Exploring Whether Physics Teaching Methods Curriculum Content Addresses Poor Performance of Pupils in Physics: A Case of One Teacher Education University in Kitwe District

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Abstract- The study investigated whether physics teaching methods curriculum content addressed poor performance of pupils in physics. It was conducted at a Teacher Education public University in Kitwe District. The purpose was to establish whether Physics trainee teachers were equipped with skills to teach physics effectively. A Cross-sectional survey design approach was used. Data was collected using Questionnaires and closed interviews from 67 physics students and 6 Lecturers. The findings showed that students inadequately practiced teaching using teaching methods learnt in lectures, hence, they had limited pedagogical skills, they were not demonstrated to on teaching using the teaching methods they learnt in lectures to enhance their understanding and that skills in preparation and setting-up laboratory experiments were inadequately imparted in the students. The study recommended that teacher training institutions should consider introducing a course where students could be taught content they are expected to teach in schools and made to practice teaching topics they are expected to teach in schools more often so as to improve their pedagogical skills. Lastly, more Laboratory practical skills should be impacted by allowing students to assemble, construct objectives and evaluate questions for simple experiments they are expected to conduct in schools.

Index Terms- curriculum content, physics teaching methods, Teacher education, pedagogy, pupil performance

I. Introduction

1.1 Background

The performance of pupils in physics at senior secondary school level still poses a challenge. The 2017 Science and physics Examination report by Examination Council of Zambia performance analysis still shows that the performance of pupils is poor (ECZ, 2017). Table 1.1 shows results for science and pure physics at four schools in Kitwe district from 2016 to 2018.

Table 1.1:
Table of results in physics and science for four Kitwe district schools

SECONDARY SCHOOLS	2016		2017		2018	
	Physics	Science	Physics	Science	Physics	Science
School A	33.7 %	42.1 %	38.2 %	40%	39.7 %	40.6 %
School B	38%	41.6 %	17%	27.7	35%	40.1 %
School C	-	35%	-	56%	-	49.9 %
School D	-	38%	-	43.7 %	-	46.7 &

Source: Kitwe District Grade 12 National Examination Analysis

Table 1.1 shows that results in physics and science are not pleasant. A lot of research has been done in order to establish and find lasting solution to this challenge of poor performance. A study by (Ngema, 2016) show that the causes of the poor performance by pupils in physics are changes in the curriculum, the time allocated for each science topic, the teachers' teaching load, resources, the educators' lack of specialized content knowledge, the medium of instruction, the involvement of the parents, poverty, and motivation. Mbetwa (2016) also reviewed that the significant factors leading to poor performance included low teacher to pupil ratio due to overcrowded classes, negative attitude by pupils towards science, lack of laboratory apparatus and chemicals, lack of laboratory space and lack of teaching and learning materials. Kagoda and Itaaga (2013) alluded that trainee teachers feel they are not adequately prepared to meet the demands and needs of secondary school curriculum. This means that the trainee teachers are not pedagogically prepared to teach physics at secondary school level.

The background to this study was that regardless of many strives the government through the Ministry of General Education had done to improve pupils performance in science subjects, the performance has still not improved. This research therefore focused on the teacher training. May be teachers were not given

the necessary skills to effectively teach physics to secondary school pupils. It was against this background that the research had to explore the teaching method programme and see how it was designed to tackle the problem of poor performance in physics by secondary school pupils.

1.2 Problem Statement

Physics and Integrated Science student teachers have been faced with challenges in giving learning instructions to learners. For example at a certain Secondary School in Kitwe District, mentors of Student teachers reported that student teachers had challenges with lesson planning, lesson delivery and worse more lack of subject content. One serious encountered was a student teacher failing to assemble a simple circuit to show parallel and series resistors for a grade 8 class. This led to arrive at an assumption that pupils do not perform well not because they find the physics difficulty but because of the teachers who teach them. To support this assumption King'aru (2014) showed that among many other reasons the common reasons that contribute to poor performance are poor methodologies in science education. Therefore the researcher was prompted to carry out a survey to assess whether the poor teaching skills exhibited by student teachers of physics is as a result of lapses in their teacher training programme

1.3 Research Questions

1. How are physics student teachers prepared to teach secondary school physics content?
2. What strategies put in place to ensure that practical skills in teaching methodologies are imparted to physics student teachers?
3. What are the views of physics student teachers on how they wish to be trained in order for them to deliver lessons adequately?
4.

