. Adaptation of Student Self-Evaluation Interview Items (SSEII) published by Science Web (2013) was made in addition to individual and group counselling interventions for data collection. A Cronbach’s Alpha of 0.67 was established as the reliability of the SSEII. Hypothesis was formulated and tested at $\alpha = 0.05$ level of significance. The data was analyzed using coding of sub-themes, percentages and t-test. Findings from the study revealed that minimum standard of 75% attendance to lectures did not go well with 39% of the PGDE students and there was statistically significant difference in the mean scores performance ($t(23) = 2.30$, $\rho < 0.05$) between experimental and control groups. Reducing the minimum standard of 75% lecture attendance to 60% by authority concerned and application of student self-evaluation method were among some of the recommendations made from the study.

Key Words: Assessment, Self-Evaluation Method, Counselling Intervention and PGDE Students

Research Paper

Introduction
Evaluation refers to value judgment. It is a strategy of determining the extent to which a particular action is successful. In a classroom situation, self-evaluation is defined as ability of student to judge the quality of the work, based on evidence and explicit criteria, for the purpose of doing better in future (Rolheiser and Ross, 2013). Student self-evaluation method refers to the extent to which students were given the opportunity to express their feelings (positive or negative) about a particular course of instruction through student / teacher discussion or teacher student conference. The derived information gotten from student self...
evaluation assist in identifying the weakness in teaching, the curricula, the management, the resources and point out the need of change (Ristevska and Sivakova, 2014).

Post Graduate Diploma in Education (PGDE) is a 2 years programme in the DEF, ATBU Bauchi. The programme is meant for those graduates who took up teaching/lecturing appointments in secondary schools, Colleges of Education, Polytechnics and Universities without having teaching qualification. The aim of the programme (PGDE) is to assist in producing qualify and professional teachers in institutions of learning. Counselling Intervention refers to the professional (Counsellor) advice offered to both PGDE students and course lecturer in Educational Statistics based on the outcomes of the SSEII result.

Mathematics unlike educational statistics, (Garfield, 1994) observed that it serves students with varying backgrounds and abilities many whom have had negative experiences with statistics and mathematics. Researchers in the field of statistics education agreed that students understanding of statistical concepts are often poor (Garfield, 1994). Research studies had shown that statistics anxiety had an effect on student’s success and it is a challenge for both the students and teachers of educational statistics (Morris, Kenlawy & Smith, 1978; Lolando & Gardner, 1991; Onwueguzi, 2003; Perepiczka, Chandler & Becerra, 2015 and Abd Hamid, & Sulaiman, 2014). Attitude affect student’s achievement towards educational statistics (Ginsburg, 1994; Muhammad, 2015). Poor methodology of teaching contributes to the problems students encounter in learning mathematics and other related courses to it (Blanco, 2001; and Leongson & Limjap, 2005).

Researches on improving educational statistics instruction continue to be the focus of concerns of researchers in the field of measurement and evaluation and mathematics education. Gardner, (2007) observed that research studies about statistics instruction has been conducted by psychologist, statisticians and mathematics instructors. The psychologist focused on statistical thinking and argumentation whereas mathematics teachers’ focus on mathematical or numerical skills that could facilitates the learning of statistics (Cliftci, Karadag & Akdal, 2014). Abd Hamid, and sulaiman (2014) observed that learning of educational statistics presents a challenge to psychology students whose background in mathematics is not strong. The American Statistics Association,[ASA], (2010); Cobb & George, (2007); and Rossman, (2008), emphasizes the need for reforms in the way that statistics is conceived and taught.

However, all these contributions of the scholars and researchers in the field of educational statistics were acknowledged. More research study need to be done on educational statistics that could focus on studying the individual student views and possible counselling intervention. Clift, (2015) observed that student self-evaluation method enables both the teacher and student to be familiar with what the student know, do not know, what they would like to know and at the same time enables the teacher to judge his/her strength and weakness.

