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THE USE OF TEACHING AND LEARNING MATERIALS BY STUDENT-TEACHERS AT ST. AMBROSE COLLEGE OF EDUCATION, DORMAA AKWAMU IN THE BONO REGION OF GHANA

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ABSTRACT: *Education is very crucial in the development of every nation, and Teaching and Learning Materials (TLMs) play critical roles in the teaching and learning processes globally. The effectiveness of teaching and learning largely depends on proficiency of teachers to use appropriate TLMs effectively. The study focused on uncovering deficiencies and inefficiencies on the use of TLMs by student-teachers on practicum at St. Ambrose College of Education, Dormaa-Akwamu in the Bono Region of Ghana. The study was qualitative and it employed action research method. Observations and interviews were instruments used to gather data from 30 subjects. The purpose of this article was to identify problems that student-teachers face regarding the use of TLMs as a catalyst to induce learning. Identifying such anomalies on the part of the student-teachers is envisaged to expose the gaps that exist in teacher education so that appropriate intervention could be deployed to rectify the situation. The study revealed that student-teachers lack requisite knowledge and skills in TLMs design and utilization and it recommended that skill development in TLMs design and utilization should be integrated into teacher education in Ghana.*

KEYWORDS: Education, Teaching and Learning Materials (TLMs), Student-Teachers, College of Education, Dormaa-Akwamu, Ghana

INTRODUCTION

Teaching and Learning Materials are fundamental media for inducing learning; and teachers, play the crucial role in this educational process. All materials and resources used for imparting the desired knowledge, skills, attitudes or values in pupils are regarded within the scope of teaching and learning materials (Simsek, 2003). These materials are objects, devices or anything which help the teacher to make learning meaningful to the learners (Ikerionwu, 2000). Teaching and learning materials are very critical to any successful teaching and learning process worldwide. This is because these resources enable the teacher to effectively transfer the content to the learners (Karaka, 2007). Teachers play an influential role in improving learning outcomes (Timperley, Wilson, Barrar, & Fung, 2007). Teaching and learning materials are next to the teacher who plays a central role in the classroom instruction. Appropriate and standard TLMs are very essential ingredients in successful teaching and learning (Association of American Publishers, 2015). Teaching and learning

materials are critical ingredients in learning and the intended curriculum cannot be easily implemented without them (The World Bank, A Chance to Learn, 2001).

The current National Teacher Education Curriculum Framework in Ghana seeks to prepare competent teachers to teach at the basic schools (KG, Primary and JHS), where the use of TLMs is very crucial. Teaching at the basic school level requires that the pupils are exposed to some form of simulation. Oppong, Amissah, Asemanyi and Ziggah (2009) assert that pupils should be given the opportunity to manipulate teaching and learning materials for a better understanding of the topic. It is believed that, students are able to retain only 10% of what they hear, 40% of what they see but 90% of what they do. It is therefore, imperative on the part of the teachers to use as many relevant instructional materials as possible, for learners to manipulate them to aid retention.

The use of teaching and learning materials by the student-teachers on the practicum (teaching practice) was challenging. The problem came to light during the routine supervision of student-teachers, by the lead investigator as a tutor at St. Ambrose College of Education, Dormaa-Akwamu, in the Bono Region of Ghana. Per the lead investigator's initial observation, student-teachers were deficient and inefficient in the use of TLMs during lessons. The few student-teachers, who are able to select appropriate materials; either cannot employ them effectively in their lessons to induce learning or they forget to utilize these materials in the teaching and learning process. Though, the student-teachers perceive TLMs as obligatory, as specified in the college's current assessment plan for student-teachers on the practicum; rather than its core function of facilitating teaching and learning. This alarming situation may due to the fact that student-teachers lack knowledge and skills in the selection and utilization of TLMs. In responding to the above anomalies in the teacher education in Ghana, the researchers embarked on the study to investigate the inefficiencies and deficiencies on the use of TLMs by the intern student-teachers at St. Ambrose College of Education, Dormaa-Akwamu in the Bono Region of Ghana. The study is expected to expose the anomalies that exist in the teacher education so that appropriate intervention would be designed to normalise the situation.

LITERATURE/THEORETICAL UNDERPINNING

The foundation for the study stems from the three key concepts in the topic under study, and these are:

- Teaching
- Learning
- Teaching and Learning Materials (TLMs)

Farrant (1996) defines teaching as a planned activity done to effect change in the behavior of learners. According to Bruner (1994), teaching is the capacity to transfer knowledge to a group of people, or showing them the process or the way, something is done. Teaching is not a mere pouring of a body of knowledge to students, rather stimulating learners to use their mental faculties to solve problems on their own (Tamakloe, Atta & Amadehe, 1996). According to Stein and Bovalino (2001), using manipulative TLMs in teaching can be

essential tools in assisting students to think and reason in more meaningful ways. Teaching becomes easier when appropriate teaching and learning materials are used (Mwonga & Wanyama, 2012). From the above conceptions, teaching is a process but not an event: it is not limited to only classroom activities rather it involves planning and organizing learning experiences. The use of appropriate TLMs is a sure and effective teaching strategy.