1.4 Research Objectives

The objectives of this study were as follows:

1. To find out how are physics student teachers trained to teach secondary school physics content.
2. To find out strategies put in place to ensure that practical skills in teaching methodologies are imparted to physics student teachers.
3. To find out the views of physics student teachers on how they wish to be trained in order for them to deliver lessons adequately.

1.5 Significance of the Study

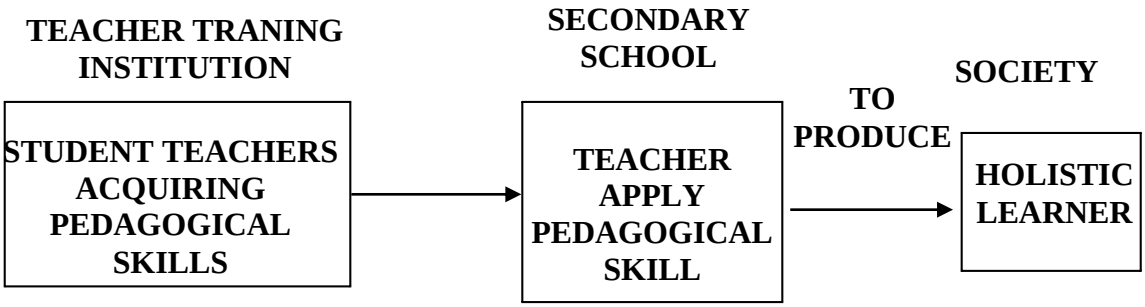
This study was conducted in order to bring to light whether trainee teachers of physics are well equipped with various methods and techniques to handle physics lessons well. By establishing the flaws in the physics teaching methods for trainee teachers will help make reforms that will help trainee teachers to be adequately prepared to teach physics with confidence and be able to meet the needs of the 21st century learners. If the teachers are well trained, then performance of pupils in physics in secondary schools will be improved. The findings of this research are of great value to other teacher education colleges and universities as it will help them understand issues surrounding the quality of teachers they are producing.

1.6 Conceptual Framework

The survey was pivoted on the concept of professional development for teachers by espousing the understanding that the classroom performance of teachers is a most important factor for learners' academic achievement. The researcher based his assumption from Weiner's Attribution theory. This theory states that external and internal factors can improve performance (Weiner, 1985).

For instance, learners may attribute their academic achievement to their teachers (external factor) while the teachers may attribute their teaching performance to their teacher training (external factor) and perhaps, to their teaching efficacy, job satisfaction and attitude towards the teaching profession (internal factors). These relationships are illustrated in figure 1.1

Figure 1.1: Conceptual Framework for the Study



The key concepts in this study were pedagogies, poor performance, physics and physics trainee teachers. Pedagogies are different strategies, techniques, methods and approaches a teacher would you to deliver a successful lesson. Without proper training teaching pedagogies a teacher will not deliver a lesson adequately resulting in poor performance of learners in physics

1.7 Theoretical Framework

The theory adopted for this study was Experiential Learning. It was developed by Carl Rodgers in 1969. Roger's theory of learning originates from his views about psychotherapy and humanistic approach to psychology. It applies primarily to adult learners and has influenced other theories of adult learning such as Knowles and Cross (Combs, 1982). This theory indicates that all human beings have a natural desire to learn. Therefore, failure to learn is not due to the person's inability to learn, but

rather to problems with the learning situation. As applied to this study, as this theory holds, the researcher expected that trainee teachers at the Teacher Education University were made to do much of teaching practice through peer teaching and teaching actual learners in a classroom so that they can experience and explore varieties of teaching techniques before they go into the field to teach learners. The rationale behind this expectation was that experiential education, or "learning by doing," (Combs, 1982) is the process of actively engaging students in an authentic experience that has a lot of benefits rather than consequences. Students make discoveries and experiment with knowledge themselves, instead of hearing or reading about the experiences of others. Students also reflect on their experiences, thus developing new skills, attitudes, and ways of thinking (Kraft & Sakofs 1988).

