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ASSESSMENT OF TEACHING AND LEARNING ACTIVITIES OF BASIC DESIGN AND TECHNOLOGY IN SELECTED JUNIOR HIGH SCHOOLS IN ASHANTI REGION

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ABSTRACT: *A cursory study indicated that there were challenges in the acquisition of practical skills in the Basic Design and Technology (BDT) programme offered in the Junior High Schools. No study was found to have been done regarding the actual challenges in skills acquisition in the programme. This case study therefore fills the gap and purposefully focuses on the teaching strategies employed by the BDT teachers and the learning outcomes of pupils, among other related issues. The study examines the teaching strategies of teachers, considering the limited facilities available, and how they affect pupils' acquisition of practical skills and competence. The qualitative research method was used for the study which sought to find out criteria used for the selection of BDT Options, the state of logistics for running the programme and the processes for teaching and learning. The purposive and simple random sampling techniques were used to sample 322 pupils and 13 teachers from four Junior High Schools (JHS) selected from the Ashanti Region. Using interview and observation to solicit data, the analysis revealed that due to inadequacy of human and material resources, teaching and learning of the BDT subjects were not effective. Moreover, little or no practicals were done. Thus, majority of the pupils in the study area graduate from the Junior High School with no practical skills and experience. Implications of the findings are discussed highlighting the importance of using proper teaching and learning approaches, providing qualified teachers, funds, studio/workshop facilities and teaching and learning materials for effective delivery and learning of BDT.*

KEYWORDS*: Assessment, Basic Design and Technology, Junior High Schools, effective teaching.*

INTRODUCTION

The Basic Design and Technology (BDT) programme was introduced into the Junior High School (JHS) curriculum in September 2007. It is one of the elective subjects taught at the Junior High School level all over Ghana. BDT as it is called today existed in different forms over decades. However, the focus still remains the same thus, training individuals to acquire practical competence before leaving JHS. This means that, basic education has been designed to expose individuals to a wide variety of ideas and skills and instils attitudes that will help them cope

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creatively with their environment and stimulate them to be an asset to their country (CRDD, September 2007). However, a cursory study indicated that there were challenges in the acquisition of practical skills in the BDT programme. No study was found to have been done regarding the actual challenges in skills acquisition in the programme. This gap therefore necessitated a study of this nature which involved an assessment of the programme's teaching and learning, among others. The study therefore examined the teaching strategies of teachers, considering the limited facilities available, and how they affect pupils' acquisition of practical skills and competence. The others were pupils' choice of BDT choices and logistics for the programme.

Basic Design and Technology adopts the design principles and processes in Pre-Technical Skills and Pre-Vocational Skills and teaches the application of these principles and processes in various aspects of the three vocational options: Pre-Technical Skills, Home Economics and Visual Arts.The subject was purposely introduced to train pupils at the JHS level to equip them with basic entrepreneurial skills before they enter the Senior High Schools in the country. This training was also intended to equip individuals who may drop out from school with skills that will help them to be self-employed. Again, it is to help individuals who may have the opportunity to enter the Senior High, Technical and Vocational schools in the country to become acquainted with the related courses offered in these schools (CRDD, 2007).

A report by the Ministry of Education (2002) on Pre-Tertiary Education Review stated that the courses in our education set-up should be arranged so that there will be a connection from Primary to JHS level and from JHS level to SHS and Technical Institute levels. This shows that pupils in the Basic Schools after studying the BDT are to be introduced to more advanced Technical and Vocational Skills at the Senior Secondary School Level. The idea is that a new breed of problem solvers with good thinking skills would be trained in Ghana within the JHS curriculum.

According to the organization and structure of the BDT syllabus, each pupil is expected to indicate his/her option of interest before the end of the second term of JHS1 after having gone through almost two terms of instruction in the core principles and skills of the three optional areas (CRDD, 2007). This implies that schools are required to offer all three BDT options in order to give the pupils the opportunity to choose their preferred option. However, cursory observations make it evidently clear that some Junior High Schools do not have the resources required to handle all the subjects. Teaching the core skills aspects of the syllabus also becomes challenging for schools which offer only one option and have only one teacher handling BDT. Huze (2011) stated that the manipulations of the new BDT programme over decades may be hindering the effectiveness of teaching and learning of the BDT courses in both the Private and the Public Junior High Schools. Tawiah (2006) has reported that one significant observation about the JHS is that about 60% of pupils who fail to gain admission into SHS have limited alternative avenues for further development and progression in the Technical /Vocational

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Education and other Training Institutions. Therefore it is expedient to find out how the BDT programme was being organized in the Junior High Schools in the Ashanti Region to determine the actual short-comings in selecting and running the options and assess how the schools were handling the teaching and learning processes of the BDT subjects.