As behaviourist, Marx (1971) as cited in Amissah and Sam-Tagoe (2002) define learning as comparatively permanent change in behaviour which is the role of preceding behaviour or experience. Belonging to the cognitivist doctrine, Wittock (1977) as cited in Amissah and Sam-Tagoe (2002) describes learning as a process of attaining a relatively permanent information, ability and skill through experience. From both behaviourist and cognitivist tradition, learning is a permanent change in behaviour; and it is gained through experiences. Thus, prior learning experience is essential in acquiring the new experience (permanent change in behaviour). Learning is an experience acquired through adjustment. It is regarded as an active process but not a passive observation (Kundu & Tutoo, 2004). This implies that, for the learners to grasp the learning experiences, they must be actively involved in the teaching and learning activities, and TLMs are very useful.

Teaching and learning materials (TLMs) are essential part of many learning experiences. Educational research in Ghana and across Sub-Sahara Africa indicates that TLMs are important part of a productive learning environment, and the use of these materials help students to learn better (T-TEL Professional Development Programme, 2016). Teaching and learning materials are aids used by teachers in facilitating lessons effectively. These materials are also used by learners to learn effectively. TLMs can be big or small; and can be purchased or made easily by both the facilitator and learners (Donald, Sonnile & Nkosha, 2000). All materials and resources used for imparting the desired knowledge, skills, attitudes and values in learners are considered as teaching and learning materials (Simsek, 2003). Teaching and learning resources assist teachers to explain concepts easily to learners. When teaching a class with these resources, a few words are employed to present a given concept to learners. On the contrary, when a class is lacking these resources, the teacher strains in explaining concepts yet in vain (Omwoyo, 2003). The selection of teaching and learning materials can have great or greater impact than the impact of teacher quality on students' performance (Grover, 2009). For effective teaching and learning outcomes, TLMs should be appropriate for the intended lesson.

The three concepts; teaching, learning and teaching and learning materials are highly supported by John Dewey's Theory of Experiential Learning Cycle in the 20th century; which emphasized on acquisition and manipulation. Dewey stressed the importance of experience in education: "there is an intimate and necessary relation between the processes of actual experience and education" (Dewey, 1938). His ideas are a backlash against a passive, teacher focused approach, including traditional classroom teaching methods such as rote memorization. For Dewey, knowledge is not information transferred to students for future use, but instead knowledge is the understanding based on past and current experiences, used constantly to test previous conceptions and inform new practices (Roberts, 2003). According to Dewey, education must be conceived as a continuing reconstruction of experience, the process and goal of education is one and the same thing (Dewy, 1897). In 1946, Kurt Lewin revised Dewey's ideas and schematized it in a diagram and named it as Lewinian Learning Cycle. Based on Dewey's work, and other notable theorists such as Kurt Lewin, Jean Piaget, Carl Rogers, and William James, Experiential Learning Theory emerged (Kolb & Kolb,

2005). Kolb (1984) revised Lewinian Learning Cycle and renamed it as Experiential Learning Cycle (Arsoy & Ozad, 2014).

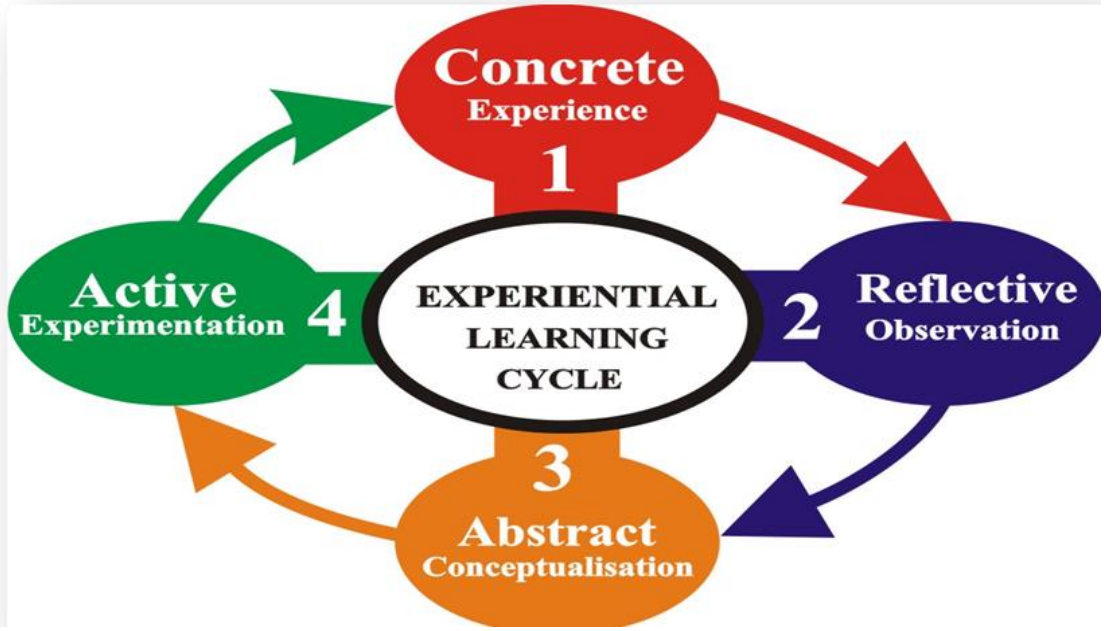

Figure 1: The Experiential Learning Cycle (Kolb, 1984)