II. Methodology

2.0 Research Design

The study adopted a Cross-Section Survey design The design was appropriate because data was collected using questionnaires and interviews. Besides data, was collected at once in a short space of time hence the design.

2.1 Population Size

The expected population was 133, second, third and fourth year students. These were student doing physics education teaching programme enrolled under full time type of learning. A population size of six (6) lecturers was collected. These are both Physics content and Physics teaching methods lecturers.

2.2 Sample Size

A sample Size of 67 student participants was arrived at after using a sample size calculator from: http://www.raosoft.com/samplesize.html, at 95% confidence level and 5% margin of error. All the six lectures participated in the study because the number was small.

2.3 Sampling Method

Simple random sampling method was used. The register of all students was obtained from the dean of students. The students were assigned numbers. Using a table of random numbers which are generated by a computer and downloaded from the internet, participants were selected into the sample.

2.4 Data Collection Methods

Data from participants was collected using questionnaires and interview schedules. These methods were chosen because the study design was a survey as according to Fowler (1995). Fowler (1995) suggested that Qualitative data are mostly non-numerical and usually descriptive or nominal in nature. This means the data collected are in the form of words and sentences. Often (not always), such data captures feelings, emotions, or subjective perceptions of something. Qualitative approaches aim to address the 'how' and 'why' of a program and tend to use unstructured methods of data collection to fully explore the topic. Qualitative questions are open-ended. Qualitative methods include focus groups, group discussions and interviews.

2.5 Data Analysis Methods

Both qualitative and quantitative data was collected. Qualitative data was analysed using the Qualitative data analysis software QDA Miner 4 Beta. Data from the interviews conducted was transcribed and fed into the software. Common words were coded and liked to form concepts. Common concepts were linked to form categories and eventually arrived at emerging themes. Quantitative data was analysed using SPSS version 20. Data from questionnaires was fed into the software and frequency count from the respondents were analyzed

2.6 Piloting Data Collection Instruments

After the research instruments were designed, they were piloted on the actual population. The pilot was conducted on five (5) selected members of the sample for the study. The members were excluded from taking part in the actual study. This was done in order to avoid the selected members to feel bored and become un- interested as they were to be completing the same questionnaire in the actual data collection process. Questionnaires were given to the selected sample. After the questionnaires have been completed data was analyzed to see if it answered the research questions

2.7 Validity and Reliability Test

Content validity was undertaken to ascertain whether the content of the questionnaire was appropriate and relevant to the study purpose. To estimate the content validity of the questionnaire, five purposely chosen experts were asked to review the draft 17 -item questionnaire and 8 and 10 item interview schedules to ensure they were consistent with the objective of the study. Each reviewer independently was required to rate the relevance of each item on the questionnaire to the objectives using a 4-point Likert scale. The Content Validity Index (CVI) was used to estimate the validity of the items (Lynn, 1996).

Test-Retest reliability of the questionnaire was undertaken by administrating the questionnaire to 5, randomly selected students of physics education from the population. They were made to complete the Questionnaire on two different occasions; at baseline and 3 weeks later. However a different group of 5 students was made to complete the questionnaire. Because ordinal data was obtained from the questionnaire using a four point Likert scale rated from strongly disagree to strongly agree; and the scale was not continuous, non-parametric statistical tests was deemed to be more appropriate than Pearson Correlation Coefficient (Hilton 1996; Wittkowski 2003; Jakobsson 2004). Therefore, the analysis of responses between the test and the retest was conducted using Wilcoxon Non-parametric Statistical Test to determine whether there will be any significant differences between the responses at each time point.

III. Findings

3.1 Research Question One

The first research question was to establish how physics student teachers were prepared to teach secondary school physics. The findings were as follows:

Students were asked to state the year in which physics teaching methods course was introduced in the physics teacher education programme at the University.

