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Exploring Teaching and Learning Materials Usage in Science Lessons: How Pre-Service Teachers Cope With Challenges in the Mfantseman Municipality

[1]Delphine Abla Azumah, [2]Emmanuel Eshun

[1]OLA College of Education, Cape Coast, Ghana

[2]Presbyterian College of Education, Akropong, Ghana

Abstract: **The usage of Teaching Learning materials during science lessons have a great influence on learners' academic performance. The study however set to find how pre-service teachers cope with challenges with the non-availability of TLMs. Forty (40) pre-service teachers, having their internship at public basic schools in the Mfantseman Municipality in the Central Region of Ghana were the participants for the study and they were purposively selected. The survey method was used in which the participants responded to questionnaires administered to them. From the results, it was concluded that the ability of teachers to improvise, use various strategies to teach science in the absence of TLMs and the involvement of learners in the improvisation process all contribute to the effectiveness of the teaching and learning process of science.**

Keywords: **Teaching and Learning Materials, Science lessons, Pre-service Teachers.**

1. INTRODUCTION

Preparation and delivery of lessons are indispensable components of a teacher' practice and during those times an important inclusion is considered: how can the teaching and learning be made fun, hands-on, memorable and something not imagined by the students? Obviously, the use of teaching / learning materials is vital in the production of high achievers in the various subjects. Teaching/learning materials refers to materials that are used to support learning. Apart from making the lessons interactive, TLMs prevent the teacher from giving lengthy explanations to science concepts. There is a higher level of participation student participation in science lessons. In the basic schools pupils build a foundation for futurelearning and if they fail to grasp basic concepts (which TLMs easilyhelps out with), they lose interest in subjects gradually. Again, with the use of TLMs in lessons, teachers are bound to use activity based methods of teaching for the students to get to understand basic concepts in the various subjects.

For the constructivists, students learn when they are actively involved in knowledge construction and knowledge comprehension process (Dennick, R. 2016) and one of the ways knowledge can be constructed easily is by the use of TLMs. In the ' teaching and learning of science', with students going through the process skills, there has to be something that they observe, design an experiment to measure , record results and draw conclusions on. An example is checking the temperature of cold water at regular intervals to see how fast it rises and thermometers are needed for this activity. Research shows that one can remember 90% of the words said and things done by the individual(Seven, M. A. and Engin, A. O.,2007; HIV Alert School Model, 2010) This is made possible when the appropriate TLMs are effectively used during the science lessons.It means that, with the provision of TLMs for lessons, learners interact with

and manipulate the items on their own, leading to increase in learner participation(Wambui, S. E., 2013), higher learner accomplishments in terms of learning(Atiemo, A. J.2014) and then the 90% recall of concepts learnt is easily achieved.Nonetheless, the use of TLMs does notcome without problems.Schools will have to be equipped with modern computers and their attachment or add-ons with an acceptable student- to- computer ratio which comes at a high cost. Meanwhile, the equipment become old within the shortest period of time with lots of repairs taking place supervised by very few ICT local professionals who deal with hardware problems. To compound the problems further, low income families are not able to buy computers for the home for students to practice on their own (Mikis, M. K.,2009)Apart from the expensive nature of some forms of TLMs, another research indicated that basic structures and facilities were non-existent in some schools and teachers had very 'heavy workload' or tight schedule at school, leaving them very limited time for the preparation of some TLMs for use in the classroom(Das, D. and Sarkar, B.,2015). Meanwhile FEMSA (Unesco) has recommended that teachers should prepare TLMs using improvised materials that are available in the environment.

In discussing about 'temporary magnets' under the topic 'magnetism' a teacher recounts making his students 'prepare their own electromagnet and through repeated test, the students learnt that the ability of a temporary magnet to attract magnetic substances could be changed with respect to the power.' (Dixit, D. 2013),but students preparing TLMs for use in class has to be supervised by the teacher as recommended by FEMSA(Unesco), in their study on the availability of resources for teaching science and mathematics in some selected African countries. With the research done to ameliorate the challenges associated with the use of TLMs in science lessons, even with the basic ones, it seems little research had been done on how pre-service teachers cope with the challenges when using TLMs during science lessons.