Learning by doing is a key concept in Experiential Learning Cycle. The central tenet is that learning is the process whereby knowledge is created through the transformation of experience, and Knowledge results from a combination of grasping and transforming experience (Kolb, 1984). Experiential learning can be conceptualized as a process with several components: students have an experience (Concrete Experience), reflect on observations about that experience (Reflective Observation), analyze responses and formulate new ideas (Abstract Conceptualization), and then actively test these new ideas in new situations (Active Experimentation). For instance, in teaching texture as an element of design, students should be given opportunity to touch and feel various surfaces (Concrete Experience), observe critically surfaces and reflect on the experiences (Reflective Observation), analyse surfaces to understand why certain surfaces are rough or smooth (Abstract Conceptualization) and finally create variety of textures on surfaces (Active Experimentation). This process is a continual cycle, with increasing complexity (Kolb & Kolb, 2005). Kolb suggests that previous experiences, hereditary characteristics, and current environment together drive development of a preferred way of grasping and processing experiences. The combination of these preferred methods contributes to specific learning styles, such as initiating, experiencing, imagining, reflecting, analyzing, thinking, deciding, acting and balancing.

In summary, experiential learning is a teaching technique where learners are educated through interaction with concrete materials to gain first-hand experience. The desired skills knowledge, experience and attitude are acquired by manipulations and interactions with

teaching and learning materials. The experiential learning cycle stems on three key components: concrete experience, reflective observation, abstract conceptualization and active experimentation. If appropriate TLMs are designed and used effectively in lessons, pupils would be able to concretize learning, reflect on what they observe, conceptualize them and carry out experiment to verify their understanding.

METHODOLOGY

The research design used in this study is qualitative, and the main research method employed in conducting the study is action research. This approach is appropriate because the study is concerned with phenomenon relating to quality or kind but not quantity. Thus, the study focused on the nature of TLMs used by student-teachers during teaching practice. This kind of research seeks to generate knowledge, suggest and implement change, and improve practice and performance (Stringer, 2000). The study seeks to identify abnormalities in teacher education and suggest measures to normalize the situation. The target population for the study was 360 student-teachers which constituted the entire student population of St. Ambrose College of Education, Dormaa-Akwamu in the Bono Region of Ghana. The accessible population for the study was 30 final year student-teachers on practicum in teaching. Purposive sampling was used to reach these 30 student-teachers.

Participant observation and one-on-one interview were employed as data collection instruments in this study because they are envisaged to furnish the researchers with accurate and reliable data to gain deep understanding of the problem. The thirty student-teachers on internship programme were observed closely during lessons in order to ascertain if their TLMs were appropriate, suitable, attractive, interactive, durable and effective in their lessons. In-depth (personal) interview was conducted to gain deep understanding of the problem. The focus of the interview was to find out challenges/difficulties that student-teachers encounters in designing and utilization of their own TLMs, so as to device appropriate interventions to address them. In order to obtain authentic data, salient questions were repeated in both observation and interview guides.

The qualitative data obtained was analyzed by categorizing TLMs used by the student-teachers and classifying their views on the nature of TLMs used. The observations and interviews results were presented in tabular and pictorial forms; and they were further described, discussed and summarized to induce conclusions.

FINDINGS/DISCUSSIONS

Participant observation done to find out the nature of TLMs used by the student-teachers revealed that all the 30 student teachers knew the essence and the need to use TLMs in lessons; however, they all lacked the knowledge and skills in TLMs design and utilization. As a result, 50% of them used inappropriate TLMs in their lessons, 13% used appropriate but monotonous TLMs, whiles the remaining 37% used chalkboard illustration as shown in Table 1.

Table 1: The Nature of TLMs use by Student-Teachers

TLMs Used by the Student-teachers	Number of Respondents	Percentages
Use of chalkboard illustration	11	37
Inappropriate TLMs	15	50
Appropriate but monotony of materials	4	13
Totals	30	100

Again, the 37% of student-teachers who resorted to chalkboard illustrations may not give a clear picture of what is being taught. Since student-teachers lack skills in designing and using concrete TLMs, they usually misuse chalkboard illustrations as shown in Figure 2.

Figure 2: Student-Teachers using Chalkboard Illustrations

From Figure 2, student-teachers are using chalkboard illustrations to teach basic one pupils' addition and subtraction of numbers; instead of using concrete materials such as bottle tops, pebbles, seeds, fruits, sticks and any other suitable materials. According to Karaka (2007) concrete materials enhance understanding of basic concepts no matter how the teacher plans. This is because the one who must learn is the learner, not the teacher. The use of only the chalkboard illustration may not result in effective teaching and learning.

Again, it was observed that most TLMs used by the student-teachers were inappropriate. The materials used in lessons are most effective when they are at the appropriate level and relate closely to the topics of instruction. Low-cost materials should be prioritized in order to ensure that all students have access to relevant materials (Hewlett Foundation, 2014; McEwan, 2013). The Figure 3 shows some inappropriate TLMs used by the student tecahers.