Table 4.1, shows the responses by the students.

Table 4.1.
Year when teaching methods course introduced at the University. N= 63

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	2ND YEAR	62	98.4	98.4	98.4
	4TH YEAR	1	1.6	1.6	100.0
	Total	63	100.0	100.0	

Source: Field data, 2019

From the Table 4.1, 62 out of 63 respondents stated that physics teaching methods course was introduced in 2nd year up to the last fourth year of study. Only one (1) respondent said it is introduced in 4th year of study possibly the respondent did not understand the question.

Both physics content and physics teaching methods lecturers were asked to state the year in which physics teaching methods course was introduced to physics student teachers. All of them stated that it was introduced in second year and in fourth year students go for teaching practice for a term. From second year to third year, students are taught different methods of teaching, lesson planning and assessments.

Students were asked a question to state if they were give chance to practice using the methods of teaching they learn in class, the results are shown in Table 4.2

Table 4.2:
Student responses on whether they are given chance to practice teaching using teaching methods learnt in Class. N= 63

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	YES	24	38.1	38.1	38.1
	NO	20	31.7	31.7	69.8
	SOMETIMES	19	30.2	30.2	100.0
	Total	63	100.0	100.0	

Source: field data, 2019

Out of the 63 respondents 24 said "YES" 20 responded "NO" and 19 said "SOMETIMES". The percentage of those students who said" YES" they are given chance to practice teaching the teaching methods learnt in class was 38. 1% and those who said "NO" and "SOMETIMES" were 61.9%

During the interview with the physics content lecturers, they pointed out that it is difficult to allow students to make them teach because the nature of the physics content is mostly unknown as one of the lecturers pointed out below;

I have desire to make my learners teach themselves but it is difficult because the content is unknown….. they can only understand it after I lecture to them. I mean how can you make someone teach the things they don't understand or know?

That was a response from one of the physics content lecturer.

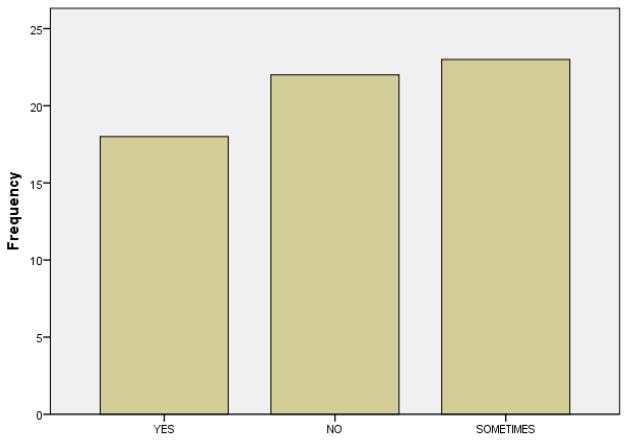
However, the physics teaching methods lectures stated that they allowed students to practice teaching different teaching methods during peer teaching and this is done in groups.

We make students to be in groups, make a lesson plan together as a group and during peer teaching, I choose any member from the group to teach the lesson. By so doing it makes every group member to be ready to teach the lesson they have planned together

One of the physics teaching methods responded as above.

When asked if lectures demonstrate how to teach using the teaching methods students learn in class, students' responses were as recorded in Figure 4.1.

Figure 4.1. Responses of Students if Lecturers Demonstrate Teaching using Teaching Methods learnt in Lectures. N=63



Source: Field data, 2019

From Figure.4.1 we see that 18 out of 63 respondents said 'YES' to the questions representing 28.6% of the total respondents. 34 responded 'NO' representing 34.9% and those that responded 'SOMETIMES' were 23 representing 36.5%.

Physics content lecturers were asked as to whether they demonstrated to the learners how to teach using teaching methods learners students learnt in class. The general response from the two lecturers was that they used to demonstrate to the student teachers. However when asked which type of teaching method they used most, they consensually responded that they used lecture method mostly. One lecturer had this to say:

Mmmmm….. I mostly use lecture method because it is easier to cover a lot of material and besides the nature of physics content is that is easier taught using lecture than any other method. However, we also give assignments for learners to go and research on their own so discovery method of teaching is applied also.

