

Assessment of Effective Use of Teaching Aids by Professional Diploma in Education Chemistry Student-Teachers

Jeremiah Makarau Iliya, Ilbrahim Aliyu Mohammad, and Aisha Yusuf Lawal

Received: 19 January 2022/Accepted 20 May 2022/Published online: 22 May 2022

Abstract: *This research examines the effective use of teaching aids by students studying a professional diploma in chemistry education (PDE) at the Federal College of Education, Zaria during their teaching practice. Two research questions and a hypothesis were developed to guide the study. The research design used in sampling for the study were the descriptive survey and the Dillman methods. The sample size consisted of one hundred and ninety-six (196) students (respondents) that were selected using simple random sampling. A five (5) item structured questionnaire developed by the researcher was used for data collection. Chi-square (χ^2) test statistics were also used to test the hypotheses at a 0.05 level of significance. The finding obtained from the investigations reveals that teaching aids have significant enhancement on the quality of results obtained by PDE student-teachers because the objectives of the lessons are simplified for ease of achievement, motivation and improved class attendance. Based on the findings of the study, it was recommended that adequate orientation should be given to the PDE student-teachers on the ways of acquiring teaching aids to achieve greater efficiency.*

Keywords: *Assessment, Effective, Teaching Aids, Professional Diploma, Student Teacher.*

Jeremiah Makarau Iliya

Department of Chemistry, School of Science,
Federal College of Education Zaria,
Kaduna State Nigeria

Email: Makarauj@gmail.com

Orcid id:0000-0003-1899-1466

Ilbrahim Aliyu Mohammed

Department of Chemistry, School of
Science, Federal College of Education Zaria,
Kaduna State Nigeria

Email: ibrahimbomo@gmail.com

Orcid id:0000-0002-5535-4039

Aisha Yusuf Lawal,

Department of Chemistry, School of
Science, Federal College of Education Zaria,
Kaduna State Nigeria

Email: aishayusuflawal@gmail.com

Orcid id:0000-0003-1726-1541

1.0 Introduction

Professional Diploma in Education (PDE) is a program that offers an opportunity for individuals teaching without the required qualification to acquire the relevant knowledge in the field of education and subsequently be certified. The Diploma comprises a blend of virtual learning and face-to-face practical teaching at the Federal College of Education (FCE) Zaria Campus (when required). The PDE chemistry student-teachers are those who are in different secondary schools for teaching practice (TP) to teach chemistry for 3 months. Teachers' character and quality competence are the most significant factors which influence education quality and its contribution to national development (Menter, 2018). Teaching Practice (TP) programs in Colleges and Universities are nationwide programs for the implementation of teacher education curriculum but with some challenges such as lack of resources, funds and inappropriate teaching practice coordination (Anthony, 2014).

Teaching practice can be seen as the basic professional requirement, that is relevant for the qualification of students and teachers for their respective academic roles. It is, therefore, necessary that due attention should be considered towards the employment of the best teaching aids in the facilitation of student-teacher relationships. This implies that the student-teacher should not only go through the process of teaching practice but consideration should also be directed to the gain from such practice.. According to Oyekan (2016), teaching practice exposes the student-teacher to the real school and class situation where he/she acquires some practical experiences in the art of teaching and becomes adapted or acquainted with the social settings of the institution (Oyekan, 2016).

Teaching aids can be seen as any tools that teachers use in the classroom to facilitate teaching and learning such as flashcards, maps, videos, pictures, three-dimensional models or educational toys, cassettes and blackboard or marker board (Anthony, 2014). Bukoye (2019) observed in his study that instructional materials are an essential tool required for teaching at all levels and should be considered in the development of any curriculum. Pryambodo and Wulaningrum (2017) investigated the impact of the employment of three basic teaching aids (namely, clay molymod, electrolyte tester and electroplating tool) and reported that the reviewers' assessment showed that all of the teaching aids have very good quality. Similar findings have also been deduced by Adalikwu and Lorkpilgh (2013) from their study on the effect of teaching aids on the academic performance of senior secondary school students in chemistry, within the Cross River State. It is evident from several studies that conclusions drawn from various studies may witness some differences due to factors such as the quality of teachers, students, physiological factors and others. The objectives of the present investigation are centred on (i) the assessment of the

effectiveness of teaching aids in the teaching of professional diploma student-teachers in chemistry education and on (ii) the examination of the effective use of teaching aids based on gender

1.1 Research questions

1. Does effective use of teaching aids lead to effective teaching by the professional diploma in education chemistry student-teachers?
2. Is the effective use of teaching aids by a chemistry students–teachers gender-related?

1.2 Hypothesis I

Ho: Effective use of teaching aids does not lead to effective teaching by a professional diploma in education chemistry student–teachers.

2.0 Materials and Methods

2.1 Research design

The research design issue for the study is a descriptive survey. Asika (2018) describes a descriptive survey as a research method that enables a researcher to obtain the opinions of a representative sample of a target population to infer the perception or view of the entire population of the study area. It also uses research instruments to collect information from the respondents.