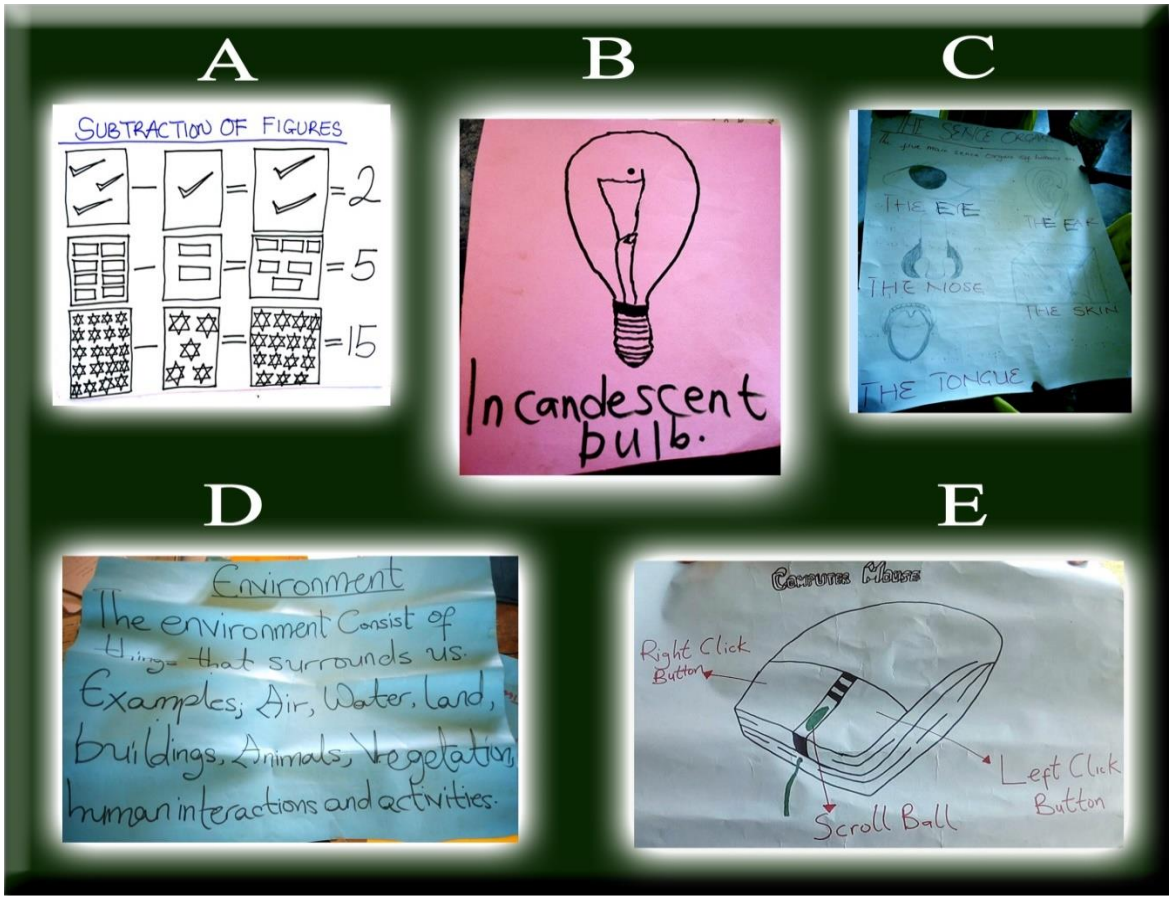

Figure 3: Some Inappropriate TLMs used by Student-Teachers

From figure 3, all the five materials are inappropriate and unattractive, and cannot attract and sustain learner's interest. Material (A) is inappropriate because in teaching basic addition and subtractions, concrete materials such as counters made of bottle tops are required to enable pupils add and subtract numbers practically. Besides, in material (A) 8 - 2 = 6, not 5; and this error could have been avoided if concretes materials were used to help learners count and subtract on their own. In addition, material (B) is inappropriate because the student-teacher could have used real incandescent bulb for learners to observe, touch, feel and facilitate their understanding. Again, material (C) displayed lack of drawing and writing skills, rendering the sense organs different things, which do not show the clear picture of what is being taught. The student-teacher could have used sense organs on pupil's body as her TLM. Furthermore, material (D) is considered inappropriate because in teaching the 'environment' as a topic,

object found in the environment could be used as TLMs. The object listed on the cardboard could have been written on the chalkboard. Finally, material (E) is inappropriate because there was a mouse in the school, which could have been used by the student-teacher to enable the pupils to physically identify and click the mouse button. Based on these five reasons, it could be deduced that student-teachers lack knowledge and skills on TLMs design and utilization.

Also, the personal observation, as indicated in Table 1, revealed that, only four student-teachers representing 13% of the respondents who used concrete and appropriate materials did not vary their materials in lessons.

Figure 4: Appropriate but Monotony of Materials used by Student-Teachers

The use of only one material for instructions results in boredom and monotony of lessons. Oppong et-al, (2009) assert that, for a teacher to enhance the quality and effectiveness of teaching and learning, he is bound to use a variety of instructional materials. The selection, utilization and evaluation of learning materials are very crucial, as "they are not ending in themselves but means to an end". There are countless materials available that student-teachers could have acquired freely from the environment and used as counters. To make the TLMs attractive, object such as pebbles, wood and canes can be painted and used as counters. Surprisingly, the only 13% of the student-teachers who used appropriate TLMs, resorted to monotony of materials. The main materials employed by the student-teachers to teach addition/subtraction were dry seeds and beer bottle tops; which were not new to attract pupils' interest (Figure 4).