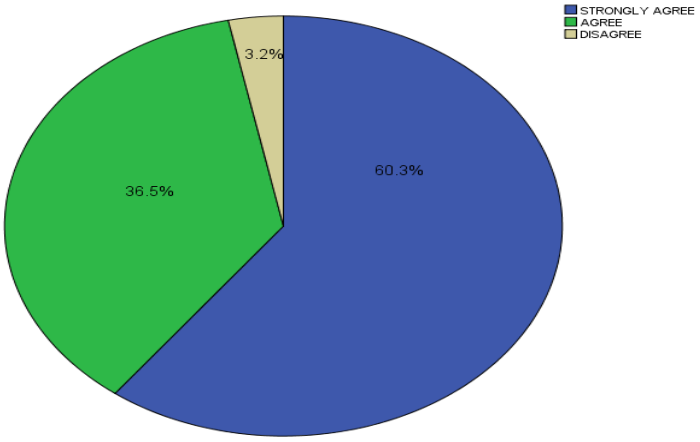
Another lecturer of physics content responded;

Nooo. These are older learners, we need not to struggle teaching them, we give them the guide through lectures and so it is their duty to go and discover more on their own.

The physics teaching methods lecturers were also asked whether they demonstrated to the students how to teach using those teaching methods taught in the course physics teaching methods (PTM). The general response was that, they did not instead they provided guide on the procedure how a particular teaching method can be used. Then they allowed students themselves to select topics and practice how to teach using the particular teaching method.

Furthermore, students were asked to whether learning some of the topics which learners learn in class in secondary schools would help them teaching physics adequately. Their responses are presented in Figure. 4.2.

Figure 4.2. Responses of students to whether learning certain topics learners learn in class would help them teach physics adequately. N=63



Source: Field data, 2019

From Figure. 4.2, 60.3 % of the respondents 'STRONGLY AGREE' to introducing topics in physic teaching course same as those learners learnt in class and 36.5% 'AGREED'. A 3.2 % of the respondents 'DISAGREED'. Students went further and suggested some topics which were difficult for them. These were Nuclear Physics, thermal physics and Electricity.

On the other hand both the physics content and physics teaching methods disagreed to teach students senior secondary physics topics. They stated that there was no much content. Students can easily understand the topics without challenges. They (students) needed to learn content higher than that of the content for the learners they were going to teach.

The Lecturers further argued that after the students undergo the training, they will have no challenges in handling those topics

3.2 Research Question Two

The second research question was to find out strategies put in place to ensure that practical skills in teaching methodologies are imparted to physics student teachers?

The student were asked to rate the three point likert scale on the questionnaire on how often they practiced teaching, that is peer teaching or teaching actual learners in a class (school). The results are presented in Table 4.3.

Table 4.3:
Student responses on how often they do teaching Practice. N=63

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	VERY OFTEN	1	1.6	1.6	1.6
	OFTEN	15	23.8	24.2	25.8
	NOT OFTEN	46	73.0	74.2	100.0
	Total	62	98.4	100.0	
Missing	99[1]	1	1.6		
Total		63	100.0		