2.2 Research population

The target population for this study consists of 400 students in the professional diploma in chemistry education program within the Federal College of Education, Zaria who are engaged in teaching practice exercises in different schools within Zaria Kaduna State.

2.3 Sample and sampling techniques

A sample size of 196 chemistry PDE chemistry student – teachers were determined using Dillman (2000) method $n = \frac{(N)(P)(1-p)}{[(N-1)(B/C)^2 + (P)(1-P)]}$ where the acceptable amount of sampling error or precision is set at 0.05 or 5%, the confidence level of 1.96 which corresponds to 95% level. Since the population (N) = 400, p=0.5, B=0.05, C=1.96. This gives 49% of the population.



2.4 Instrumentation

The instrument for this study was a self-structured questionnaire. The questionnaires were given to the professional diploma in education student-teachers to assess the impacts of teaching practice on them. The observations are collected, recorded and used as primary data. The primary data refers to those data which have been recorded by the researchers in the actual pheromone population event or historical object. The questionnaire is designed in such a way that it provides respondents' responses to the research questions and hypotheses.

2.5 Validity of the instrument

The questionnaire used for the study consisted of five test items that were employed for the achievement test. They were given to the supervisor and other researchers (a senior lecturer from the Department of Measurement and Evaluation, Federal College of Education, Zaria) to determine the face and content validity of the instrument with the objectives and hypotheses of the study. Necessary corrections and modifications were made which leads to the final copy.

2.6 Procedure for data collection

The researcher made use of questionnaires for getting answers to questions by using a form, which the respondents fill by his/herself and return to the researcher for this research work, the structured (closed) questionnaire was used for the structured and all the respondents are required to tick the correct answer. The important feature of the structured questionnaire is that it sets a limit and control over the extent to which respondents could answer the question. However, the respondents are not able to clarify or expand their responses. Each response obtained from the responses had a corresponding point: Strongly agree, Agree, Neutral, Disagree and strongly Disagree had 5, 4, 3, 2, 1 points respectively.

2.7 Procedure for data analysis

The data collected from the questionnaires were analyzed using the chi-square (X^2) test of independent and simple percentages.

2.8 Chi-square (x^2) test

The Chi-square test is a non-parameter statistic used on a normal scale. It is used to test significant relationships or associations where there is no basic assumption about the distribution of the parametric. The chi-square test will be used to analog the primary data. The square model is given as:

$$\chi^2 = \frac{(O-E)^2}{E} \quad (1)$$

where χ^2 is the Chi-square, O is the observed frequency and E is the expected frequency. The expected frequency (E) was computed using

$$E = (RT * CT) / GT \quad (2)$$

where E is the expected frequency, RT is the row total, CT is the column total and GT is the grand total. The degree of freedom (DF) was computed using the formula, The degree of freedom is given as follows,

$$DF = (R - 1) (C - 1). \quad (3)$$

where R is the row and C is the column. The computation was carried out at 0.05 level of significance.

3.0 Results and Discussion

Results obtained based on the research questions are presented below

3.1 Influence of teaching aids on professionalism

The summary of responses to question 1 is presented in Table 1, that is, Are objectives of the lessons easily achieved when teaching aids are used by a professional diploma in education student-teachers?

Table 1: Summary of results from question 1

Response	Frequency	Percentage
Agreed	152	94
Disagreed	10	6
Total	162	100



From Table 1, it is evident that 152(94%) of the respondents agreed that the objectives of the lessons are easily achieved when teaching aids are used by a professional diploma student-teachers from the chemistry education department of the FCE, Zaria. while 10(6%) of the respondent disagreed. . Therefore, the supportive inference is that the objectives of the lessons are easily achieved when teaching aids are used by student-teachers from the department of professional diploma in education chemistry.

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Table 2: responses to question 2 (Did availability of teaching aids motivate professional diploma in education student-teachers to enter the classroom?)

Response	Frequency	Percentage
Agreed	102	63
Disagreed	63	37
Total	162	100

Table 2 shows that 102(63%) of the respondents agreed that the availability of teaching aids motivates professional diplomas in education student-teachers to enter the classroom, while 63(37%) of the respondents disagreed. This indicates that the availability of teaching aids most likely motivates professional diploma in education student-teachers to enter the classroom.

Table 3 reveals that 129(80%) of the respondents agreed that students' interests are aroused when teaching aids are used by the professional diploma in education student-teachers, while 33(20%) of the respondents disagreed. Consequently, it can be deduced from popular responses that students' interests are usually aroused when teaching aids are used by a professional diploma in education student-teachers.

Responses deduced from Table 4 indicate that 79(49%) of the respondents agreed that the use of teaching aids causes distraction in the classroom when in use by the professional diploma in education student-teachers, while

83(51%) of the respondents disagreed. a This indicates that the use of teaching aids does not likely cause distraction in the classroom when in use by the professional diploma students in education student-teachers.