However, the materials were appropriate but the student-teachers did not use variety of seeds and bottle tops to make them new and attractive to the pupils. It was observed that all the 50% inappropriate TLMs used by the student-teachers were also not interactive. Their TLMs were mostly flat or two-dimensional objects, which pupils cannot manipulate and interact with them. Pupils should be given the opportunity to manipulate teaching and learning materials for a better understanding of the topic. It is believed that, students are able to retain only 10% of what they hear, 40% of what they see but 90% of what they do. It is therefore imperative on the part of the teachers to use as many relevant instructional materials as possible to facilitate the retention (Oppong et-al, 2009).

Moreover, the interview granted revealed that all the 30 student-teachers (representing 100%), who were interacted with, knew the essence of TLMs in teaching and learning, and hence the need to use them in lessons. Table 2 describes how student-teachers acquire their TLMs for their lessons.

Table 2: Do student-teachers design their own TLMs?

Responses	**Number of Respondents**	**Percentages**
I make my own TLMs	8	27
Friends help me to make TLMs	7	23
I use chalkboard illustration	10	33
I use TLMs procured by the school	5	17
Totals	30	100

From table 2, 27% of respondents make their own TLMs. Twenty three percent of the respondents revealed that, their friends sometimes assist them to make their TLMs. The fifty percent of respondents, thus (27% + 23%) who strived to make their own TLMs, eventually produced inappropriate materials. The 33% who resorted to chalkboard illustration used it wrongly. Seventeen percent of student-teachers utilized TLMs purchased by their schools, which were not manipulative and interactive to aid learners' participation during lessons as shown in figure 4.

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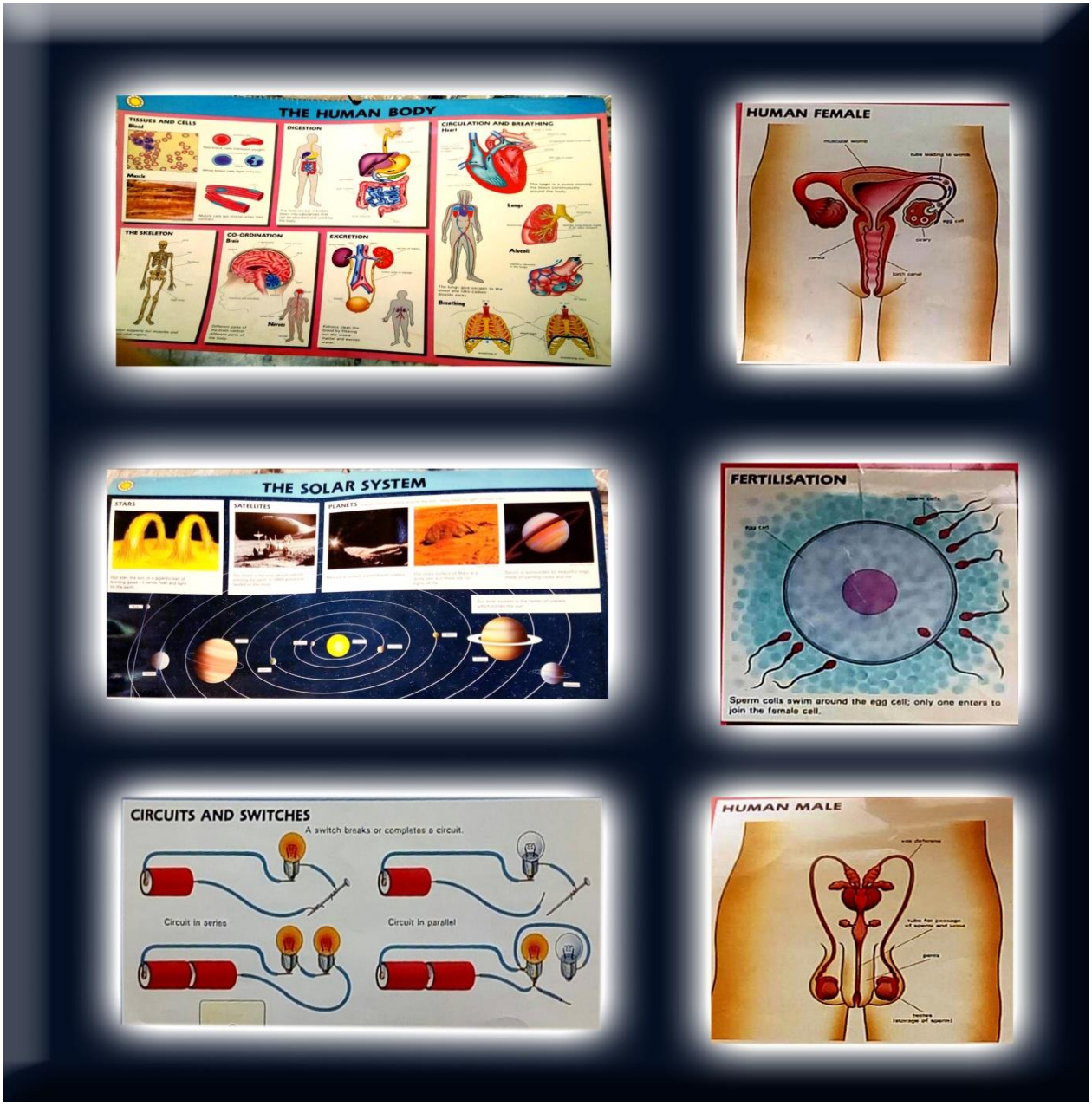