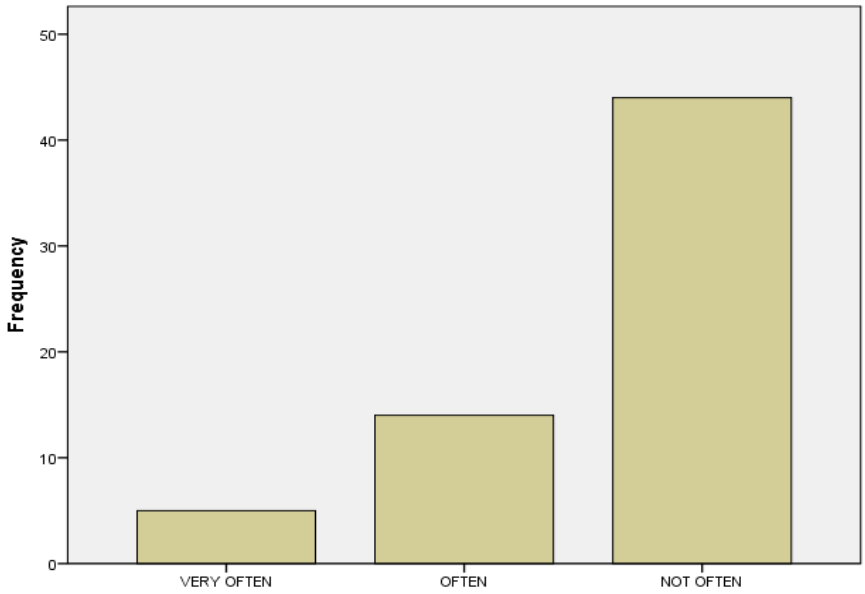
Note: missing 99[1] student who never responded to the question in the questionnaire
Source: Field data, 2019

From table 4.3 out of 63 respondents, 1 responded 'VERY OFTEN', 15 responded 'OFTEN' and 46 responded 'NOT OFTEN'. Only 1 respondent never indicated their response.

Lecturers interviewed stated that students were given chance to practice teaching and that they go to teach actual pupils during their teaching practice which is done in 3rd year.

The second question that student were asked whether they were taught how to carry out practicals they are expected to carry out with learners in secondary school. Their responses were presented in figure 4.3

Figure 4.3. Students' responses to whether they are taught how to carry of practicals expected to be done in secondary school with learners. N=63



Source: Field data, 2019

Figure 4.3, shows that 5 Students responded 'VERY OFTEN' 14 responded 'OFTEN' and 44 responded 'NOT OFTEN' and the total number of respondents was 63.

The lecturers response to whether they taught student were taught how to conduct practical on topics their supposed to conduct with learners in secondary schools. The general feeling of the two lecturers was that they did but not all topics. Students carried out practical in higher topics they were learning in class. Besides, the practicals at secondary school are elementary and students can conduct them without any challenges.

On strategies put in place to help students acquire practical skills, what emerged from the interviews with the lectures was that students are made to carry out six practicals in each physics course as part of the continuous assessment project.

4.3 Research Question Three

The third and final research question was to find out the views of physics student teachers on how they wish to be trained in order for them to deliver lessons adequately.

The following responses emerged. These were the actual words written by students from the questionnaires.

One student suggested that,

"*I think it can be good if the second year can cover everything about lesson plans, assessment etc so that in third year student do a lot of peer teaching on different topics that are learnt in secondary schools*."

Another student added that by implementing more teaching methods, and practicing more, and using more demonstrations than lecture method by lecturers will help improve student-teachers teaching skills. More so student teachers should be exposed to more peer teaching as they are still in the university.

Other students stated that they do not conduct laboratory experiments during peer teaching. So they suggested that laboratory experiments must be encouraged during peer teaching. Finally student teachers suggested that they should introduce more of secondary school work which can help teachers to teach effectively for example introducing some of the topics which learners learn in secondary schools in the physics Teacher Education course

IV. Discussion of Findings

The results were discussed according to each research question. To answer the research question one, students were asked four questions from the questionnaire and lectures were interviewed. The following were the questions and the analysis of the responses.

4.1 Research Question One

4.1.1 In which Year of Study is Physics teaching methods (PTM) learnt/ Introduced at your University/college?

According to the findings obtained, physics teaching methods course was introduced to the students in second year of the four year degree programme. This was adequate enough to make sure that students were made to acquire necessary pedagogical skills to help them teach physics content at secondary school confidently. Previously the course, PTM, was introduced to student teachers in third year of study. But it was discovered that there was less time to make student teacher fully and

adequately prepared to become fully baked teachers hence bringing it to second year.

4.1.2 Are students given chance to practice teaching using the methods of teaching you learn in class?

The number of respondents who said 'NO' and those who said 'SOMETIMES' collectively outweighed the number of respondents who said 'YES'. This was a clear indication that there was less teaching practice done by the students. Lectures reported that they allowed their students to practice teaching during their training at the university and also a three months attachment to schools so that they can teach actual children (learners). However, this could not be as often as expected as we have seen the responses from the students themselves.