In view of this, the study is to determine by assessing the effect of self-evaluation method on PGDE students’ performance in Educational Statistics and its Counselling Implication. Specifically, the study determined and offered counselling assistance to PGDE student’s on the:

i. Way the student practice/work in educational statistics class.
ii. Things that didn’t go well with the student in educational statistics class.
iii. The student behaviour in educational statistics class.
iv. Things the student could do personally in educational statistics class.
v. Things the student needs help in educational statistics class.
vi. Come up with the mean scores performance between experimental and control groups.

Hypothesis

$H_0$ : There is no significance difference on the mean score performances between experimental and control groups.

Methodology

The population of the study constitute of 25 (18 male and 7 female) PGDE students from the Department of Education Foundation (DEF), Faculty of Technology Education, Abubakar Tafawa Balewa University, Bauchi (ATBU). The population was characterized graduate students with various field of specialization pursuing PGDE with Measurement and Evaluation and Educational Administration and Planning as areas of specialization. Proportionate stratified random sample technique was used. The sample of the study constituted all the 13 (9 male and 4 female) PGDE students specializing in Educational Administration and Planning.

Post- Only non equivalent control group design was adopted as the design of the study. In the design there were two groups which were composed on the basis of using intact groups (PGDE students with specialization in Educational Administration and Planning as the experimental group and PGDE with specialization in Measurement and Evaluation as the control group) with no pre test administered to any of the groups in the design. Furthermore, the control group does not receive any treatment. Adaptation of Student Self –Evaluation Interview Items (SSEII) published by Science Web (2013) was made. The SSEII items were modified in form of structure interview and a phrase “in educational statistics class” was added at the end of statement on each item (Table 1 for detail). However, of the 7 items, item 2 and item 4 were dropped as a result of face validation of the items by expert in Measurement and Evaluation from the DEF. The retained 5 items of the SSEQ were later subjected to pilot testing using 7 (4 male and 3 female) PGDE students measuring in Guidance and Counselling. A Cronbach’s Alpha of 0.67 was established as the stability of the items. The structured interview was conducted using face to face verbal interview plus note taking by the interviewer. Individual and group counselling interventions were also used for generating data from the interviewees.

The qualitative nature of the study prompted the analysis of the data to be based on using coding of sub-themes present or emergent through the uses of focus prompt which is a phase that guides the generation of codes to represent the relevant information (interviewees are talking about) in the data. Percentages were also used in the interpretation of the result in addition to t-test used in testing the hypothesis. The instrument was administered and collected by the researchers (as they were both lecturers each in educational statistics and Guidance and counselling for the PGDE programme).

Experiment Procedure.

The learning requirement and the instructional designs of the two groups (experimental and control) were similar. However, two phases (1 and 2) were used as treatment on the experimental group.
Phase 1 was face to face verbal interview using SSEQ items lasting for 10 minutes per student (4 students per day) conducted prior to the beginning of the second semester lecture in Educational statistics.

Phase 2 was counselling session and Individual and group counselling interventions were adopted based on outcomes on interpretation and analysis of each interviewee. In addition to that, the interviewer (lecturer on the course educational statistics and the co author of the study) was also counselled based on students interviewed result.

With observing of the two Phases (1 & 2), the normal lecture which lasted for 4 weeks (2 hours per week) on the course Educational Statistics begins for all the students (combined experimental and control group). At the end of 4 weeks lecture session, test was administered to all the students. The result of the test for the two groups was compared to determine if there is any difference in mean score performance between experimental group and control group.

Result

Results obtained from the data were tabulated in percentages and hypothesis tested was presented in this section.

Table 1: Interviewed item and coded sub-themes tabulated in percentages on the way PGDE student Practice/Work in Educational Statistics Class.