Figure 5: Some TLMs Procured by Schools and used by Student-Teachers

From figure 5, though the TLMs procured by the schools are colourful and attractive, yet pupils cannot manipulate them to promote interaction and participation. Using the 'circuits and switches' in the bottom left of Figure 5 as an example, the student-teacher could have acquired dry cells, copper wire, and bulb easily to enable pupils to practically carry out the activity. Again, if student-teachers are able to design and produce their own TLMs, it would help to personalize teaching and learning. Teacher-made materials add personal touch to teaching that students appreciate (Block, 1991). In conclusion, the Table 2 and Figure 5 confirm that, all the student-teachers interrogated lacked requisite knowledge and skills of TLMs selection, design and utilization.

Table 3: Challenges / Difficulties Student-Teachers Face in Designing TLMs

Challenges / Difficulties	Number of Respondents	Percentages
Finance	12	40
Lack of Skills	15	50
Time Constraint	3	10
Totals	30	100

From table 3, the major challenges/difficulties that student-teachers face in making their own TLMs include: lack of finance, lack of skills in TLMs design and time constraints. The student-teachers' lamentations on these challenges are described as follows:

- **Finance:** Forty percent of the student-teachers interviewed lamented on lack of money to buy tools and materials for design and production of TLMs.
- **Lack of skills in TLM design and production (drawing and lettering skills):** Fifty percent of student-teachers interviewed bemoaned of the difficulties that they face in drawing and lettering, in making their own materials.
- **Time Constraint:** Only 10% of the respondents were of the view that, making their own TLMs is time consuming, as they have to prepare lesson notes and mark class exercises. It can be deduced that, because student-teachers lack basic skills in TLM design and production, they spend a lot of time in producing their own materials.

Table 4: Specific Skills that Student-Teachers Lack in Making TLMs

Lack of Skills	Number of Respondents	Percentages
Drawing Skills	24	80
Lettering Skills	6	20
Totals	30	100

From Table 4, 80% of student-teachers interviewed bemoaned of the difficulties they encounter when drawing objects or illustrations for their TLMs. The remaining 20% complained that they found it difficult to write words boldly on the cardboard for pupils to see and read clearly from afar. It is believed that, student-teachers have limited the skills in TLMs design and production to only drawing and lettering because their TLMs were mainly made of cardboard. Thus, they usually draw and write something on the cardboard and used as TLMs. It could be inferred that, because student-teachers lack basic drawing and writing skills, they spend a lot of time in making their own TLMs. Based on this, it can be deduced that if student-teachers are equipped with requisite knowledge and skills on TLMs design and production, it would help to reduce time that student-teachers spend on making their own materials.

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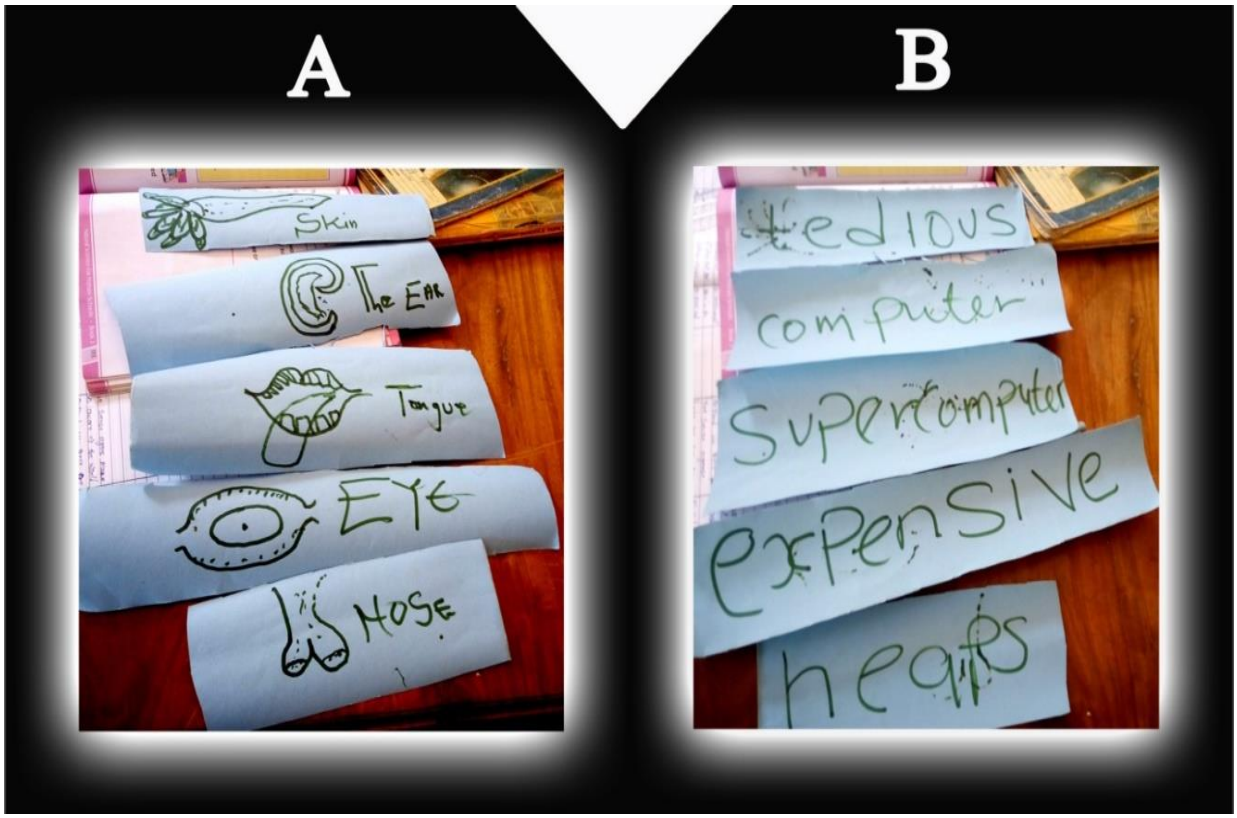