4.1.3 Do your lecturers in your courses demonstrate how to teach using the teaching methods you learn in a lecture to enhance your understanding?

We have seen that 18 out of 63 respondents said 'YES' to the questions representing 28.6% of the total respondents. 22 responded 'NO' representing 34.9% and those that responded 'SOMETIMES' were 23 representing 36.5%. The sum of the respondents who said 'NO' and those who said 'SOMETIMES' amount to 45 out of the 63 total respondents. This margin shows lecturers did not often or never demonstrated to their students how to teach using those teaching methods learnt in class.

As for the physics content lecturers, they admitted to using mostly lecture method and allowed Students to do research assignments (discovery method) sometimes. They gave a reason that it was easier to cover a lot of physics content using lecture method than any other method. Lecturers also stated that the students were older learners and knew what they went into the university for and so they needed not to struggle teaching them variety of teaching methods. They gave them guide through lectures and so it was the student's duty to discover more on their own. Although this might be a good idea as indicated by (Kagoda, 2011) who argued that Learning about teaching is also enhanced through teacher trainees doing research on their own practice, it is felt that demonstrations by lecturers on how to teach using those same teaching methods would help the student teachers have a clear picture and understanding on how to use the teaching methods in different ways. By so doing it will enhance their confidence and improve their teaching skills.

4.1.4 Do you think learning some of the topics which learners learn in secondary schools in your physics teaching courses will help prepare teachers to teach physics adequately?

From the findings, we see that 60.3 % which is 38 of the total 63 respondents 'STRONGLY AGREE' to introducing topics in physic teaching course same as those learners learnt in class and 36.5% representing 23 out of 63 respondents 'AGREED'. Only 3.2 % which is 2 out of 63 respondents 'DISAGREED'. The difference in the number of students who wanted to have some topics learnt in secondary school being introduce in teacher education was significantly higher than those who did not want as seen from. Students went further and suggested some topics which were difficult for them. These were Nuclear Physics, thermal physics and Electricity.

However, there seem to be a contradiction on what students want and what the lecturers want. From interviewed conducted with the lecturers, they stated that there was no much content. Students can easily understand the topics without challenges. Students needed to learn content higher than that of the content for the learners they were going to teach.

The Lecturers further argued that after the students undergo the training, they will have no challenges in handling those topics

4.2. Research Question Two

The second research question was to find out strategies put in place to ensure that practical skills in teaching methodologies are imparted to physics student teachers. In answering this research question students were asked two questions by rating the responses on a Likert scale and qualitative data was obtained from interviews with the lecturers of both physics content and physics teaching methods. The following was the analysis of the findings;

4.2.1 How often do you practice teaching i.e. Peer teaching or teaching actual learners in a school (class) while at the University?

Out of 63 respondents, 1 responded 'VERY OFTEN', 15 responded 'OFTEN' and 46 responded 'NOT OFTEN'. Only 1 respondent never indicated their response. From these findings we can see that the number of respondents who said 'NOT OFTEN' is higher than the sum of those who said 'VERY OFTEN' and those who said 'OFTEN'. Therefore there is significant evidence that students are not often given opportunity to practice teaching i.e. peer teaching or actual learners in a school (class) while at the university.

4.2.2 Are you taught how to carry out practical you are expected to carry out with learners in school?

Out of the 63 respondents, 5 students responded 'VERY OFTEN' 14 responded 'OFTEN' and 44 responded 'NOT OFTEN'. The sum of the respondents who said 'VERY OFTEN' and those that said 'OFTEN' is much lower than those that said 'NOT OFTEN'. This implies that there is sufficient evidence that student teachers were not made to carry out practical or laboratory experiments which students are expected to carry out with learners in class. Both the physics content and physics teaching methods responses during the interviews confirms that students were not often made to carry out experiments expected to be carry out in secondary school. They stated that students carried out experiments in higher topics they were learning in class. Lecturers went further to add that the experiments at secondary school were elementary and student teachers can conduct them without any challenges.