<table>
<thead>
<tr>
<th>Interviewed Item</th>
<th>Coded sub-themes tabulated</th>
<th>No, of students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell me the way you practice/work in educational statistics class.</td>
<td>a. Group discussion.</td>
<td>7</td>
<td>54</td>
</tr>
<tr>
<td></td>
<td>b. Non-group discussion.</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td>c. Web Assisted Learning.</td>
<td>15</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Table 1 above, showed the result obtained from SSEII and this was used to achieve objective 1 from the study.

Table 2: Some of the things that didn’t go well with PGDE student in educational statistics class as coded and tabulated in percentages

<table>
<thead>
<tr>
<th>Interviewed Items</th>
<th>Coded sub-themes tabulated</th>
<th>No, of students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tell me about the some of the things that didn’t go well with you in educational statistics class.</td>
<td>a. Obtaining 75% minimum attendance to lectures.</td>
<td>5</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>b. Avoidance of late coming to lectures.</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>c. Abiding by lecturer rules and regulations.</td>
<td>2</td>
<td>15</td>
</tr>
<tr>
<td></td>
<td>d. None</td>
<td>4</td>
<td>31</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Result from the interviewed on some of the things that did not go well with PGDE student in Educational Statistics class was summarised on Table 2 above.
Fig1: PGDE Students’ comments on their behaviour in Educational Statistics Class as coded and tabulated in percentages.

The Pie chart on Figure 1, Showed the summary in percentages from the coded sub –themes on the interviewed item on PGDE students comments about their behaviour in educational statistics class.

Table 3: Things PGDE student could do in Educational Statistics Class coded and tabulated in percentages

<table>
<thead>
<tr>
<th>Interviewed Items</th>
<th>Coded sub-themes tabulated</th>
<th>No, of students</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>What were some things you could do for yourself in educational statistics class.</td>
<td>a. Concentration on examples given by the lecturer.</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>b. Concentration on solving questions related to the lecture given.</td>
<td>10</td>
<td>77</td>
</tr>
<tr>
<td></td>
<td><strong>Total</strong></td>
<td><strong>13</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Result on Table 3 above, showed the interviewed item, code sub-themes from the interviewed as tabulated in percentages.
The bar chart on Figure 2, showed in percentages on some of the things PGDE student need help in the Educational Statistics class.

**Table 4a: Mean scores and Standard deviation between experimental and control groups.**

<table>
<thead>
<tr>
<th>Group</th>
<th>N</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>Std.Error</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Experimental</td>
<td>13</td>
<td>50.38</td>
<td>9.206</td>
<td>2.553</td>
</tr>
<tr>
<td>Control</td>
<td>12</td>
<td>42.17</td>
<td>8.601</td>
<td>2.483</td>
</tr>
</tbody>
</table>

**Table 4b: Independent t-test computed between experimental and control groups**

<table>
<thead>
<tr>
<th>Score</th>
<th>F</th>
<th>Sig</th>
<th>t</th>
<th>df</th>
<th>Sig( 2-tail)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Equal Variances assumed</td>
<td>.407</td>
<td>.530</td>
<td>2.301</td>
<td>23</td>
<td>.031</td>
</tr>
<tr>
<td>Equal variance not assumed</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>.031</td>
</tr>
</tbody>
</table>

Table 4a shows mean scores of M =50.38, Std. D= 9.206, and M =50.38, Std. D= 9.206 for experimental and control groups respectively. While Table4b shows the independent t-test computed with $t (23) = 2.301$, $\rho =.031$ at $\alpha = 0.05$ level of significance. From the result, the $H_0$ was rejected at $\rho < 0.05$.

**Findings**

- Proportion of PGDE students who engaged in group discussion stood at 54%.
- Minimum standard of 75 % attendance to lectures did not go well with 39 % of the PGDE students.
- Only 23 % of the PGDE students have statistics Phobia of failing.
- 77 % of PGDE students concentrate on solving questions related to a given lecture.
- 54 % of the PGDE students need help in understanding statistics concepts.
- Student self-evaluation method and counselling intervention improves PGDE student’s performances in educational statistics.