2. THEORETICAL FRAMEWORK

Constructivist Theory of Teaching

Learners construct their own knowledge and meaning from their experiences(Horstman& White, 2003)There is the need for learners to construct their own knowledge rather than receiving it from others. As a result, the focus is taken away from the teacher and put on the students and their learning. This means that learning does not occur as a result of teaching but what students do with the new information they come across.The construction of knowledge occurs in the human mind and learners, after coming across an information try to form their own mental model of the world around them from their experience. (Driscoll, 2000). Those real experiences that enable learners construct their knowledge have a sense of purpose and meaning to them. From the constructivist theory it is obvious that learners' experience in the real world is very important and it consists of authentic activities, exploration, problem-solving, anchored instruction and portfolios among others. The activities are also undertaken in groups which enhance the learners' social and communicative skills, collaborative skills and exchange of ideas. To make those activities attain their intended purpose, the teacher has to provide a positive and supportive environment by exposing the learners to primary data sources and materials they can actively interact with as the construct their own knowledge.

Research Questions

There are some questions that guide the study and the study seeks to answer them. They are goals to be achieved through the proposed research.

Therefore the study has the following research questions:

- To what extent are TLMs used by teachers in basic schools in the Mfantseman Municipality?
- What challenges are associated with the use of TLMs in the basic schools in the Mfantseman Municipality?
- To what extent do basic school teachers cope with the non availability of TLMs in the Mfantseman Municipality?

Method

The cross-sectional survey design was used as data was collected at one point in time from the sample of respondents. This research design enables one to describe the opinions or attitude or characteristics of a sample or population.

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Participants

Forty (40) pre-service teachers who were having their internship at public basic schools in the Mfantseman Municipality in the Central Region of Ghana were the participants for the study. The participants were purposely selected from the public basic schools in the Municipality.

Instrumentation

Data were obtained on the extent of Teaching and Learning Materials (TLMs) usage, challenges associated with the use of TLMs and the extent to which pre-service teachers cope with non-availability of TLMs, through the use of questionnaires.

Method of Data Collection

The method used for gathering data for this study was the survey research method. It involves the use of questionnaires to obtain information from respondents.

Method of Data Analysis

Simple percentage was the main analysis technique employed to answer the research questions.

3. RESULTS AND DISCUSSION

Research question 1: To what extent are Teaching and Learning Materials used by teachers in basic schools?

Table 1 shows the extent of usage of TLMs by pre-service teachers.

Table 1: Extent of usage of TLMs by Pre-service Teachers

Item	SA	A	D	SD	Total
TLMs make lessons interactive	31(77.5%)	7(17.5%)	-	2(5.0%)	40(100%)
TLMs help pupils to be innovative	24(60%)	16(40.0%)	-	-	40(100%)
The use of TLMs attract pupils attention	37(92.5%)	3(7.5%)	-	-	40(100%)
Pupils remember concepts taught	30(75%)	9(22.5%)	-	1(2.5%)	40(100%)
Learning is made real	33(82.5%)	7(17.5%)	-	-	40(100%)
Use of TLMs helps to transfer knowledge	21(52.5%)	19(47.5%)	-	-	40(100%)
Communication among pupils	22(55.0%)	17(42.5%)	-	1(2.5%)	40(100%)
Cooperation among pupils	23(57.5%)	17(42.5%)	-	-	40(100%)

From Table 1, 38 representing 95.0% of the respondents generally agreed that TLMs make lessons interactive, while 2 representing 5.0% of the respondents disagreed with the statement. 30 representing 97.5% of the respondents also agreed that TLMs increase the retention of learners. All the respondents (100% respondents) generally agreed that TLMs: help pupils to be innovative, attract pupils' attention, help pupils to transfer knowledge gained in one subject area to the other and also help pupils to communicate ideas effectively.