Figure 6: TLMs Showing Lack of Drawing and Lettering Skills

From Figure 6, the material (A) demonstrates lack of drawing skills on the part of student-teachers. The organs were poorly drawn, and they misrepresented what the student-teacher intended to portray. Consequently, pupils may not be able to identify the organs, and this will affect their understanding. Again, material (B) reveals the lack of lettering skills of student-teachers. Both materials are inappropriate and unattractive.

All the 30 student-teachers interviewed asserted that, in many cases, their TLMs were not appropriate and effective for the intended lessons, but they have no option than to use them; since the college assessment criterion requires that student-teachers must use TLMs in every lesson.

Table 6: Common Faults Found on Student-Teachers' TLMs

Faults (Inappropriateness)	Number of Respondents	Percentages
Poor drawing / illegible text	9	30
Difficulty in hanging/posting	8	27
Materials are not durable / flexible	7	23
Unattractive materials	6	20
Totals	30	100

From Table 6, all the thirty student-teachers interviewed identified faults on their materials: rendering their TLMs inappropriate and ineffective for the intended lessons. The following were some of the common faults enumerated.

i. **The TLMs have poor drawing and lettering:** Thirty percent of the respondents agreed that sometimes their TLMs are not effective for the intended lessons because of poor drawing and labeling. This is because of the loss of details in illustrations and illegible text.

ii. **Difficulty in posting or hanging the materials:** Twenty seven percent of TLMs produced by the student-teachers on practicum do not have handles, and hence cannot be hanged or posted on the wall. They usually hold the materials while teaching or they call pupils to hold them in front of the class. In some cases, masking tape is used to fix the material on the chalkboard; and occasionally, the materials fall whiles teaching is ongoing.

iii. **The materials are not durable and flexible:** Twenty three percent of the respondents lamented on durability and flexibility of the material used for making the TLMs. Cardboards, which are mainly used for their TLMs, are easily torn upon manipulations.

iv. **Unattractive materials:** Twenty percent of the respondents indicated that their TLMs were not new to the learners, and therefore they are not attractive enough to attract and sustain pupils' interests**.** This is because the pupils are used to the materials**.** The most common materials for the student-teachers are posters made of cardboards, and counters made of seed and bottle tops for teaching addition and subtraction.