The BDT subject is made up of two parts: the Core Skills and Options for pupils to choose from based on their interests and the facilities available to them in their schools. Pupils study the Core Skills which are put together in a compulsory course comprising the components of Basic Life Skills, Graphic Communication, Drawing, Designing, Problem Identification and Solution, and Entrepreneurial Skills for the 1st and 2nd terms of Year 1. During the 3rd term of year 1, pupils choose any one of the three Options and pursue it throughout their JHS education. Home Economics is Option 1, Pre-Technical Skills is Option 2 and Visual Arts is Option 3. Home Economics (Option 1), comprises Tools and Equipment, Health and Hygiene, Food and Nutrition, Fabrics for sewing, Food Preparation, Processes in sewing, Food Commodities, Garment Construction, Meal and Menu Planning and Cloth Maintenance. Pre-Technical Skills (Option 2) also comprises Metalwork, Brickwork, Basic Electrical and Electronic Circuits and Technical Drawing. Visual Arts (Option 3), comprises Visual Communication, Weaving and Stitching, Modelling, Casting and Carving, Construction and Assemblage and Fabric and Leather Decoration (CRDD, 2007).

During the final year examination, also known as Basic Education Certificate Examination (BECE), the BDT subjects are organized in two folds: Paper One is a theory with 30 marks whiles Paper Two is a practical with 70 marks. The Core Skills aspect of the BDT covers 15 marks, whereas 15 marks are also awarded for the other 3 options for Paper One. Paper 2 is presented in two sections: sections “A” and “B” and is awarded a total of 70 marks. Section A is the compulsory Core Skills for 20 marks whereas section B focuses on the BDT option: Visual Arts, Home Economics or Pre-technical Skills for 50 marks. Pupils are required to pass all papers.

Teachers who handle BDT subjects are expected to ensure that the critical thinking and problem solving skills have been captured in the teaching syllabus for BDT in the Junior High Schools. In other words, teachers are to make sure that whatever they teach from the syllabus is geared towards the achievement of critical thinking and problem solving skills. The BDT Curriculum has therefore been broken down into syllabus for the various classes in the Junior High schools. It is expected that the teachers in JHS develop their schemes of work from this syllabus.

METHODOLOGY

The target population for this study were the pupils and teachers of the Junior High Schools in the Kumasi Metropolis of Ashanti Region. However, this number was obviously unreachable and therefore required the use of a sample that would be representative of the population. Four

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schools were selected for the study. Data were then collected from pupils and teachers of the four schools to represent an exact picture of how BDT is being organised in schools.

Profile of the Selected Schools

The profile of the schools was basically centered on the JHS sections. The profile deals with the population of pupils and teachers, number of streams/classes, average number of pupils per class and BDT courses offered. The schools were coded as A, B, C and D. Schools with codes A and D are private schools while B and D are public schools.

School A (Private)

The JHS section is located separately from the primary and preschool sections. The school is enclosed with a secured fence wall and has no laboratories or studios for BDT. The JHS has three streams for each of the three year groups and a class size of an average of 45 in JHS 3, 50 in JHS 2, and 55 in JHS 1. The school offers all the three BDT options namely Home Economics, Visual Arts and Pre-Technical Skills. There are 21 teachers of which five teach BDT.

School B (Public)

School B was named after the community in which it is located. The JHS has a population of about 1,050 students. The school operates ten streams of classes for each level with a class size ranging from 35 to 40 pupils from JHS 1 to JHS 3. It has a secured fence wall and a serene environment decorated with flowers providing a beautiful landscape. The school offers all the three BDT options. The JHS section has 50 teaching staff of which 17 are BDT teachers.

School C (Public)

School C has a population of 500 pupils in the JHS section. The school offers all the three BDT options. It has five classes at each level with an average of 45 pupils in JHS 1, 2 and 3. The school is not fenced. It was named after the community in which it is located. There are 30 teachers in the JHS department of which five handle BDT. There is only one teacher handling BDT Visual Arts in the JHS.

School D (Private)

School D has a population of 74 pupils in the JHS section. The school has a secured fence wall and a serene environment. Unlike the other schools mentioned earlier, School D has a smaller compound and a lesser population. The JHS section has three classrooms. There are 19 pupils in JHS 1, 24 pupils in JHS 2 and 30 pupils in JHS 3. The school offers just one BDT option, Home Economics to be specific. There are 7 teachers who constitute the teaching staff in the JHS section. There is only one teacher handling the BDT programme in the school.