Table 3: Responses to question 3 (Are students' interests aroused when teaching aids are used by the professional diploma students in education student-teachers?)

Response	Frequency	Percentage
Agreed	129	80
Disagreed	33	20
Total	162	100

Table 4: Responses to question 4 (Does the usage of teaching aids cause distraction in the classroom when in use by professional diploma students in education student-teachers?)

Response	Frequency	Percentage
Agreed	79	49
Disagreed	83	51
Total	162	100

Table 5: Question 5: Are Professional diploma in education student-teachers feel discouraged to teach, if teaching aids is not available?

Response	Frequency	Percentage
Agreed	84	52
Disagreed	78	48
Total	162	100

Table 5 shows that 84(52%) of the respondents accept that professional diploma in education student-teachers do feel discouraged to teach, if teaching aids are not available, while 78(48%) of the respondents disagreed that the professional diploma in education student-teachers do feel discouraged to teach if teaching aids are not available. Therefore, the majority of the teaching staff are for the inference that professional diploma in



education student-teachers do feel discouraged to teach, if teaching aids are not available.

Table 6: Responses to question 6 (Does effective use of teaching aids have an impact on the gender of the student–teachers?)

Response	Frequency	Percentage
Agreed	92	57
Disagreed	70	43
Total	162	100

Results shown in Table 6 show that 92(57%) of the respondents agreed that effective use of teaching aids has an impact on the gender of the student–teachers, while 70(43%) of the respondents disagreed that effective use of

teaching aids has an impact on the gender of the student –teachers.

Table 7: Responses associated with the impact of teaching practice on the professional trait of student-teacher gender

Response	Frequency	Percentage
Agreed	72	44
Disagreed	90	56
Total	162	100

Table 7 reveals that 72(44%) of the respondents were male and 90(56%) were female.

Table 8: Hypothesis testing

Responses	O	E	O-E	(O-E) ²	$\frac{(O - E)^2}{E}$	DF	P-value	Level of significant
Strongly disagreed	0	40.5	-40.5	-	40.5	3	0.00	0.05
Disagreed	10	40.5	-30.5	930.25	23.25			
Agreed	49	40.5	8.5	72.25	1.78			
Strongly agreed	103	40.5	62.5	3906.25	96.45			
Total	162							$\chi^2 = 161.98$

Source: Questionnaire administered 2021.

Computation of expected frequently for goodness Bit test (E), i.e $E = \frac{N}{n} \times \frac{162}{4} = 40.5$. The chi-square computed is 161.98. Using chi-square χ^2 distribution table. Under 3, the chi-square tabulated/critical tabulated chi-square χ^2 is 7.82. Therefore, the computed value of chi-square χ^2 which is 161.98 is greater than the critical tabulated chi-squared χ^2 of 7.82, therefore we shall reject the null

hypothesis and accept the alternative hypothesis which is favorable to all alternative hypotheses.

$\Sigma = 161.98$

3.2 Summary of findings

The finding reveals that teaching aids have influenced the teaching of professional diplomas in education student-teachers as it:

- i. make the objectives of the lesson very easy to achieve.
- ii. motivate them to enter the classroom.
- iii. arouses the students' interest.
- iv. makes them feel discouraged if the required teaching aids are not available.

3.3 Discussion of findings

The findings in this study agree with that of Abubakar (2019) who remarked that the effectiveness of teaching by teaching practice



students may also be enhanced by the use of teaching aids. This is because through teaching aids, objectives of the lesson are easily achieved and this motivates the professional diploma in education student-teacher to enter the classroom for teaching. The use of teaching aids aroused the interest of the students as indicated in the study. The findings are in agreement with Dusabemariya's (2020) assertion that the teaching and learning process is beautiful, interesting and very friendly especially when the teacher is innovative and creative. Teaching aids help to acquire the needed ability to associate with others to improve teaching and learning ability and it motivates (Ngirabakunzi, 2017).

The resources the teacher uses while teaching contributes immensely to the teaching and learning and also depends on how student learn as they are motivated properly through different teaching aids.

4.0 Conclusion

Effective use of teaching aids by the professional diploma in education student-teacher makes the objectives of their lesson very easy to achieve, motivate them to enter the classroom, arouses the student's interest and thus provided an opportunity for the student-teachers to increase their professional competence.

Given the results obtained on the impact of teaching practice on the professional trait in professional diploma in education student-teachers, the following recommendations are put forward:

Some forms of assistance (financial or material) should be given to the professional diploma in education student-teachers in acquiring teaching aids to achieve greater efficiency.

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Consent for publication

Not Applicable

Availability of data and materials

The publisher has the right to make the data public

Competing interests

The authors declared no conflict of interest. This work was carried out in collaboration among all authors.

Funding

There is no source of external funding

Authors' contributions

All authors contributed equally to the work