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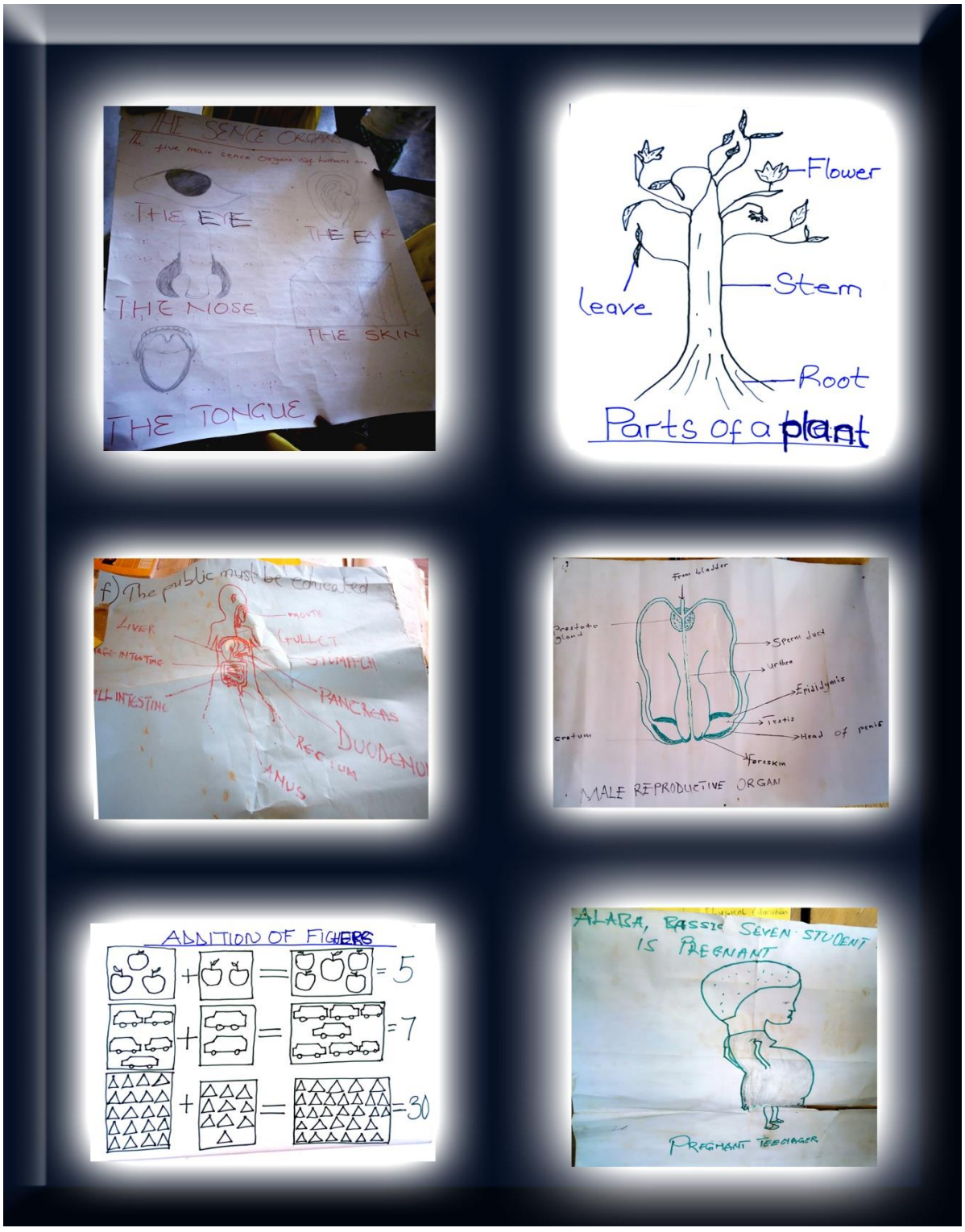

Figure 7: Student-Teachers' TLMs Showing Common Faults

From Figure 7, all the TLMs demonstrate the four main characteristics of faulty TLMs as enumerated by student-teachers. All the four TLMs are difficult to hang or post on the wall; they are not durable and flexible; they show lack of drawing and lettering skills; and finally, they are not attractive. As a result, they are not appropriate TLMs, and when used in lessons the intended lesson outcome may not be achieved.

Implication to Research and Practice

Deficiency and inefficiency on the part of student-teachers in using TLMs may have unintended consequences on the learners. Though the student-teachers might have good intentions of imparting knowledge to the learners but because they lack skills in design and use of TLMs, they turn to be unproductive in the classroom. The current curriculum that prepares basic school teachers in Ghana does not instill the requisite knowledge and skills on TLMs design and utilization unto student-teachers; and for that matter both college tutors and student-teachers cannot be blamed for this anomaly. Student-teachers know the benefits of using TLMs in lessons but they are faced with difficulties when designing and using TLMs. The lack of requisite knowledge and skills in making and using TLMs demotivate student-teachers to make and use appropriate TLMs. As a result, student-teachers wrongly employ chalkboard illustration in place of concrete materials because they are handicapped in making and using TLMs. In the absence of appropriate TLMs, lessons turn to be uninteresting, non-interactive, boredom and unproductive. The TLMs used by the student-teachers have common faults: they are difficult to handle, post or hang on the wall; they are not durable and flexible; they show poor drawing and lettering; and finally, they are not attractive. These characteristics make their TLMs inappropriate and ineffective for lessons.

CONCLUSIONS AND RECOMMENDATIONS

Student-teachers in the study college cannot design and use appropriate TLMs for their lessons, as they lack the requisite knowledge and skills in TLMs design and utilization. Consequently, they do not use appropriate and suitable TLMs in lessons, and this can result in uninspiring, uninteresting, boredom and not interactive lessons. This anomaly may due to the fact that curriculum that prepares teachers in Ghana does not equip student-teachers the needed skills for making and using TLMs appropriately. The study therefore makes the following recommendations:

1. Skills development in TLMs selection, design and utilization should be integrated into National Teacher Education Curriculum in Ghana. National Council for Tertiary Education and other appropriate authorities should consider this issue.
2. Visual Art should be considered as core or general course in National Teacher Education Curriculum in Ghana, so that trainees would have enough contact hours to learn the desired learning experiences.
3. Conscious efforts should be made by the tutors in the colleges of education in Ghana so as to instill in the student-teachers the skills in making and using TLMs, in spite of the limited contact hours.
4. Finally, student-teachers should be encouraged and supported to design and utilize appropriate TLMs to make lessons more enjoyable, very motivating and interactive.

Further Research

The findings of this study have exposed one important area or topic which could be further studied. The study revealed that student-teachers in the study college lack requisite knowledge and skills in TLMs design and utilization. Therefore, the researchers' future study would focus on training student-teachers on TLMs design, production and utilization.

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