On strategies put in place to help students acquire practical skills, what emerged from the interviews with the lectures was that students are made to carry out six experiments in each physics course as part of the continuous assessment project.

4.3 Research Question Three

The third and final research question was to find out the views of physics student teachers on how they wish to be trained in order for them to deliver lessons adequately.

The following responses emerged.

One student suggested that, "*I think it can be good if the second year can cover everything about lesson plans, assessment etc so that in third year student do a lot of peer teaching on different topics that are learnt in secondary schools*." Another

student added that by implementing more teaching methods, and practicing more, and using more demonstrations than lecture method by lecturers will help improve student-teachers teaching skills. More so student teachers should be exposed to more peer teaching as they are still in the university.

Other students stated that they do not conduct laboratory experiments during peer teaching. So they suggested that laboratory experiments must be encouraged during peer teaching. Finally student teachers suggested that they should introduce more of secondary school work which can help teachers to teach effectively for example introducing some of the topics which learners learn in secondary schools in the physics Teacher Education course

V. Conclusion and Recommendations

5.1 Conclusion

The study was about exploring whether the physics teaching methods course offered at a Teacher Education University addresses the challenges of poor performance in physics by secondary school pupils. The study took a Cross- sectional Survey research design with a sample size of 67 full time physics Education students at the University. Simple Random Sampling Procedure was used. Physics teaching Methods and Physics content lecturers also took part in the study. The purpose of the study was to bring to light whether trainee teachers of physics were well equipped with various methods and techniques to handle physics lessons effectively. Data was collected using questionnaires and interview schedules. Both qualitative and quantitative data was collected. Qualitative data was analysed using QDA miner 4 software while quantitative data was analysed using Statistical Package for Social Sciences (SPSS) software version 20. The data collected showed that there was significant evidence that Student teachers do not often practice teaching using the teaching methods they learn theoretically in class as a result there pedagogical skills are limited and becomes difficult to address the challenges of poor performance by pupils in physics. Additionally there is statistical evidence that student teachers were not demonstrated to on how to teach using the teaching methods they learn in a lecture to enhance their understanding. Further, Practical skills are not adequately imparted in the students. Much as they do higher physics practicals, they are not however taught how to do simple practicals that they are expected to do with learners in secondary schools. Lastly, Student teachers find it difficult to teach certain topics like Atomic and Nuclear Physics, thermal physics and electronics. However, their training does not help them how to teach these topics effectively.

5.2 Recommendations

Following the research study findings and conclusions made, the following recommendations were made by the researcher, which if implemented, will help trainee teachers of physics to be well equipped with various methods and techniques to handle physics lessons effectively thereby improving performance of pupils in physics at secondary school level.

Teacher training institutions should consider, introducing a course where students could be taught content which they are expected to teach at secondary school level. This in line with Lederman and Gess-Newsome (2001) who established the fact that, regardless of the fairly high level of confidence teachers have in their subject matter content knowledge in the subject area, most of them do not understand the content that they are to teach in a conceptually rich and accurate manner. So physics trainee teachers should be taught content

Student teachers should be made to practice how to teach topics they are expected to teach in secondary schools more often so as to improve their pedagogical skills. This is supported by Shulman (1986) who asserted that PCK represented "the blending of content and pedagogy into an understanding of how particular topics, problems or issues are organized, represented and adapted to the diverse interests and abilities of learners, and presented for instruction.

Physics being a practical subject, more practical skills should be imparted into the student teacher by allowing them to assemble, construct objective evaluation questions for simple practicals which they are expected to do in secondary schools.

5.3 Suggestions for Potential Future Research

This research only sampled student teachers. A future research may be needed to sample already practicing teachers to evaluate their views on whether their training had helped them to teach physics in secondary schools effectively and address the challenges of poor performance by pupils.

Another issue that emerged from the research was the issue of Atomic and nuclear physics being difficult topic to teach as suggested by student teachers. An experimental research design can be done to find the easiest way of teaching such a topic possibly by using computer simulations

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