Discussion of Findings

The result from the study revealed effect of self-evaluation method and counselling intervention on PGDE student’s performance in educational statistics. In discussing the result of the study, certain limitations on the effect of self-evaluation method and counselling intervention on PGDE student’s performance in educational statistics on gender difference must be acknowledged. Result from Table 1, revealed the interviewed items and coded sub-themes tabulated in percentages. To achieve objective 1 of the study result on Table 1 was used. From the result, it was revealed that 54% of the PGDE students engage in group discussion, 31% did not, while 15% uses Web Assisted Learning. Although is good for student to engage in group discussion (54%), yet finding from the study revealed that only 15% of the PGDE student engaged in web assisted learning. This is discouraging; as there is need for the student to combined both (group discussion and web assisted learning). Jethro, Grace and Thomas (2012) observed that learners using Web Assisted instruction learned more efficiently and demonstrated better retention.

Obtaining 75% minimum attendance to lectures was found to be the major thing that didn’t go well with PGDE students in educational statistics class as revealed on Table 2. The objective 3 of the study which seeks to determine the PGDE student’s behaviour in educational statistics class was achieved. The Result on Fig 1, revealed that 46% of the students had positive behaviour, absenteeism and late coming had 15% each while phobia of failing had 23%.

To determine objective 4 of the study, result on Table 3 was used. Finding from this, revealed that 77% of the PGDE students concentrates on solving questions related to a given lecture while 23% concentrates on examples given by the lecturer. On determining some of the things PGDE students need help on in educational statistics class, findings on Fig 2, showed 54% of the PGDE student need help on understanding statistical concepts with only 46% who need help on explanation on steps involved in solving educational statistics problem as given by the course lecturer. Individual and group counselling intervention on related items were given and the course lecturer was also counselled based on the outcomes of the results on the Tables and Figures from the study.

Result on Table 4a, shows the mean scores performances between experimental and control groups. From the result, Mean = 50.38, Sdt, D = 9.21, and Mean = 42.17, Sdt, D = 8.60 were obtained for experimental and control groups respectively. However, this difference in main scores was statistically significant ( t (23) = 2.30, p < 0.05) from the result on Table 4b. Finding from this, shows that the Ho was rejected and concludes that there is significant difference in mean scores performances between experimental and control groups. The finding is in support Gray, Ross and Rolheiser (2010) who observed that experimental group out performed control group.

Conclusion

The study assessed the effect of self-evaluation method and Counselling Intervention on PGDE students’ performance in educational statistics. Structured interviewed items were used to obtain the data for the study. Sample of 13 students were used. Findings from the
study revealed that Student self-evaluation method and counselling intervention improves PGDE student’s performances in educational statistics. Although the study is limited to PGDE students but there is need for similar study with undergraduate students especially on the effect of Self- Evaluation method on gender difference.

**Recommendations**
- PGDE students to combined group discussion with web assisted learning.
- Authority to reduce the minimum standard of 75 % lecture attendance to 60 %.
- Efforts to be made on reducing educational statistics phobia by course lecturers.
- Educational statistics concepts to be well explain to the students.
- Application of student –self evaluation method before the beginning of educational statistics lecture on the beginning of each semester.
- Similar study to be carries out.

**Declaration of Conflicting Interests**
The Author(s) Declared No Potential Conflicts of Interest with Respect to the Research, Authorship, and/or Publication of this Article.

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Biographies of Contributors

**Aminu Yusuf** is a lecturer of Educational Research Methods and Statistics in the department of Educational Foundations, Abubakar Tafawa Balewa University, Bauchi-Nigeria. Main research topics concern mathematics/ educational statistics, and innovation in research and educational statistics.

**Muhammad Adam** (Ph.D) is a lecturer 1 at the Abubakar Tafawa Balewa University, Bauchi-Nigeria. Specializes in the area of Guidance & Counselling. Main research topics concern cognitive group counseling intervention on HIV/AIDS and study skills.

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