The simple random sampling technique was used to select 13 teachers and 322 pupils in JHS 2 and JHS 3 from the four schools as respondents to self-administered questionnaires. The simple random sampling technique ensured that all the pupils in the chosen class levels of the selected

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schools had equal chances of being selected for in-depth study. The sampling technique was also purposive because only teachers and pupils in the BDT programme were selected.
The research adopted a case study approach and the case being studied comprised the challenges in the teaching of practical skills in the BDT programme in the JHSs. This was aimed at finding out quality of the programme being run in the selected schools and to discuss how the programme has been organized. In this study, qualitative descriptive research method was employed. This research type allowed for better understanding through first-hand experience, truthful reporting, and quotations of actual conversations on the state of BDT programme. The study identified and described disparities among the three BDT options offered in the selected schools. The study also sought to find out criteria used for the selection of BDT options, the state of logistics for running the programme and the processes for teaching and learning.

RESULTS AND DISCUSSION

Selection of BDT Options

As illustrated in Table 1, the fieldwork revealed that 11.8% of the total pupils responded that the BDT options they were studying were selected for them by their parents and teachers, whiles 5.3% responded that they were assisted by their friends. Besides, 53.4% constituting the majority responded that they (the respondents), their parents and teachers chose the options. In addition, 24.5% answered that they chose the options themselves without any assistance whiles 5% representing the minority stated that their school offers just one BDT option.This is an indication that they had no other choice than what the school offers as noted earlier.

On the part of the teachers participating in the selection of BDT options for the pupils, 69.2% of the teachers responded that they did not participate in selecting options for their pupils, whiles 30.8% of them responded that they participate in selecting options for the pupils.Again, 61.5% of the teachers responded that they invited the parents to also participate in the option selection whiles 38.5% claimed that they did not invite parents to participate. It is evident here that deciding on which option pupils desire or require in choosing and studying, is greatly dependent on the pupils themselves.

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Table 1: Selection of BDT Options according to pupils

Selection of Options	Frequency	Percentage
My teachers and parents	38	11.8
My friends	17	5.3
Myself, teachers and parents	172	53.4
Myself	79	24.5
My school offers only 1 option	16	5
TOTAL	**322**	**100%**

Source: Field Survey, 2014

It was further revealed that 30.8% of the teachers' responses indicated that they do not take pupils through orientation exercises, whiles 69.2% mentioned they had orientations before their pupils made their selection into the various BDT options.Teachers considered the core skills aspects of the BDT for orientation since they introduce the pupils to all the three BDT areas for a period of 2 or 3 terms before they select their actual options. Based on this premise, some of the teachers see no need to organize a special orientation for the pupils at the onset.

Table 2 shows a significant percentage of pupils who were not satisfied with their choice of BDT options and wanted to change. Majority of 65.8% of the respondents reported that they wanted to change options. Pupils who did not want to change options were 34.2% of the total. Further studies on why pupils were not satisfied with their options and wanted to change revealed majority of the pupils claiming it was because they do not do practical works in their chosen option reducing the subject to only theory. Interview responses from teachers revealed that majority of the teachers do not allow pupils to change options once they have been selected. However, a few of the teachers claimed they allow pupils to change options. This problem could be attributed to the issue of improper orientation exercises as discussed above.

Table 2: Request to Change Options.

Variables	Frequency	Percentage
Request for change	▪ 212	65.8
No request for change	▪ 110	34.2

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Logistics

The fieldwork revealed fairly lack of logistics in almost all the selected schools. Lack of logistics was measured by the essential facilities and funding including art studio, workshop for pre-technical skills, laboratory for home economics and funding for practical works. A significant majority of the pupils indicated that they do not have studios/workshops in their schools. Majority of the teachers also reported they had no studio/workshops in their schools. It was evident that studio/workshop facilities were least available in the Junior High schools. Out of the four schools enrolled in the study, only one public school had a working studio/workshop. However, none of the private schools selected had any studio/workshop facilities.

From Table 3, the study revealed that in the absence of studio/workshops, majority of the pupils 35.1% use their classrooms for practicals, 9.3% of the pupils claimed they work under trees and 12.7% of the pupils said they do their practical work in the open on the school compound. This shows that both teachers and pupils obviously do not have comfortable places for BDT practicals, hence, the possibility of experiencing adverse effects on practical works.