The findings seem to suggest that Teaching and Learning Materials have a significant impact on students' academic performance in science. This accounts for the extent to which pre-service teachers use TLMs in their science lessons. With respect to the importance of TLMs, Udomior (1999) states that "instructional materials have an effect on learning, with good understanding in less time as well as means of communication between teachers and learners". Findings from Table 1 also support the view of Jiya (1993) that "instructional materials improve the retention rate of learners".

Research Question 2: What challenges are associated with the use of TLMs in the basic schools in Mfantseman Municipality?

Table 2 presents challenges associated with the use of TLMs in basic schools.

Table 2: Challenges associated with the use of TLMs in Basic Schools

Item	SA	A	D	SD	Total
Some TLMs are too expensive	16(40.0%)	21(52.5%)	3(7.5%)	-	40(100%)
I don't have time to improvise TLMs	1(2.5%)	15(37.5%)	18(45.0%)	6(15.0%)	40(100%)
I don't know how to use certain TLMs	2(5.0%)	17(42.5%)	12(30.0%)	9(22.5%)	40(100%)

From Table 2, 37 representing 92.5% of the respondents agreed that one of the challenges associated with the use of TLMs in basic schools is that some TLMs are too expensive to buy. However, 3 representing 7.5% of the respondents disagreed with the statement that some TLMs are too expensive to buy. 16 representing 40% of the respondents and 19 representing 47.5% of the respondents agreed that they don't have time to improvise TLMs and don't know how to use certain TLMs respectively. It is evident from Table 2 that the major challenge facing pre-service teachers with the use of TLMs is the expensive nature of some TLMs.

Research Question 3: To what extent do pre-service teachers cope with the non-availability of TLMs in the Mfantseman Municipality?

Table 3: Extent pre-service teachers cope with the non-availability of TLMs

Item	SA	A	D	SD	Total
I use strategies from other subject areas to teach science	4(10.0%)	33(82.5%)	3(7.5%)	-	40(100%)
I sometimes ask pupils to bring some common items at no cost	18(45.0%)	22(55.0%)	-	-	40(100%)
I borrow some TLMs from other schools	4(10.0%)	12(30.0%)	16(40.0%)	8(20.0%)	40(100%)
I avoid teaching topics whose TLMs are not available	2(5.0%)	11(27.5%)	11(27.5%)	16(40.0%)	40(100%)

Table 3 revealed that 37 representing 92.5% of the respondents agreed that they use strategies from other subject areas to teach science in the absence of TLMs. 3 representing 7.5% of the respondents however, disagreed with this statement. All the respondents (representing 100%) agreed that they sometimes ask pupils to bring some common items at no cost to be used as TLMs. This finding supports the assertion of Kole (2006) that "the involvement of teachers and learners in improvising materials gives students and teachers the opportunity to concretize their creativity, resourcefulness and skills of imagination".

16 representing 40.0% of the respondents generally agreed that they borrow some TLMs from other schools. 27 representing 67.5% of the respondents generally disagreed with the assertion that they avoid teaching topics whose TLMs are not available. This finding indicate the extent to which pre-service teachers are coping with the non-availability of TLMs in the basic schools.

4. CONCLUSION

Findings from this study have revealed that TLMs and their usage have a great influence on learners' academic performance. The study however set to find how pre-service teachers cope with challenges in the non-availability of TLMs. From the results, it is concluded that the ability of teachers to improvise, use various strategies to teach science in

the absence of TLMs and the involvement of learners in the improvisation process all contribute to the effectiveness of teaching and learning process of science.

5. RECOMMENDATIONS

Based on the findings of the study, the following recommendations were made:

- Teachers should be encouraged to improvise and use TLMs in basic schools
- Government and school heads should ensure that TLMs are available in schools.
- In-service Education and Training (INSET) should be organized on how to use TLMs in basic schools.

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