Table 3: Place for Practical Work

Variable	Frequency	Percentages
Place for BDT Practicals		
Classroom	133	35.1
Under trees	30	9.3
School compound	25	12.7
Studio/Workshop/Lab	138	42.9
TOTAL	**322**	**100%**

Source: Field Survey, 2014

The study discloses that apart from the issues of studios and workshops, funding was also a challenge for many teachers in the schools studied. Inquiring on how pupils get their learning materials, majority (47.2%) responded that the school, together with their parents, provide the learning materials for them. Explaining further, 27.3% asserts that the school provides all the books whilst 25.5% divulged that their parents had to provide all the learning materials for them. For the teachers, 53.8% indicated that their schools provide funds for the BDT programme, whilst 46.2% declare that they receive no funds for practicals so, the teacher contributes his own money whilst the pupils offer class contributions to purchase materials for practicals. This implies that quite a large number of teachers may find it difficult to teach the BDT practicals. On the part of teacher respondents, 61.5% indicated that they do not have adequate Teaching and Learning Materials (TLMs) or textbooks for BDT, whilst the remaining 38.5% who were the minority indicated that they had enough TLMs. Similarly 51.5% of the pupils said there were adequate textbooks on BDT while 48.5% being the minority said there were no adequate

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textbooks (Table 4). Interviews with teachers revealed that the common TLMs available to them were lesson notebooks and chalk. Some teachers claimed they did not even have teachers' handbook for BDT. Some teachers also claimed they were in possession of some books they purchased personally from bookshops.

Table 4: Adequate Teaching &Learning Materials

Variable	Frequency	Percentages
Teachers' response		
Yes	5	38.5
No	8	61.5
Pupils' response		
Yes	166	51.5
No	156	48.5

Source: Field Survey, 2014

Observations revealed that in the public schools, there were government approved BDT textbooks stocked in the library. Pupils were however not allowed to use them simply because, according to their teachers, they destroy or misplace them. The private schools had none of these textbooks. Teachers and Pupils on the other hand had their personal copies of BDT textbooks bearing names like *"Apor series""Shake Shake series", "Akiola series", "BDT for JHS", "Gateway"* and *"Victory BDT"*. In an interview, teacher respondents commented that some of the textbooks circulating in the system were not good enough for BDT. One Visual art teacher described some of the textbooks as "scanty" and that they contained more definitions than explanations. He further defended his claim saying that pupils at that level needed more explanation and demonstrations and not just definitions to memorize.

Teaching and Learning Processes

The study examined the qualifications of BDT teachers to determine whether they merit the subjects they were teaching. Data gathered from the teachers showed that7.7% had master's degree, 15.4% had acquired Diploma as their qualification, 69.2% constituting the majority had attained first Degree and 7.7% also had SHS certificate. Interestingly, 15.4% of the teachers were found handling BDT subjects they were not trained for. When asked, they gave reasons that those were the only courses available at the time they were employed as teachers into the schools.

Findings also show that the number of teachers in the public schools was more than that of the private schools. While public schools have all teachers with first degree and others with master's degree, the private schools had some teachers who had diploma and Senior High School

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certificates. Creemers and Reezigt (1996) as cited in Ametordzi et al. (2012) state that a good teacher must have full command over his subject. He should have a much higher education than his learners. Among the schools studied, it was realised that the public schools had more highly qualified teachers than private schools. The presence of many teachers with higher education qualifications in the public schools studies also suggests that the pupils were receiving effective teaching taking into consideration their exposure to further education, although this may be debatable.

In addition to public school teachers having higher qualifications than those in the private schools, the study revealed that most of this category of teacher respondents have classroom teaching experience that range from three years to more than 20 years. This is an indication that the public schools had more experienced teachers than their counterparts in the private schools. When teachers lack the background knowledge and qualification in Technical and Vocational education, it is obvious they will have little or no idea of the various methods of teaching and how they apply them in classroom and studio/workshop teaching. This confirms Amissah *et al's* (2002) assertion that teaching does not depend much on the learner. Knowledge of the teacher counts very much.

The study found that all the teachers in the selected schools use the same method of teaching, but according to James (1996) as cited in Siaw (2009), technical demonstration by teachers instils in pupils the nature of the arts and helps students go beyond school learning. This method of teaching practical work as a theory lesson by teachers does not fulfill the rationale for the BDT programme which is to equip the pupil with the necessary creative skills and acquire competency (CRDD, 2007). The teachers in the sampled schools complained that the teaching periods allocated to their subjects do not allow room for them to arrange practical and studio/workshop activities.

Short and Crocker (1991) as cited in Siaw (2009) have indicated that, teachers who have control over seatwork, drills and practical exercise maximize achievement when teachers emphasize on academic instruction as their main goal. This is confirmed by Wiggins and McTighe (2005) in their contention that the more specific facts, concepts and skills are taught, the larger the ideas and processes gained.

The study discovered further that even though there were inadequate studios, workshops or laboratories for the various subjects, some of the BDT teachers organised practical lessons under trees and on the school compound for their pupils to acquire some degree of practical skills. This confirms Hayford's (1998) observation as cited in Siaw (2009) that Ghana has examples of teachers who have redefined their teaching roles or responsibilities with the view of making a difference.

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In observing teaching and learning processes in the sampled schools, the indicators used were learning methods, frequency of lessons and frequency of practical lessons. On the issue of the number of teaching periods per week, as many as 86.5% of the respondents indicated that they have enough contact hours per week, whereas the number of teachers who indicated that their contact hours were not enough constituted 14.5%. A majority of 53.8% used between five to eight contact hours whereas a minority of 42.2% employed between 12 to14 hours per week, depending on the number of classes/streams. Again, it was recorded that to a large extent teachers used most of the contact hours effectively with as many as 93.5% of the pupil respondents indicating that their teachers used up all the lesson periods. Though majority of the teachers confessed that they had enough contact hours they dedicated few or none of them for BDT practical.

Inquiring about regularity of practical works done, majority of the pupils responded they have practical work as and when the topic demands. Specifically, some of them do practical work only in Technical Drawing which is just an aspect of the Pre-Technical Skills whilst an insignificant number of the pupils either did practical work just once or never had any BDT practical. The reason for these is the lack of studios in some of the schools hence limiting the practical work done in most of the schools.

Majority of the teachers indicated that they do not have practical works regularly whilst a few of them carry out practical lessons regularly. It was noted that the few respondents who said practical work was not done came from the private schools. This implies that most BDT teachers in the schools studied teach more theory and do fewer or no practical works especially those in the private schools.

On the question of whether the teachers in the selected schools are teaching subjects related to their specialised BDT areas, the responses were that majority of them constituting 84.6% of the total respondents taught in their specialised subject areas with 15.4% being minority respondents teaching different subject areas they were not specialised in. The comparison between what the teachers are currently teaching in the BDT subject areas they specialized in showed that all the teachers in the public schools were teaching in their specialised disciplines whilst 2 teachers in the private schools were teaching in different subjects areas where they have not been trained in. The implication is that the public school teachers are more likely to teach effectively since they have specialised skills and knowledge in the subjects they are currently teaching.

Generally, pupils who appreciated their teachers' teaching techniques gave reasons that the teachers were regular in class.They made the lessons interesting with good sense of humour and gave more notes and explanations to the notes. Those who responded in the negative explained that the lessons were full of talks without demonstrations. They lamented that teachers did not give enough practical works which BDTgenerally requires.

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Observations revealed that majority of the teachers prepare before going to teach. They had high confidence levels and good attitude towards teaching. This suggests that majority of the teachers in the schools studied are likely to motivate their pupils to achieve good learning outcomes as affirmed by Singh and Rana (2004) that for effective learning totake place teachers are expected to carefully plan procedures and activities that the pupils will undergo.Majority of the pupils in the study area recommended that in order to improve teaching and learning of BDT, they believe with the provision of Art studio, Pre-Tech workshops and Home Economics laboratory, teaching and learning will be effective. They were also of the view that teaching and learning would improve if they had access to BDT textbooks.

CONCLUSIONS

The BDT programme seems to be suffering so much in terms of unavailable logistics and funding for the various subject areas to enable the teachers have adequate resources to teach effectively. The lack of logistics places limitations on the practical knowledge and skills that pupils need to learn on the programme as the curriculum requires. In view of this, pupils graduate from Junior High Schools without acquiring practical competence.

Pupils in schools with a single BDT subject would be limited in skills and knowledge acquisition since they do not have subject options. This limits the motivation supposed to be gained from the programme (Kochar, 2004). Such schools in this single subject category do not benefit from what the curriculum stipulates in skills and knowledge acquisition that their pupils require. Dependence of subject choices on the pupils with effective orientation can be a good training for young learners to decide on the choice of academic disciplines in their academic career.The implication of many teachers with higher education qualifications in the public schools studied is that teachers handling BDT subjects in some of the private Junior High Schools may not be experienced enough to provide effective teaching and learning.Employment of senior high school graduate to teach in a JHS can affect the output of instructional delivery in such a school and so school authorities should make use of such personnel sparingly.

The identified problems in the study area can be resolved through adequate resourcing, infrastructure and effective teaching and learning activities in Basic Design and Technology in order to train and develop young individuals to acquire technical and vocational skills.

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