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A Methodical Evaluation of Teachers' Knowledge and Practices of Differentiation in Basic Schools in the Effutu Municipality of Ghana

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Abstract
Teachers' knowledge of differentiation and how they practice differentiation was evaluated in fifteen (15) Basic Schools of the Effutu Municipality. The study was guided by two (2) research questions and two (2) hypotheses. The study adopted the Vygotsky (1978) socio-cultural learning theory as the theoretical framework. A qualitative research method was employed as the approach and a case study as the design for the study. Relying on a primary data, a multi-stage sampling method which involved purposive sampling and simple random sampling was used to select the samples to participate in providing the data. The analyses revealed that the teachers have very high knowledge with respect to strategies of differentiation. Also, the frequency of implementation of differentiation in the subject areas was very good as only 3.3% of the selected teachers do not implement it in any of the subject areas they teach. Again, the proportion of teachers who implemented differentiation in core subjects like Mathematics, English Language and Natural Science were not significantly different from those who do not. Though, the result was generally reassuring, the study recommended that enhanced supervision, and continuous professional development training be provided, to improve the situation.

Keywords: Differentiation, Evaluation, Knowledge, Methodical, Practices.

Introduction

Differences exist in every learning situation or environment. As a result, there is always the need for these differences and diversities to be recognized when educating all learners in the same educational environment and classroom due to the possible individual differences in these classrooms. In view of the government of Ghana continues recognition of learners' diversity, introduced the concept of the Free Compulsory Universal Basic Education (FCUBE) for every school-age child to gain literacy. It was launched in 1996 but implementation started in 2005. The main policy goal of the FCUBE programme was to provide the opportunity for every school-age child in Ghana to receive quality basic education. Similarly, to further strengthen the appreciation of learner diversity, Ghana again, subscribed to the Salamanca statement in 1994 and eventually adopted the inclusive education policy in 2015 for every learner in the country. The adoption of the policy is purported to admit and educate all learners, irrespective of their needs in the general school system and support them to learn alongside their peers in the neighbourhood educational institutions. The demands of the Free Compulsory Universal Basic Education (FCUBE) policy, and the Inclusive Education Policy (2015) are in line with the Ghana Government Education Strategic Plan (2010-2020) which all sought to ensure the achievement of quality learning outcomes for all learners through appropriate curricula, organizational arrangements, appropriate strategies for teaching, resource use through partnerships with all educational stakeholders and for the improvement of the well-being of every learner. These policies accentuate educating all learners in the same educational environment and classroom regardless the diversity of needs of the learner, being it disability, family circumstances/life, ethnicity, experiences, motivation and abilities, different learning styles and emotional status. Therefore, as these exceptionalities and diversity are prevalent with most learners in every classroom, it seems to suggest that teachers owned it a responsibility to ensure that the learners succeed without those their needs being a hindrance. In line with that, Parrish (2019) noted that teachers play a crucial role when it comes to meeting the needs of all leaners in the classroom.

Parrish (2019) indicated that since teachers are aware that a one-size-fits-all teaching approach will not be the best approach in supporting the differently able learners in the classrooms, the teachers using ideas from Universal Design for Learning with all learners can make classrooms more welcoming for those learners with learning disabilities. However, as the teachers are always aware of the phenomenon, they are often unsure of how to deal with the situation. Teachers usually employ more of teacher-centered approach than the learner-centered approach and presume every learner would grasp the concept in the same way, at the same rate and at the same time and then progress to the next topic (Launder, 2011; Tomlinson, 2005; Lawrence-Brown, 2004; Santamaría & Thousand, 2004). Nonetheless, it can be contended that each learner has their own chosen unique way, appropriate time and a possible content of learning. Essentially, to meet the needs of all learners in the classroom, several research (Launder, 2011; Tomlinson, 2004; Lawrence-Brown, 2004; Santamaría & Thousand, 2004) finds 'differentiated instruction' as the preferred approach that accommodates for learners' diversity and the challenges these learners usually encounter during teaching and learning. In the opinion of Tomlinson (2004), differentiated instruction is seen as the change of teaching process based on teaching strategies that correspond to students' differences in diverse ability in the classroom, such as the student's readiness, their interests and learning style. Palmer and Maag (2010) on their part supported Tomlinson (2004) by stating that teachers recognize differentiated instruction to be useful and beneficial to both teachers and learners in the teaching and learning process. They indicated that, differentiated instruction help teachers to modify their lessons for remediation, assist learners with learning difficulties and as well challenge gifted learners. Also, Franz (2009) observed that, teachers lack of knowledge and inadequate expertise in the use of differentiated instruction usually discourages them from attempting its use as a teaching strategy. Though many teachers see differentiation to be helpful to learners, yet they often believe that its implementation in their classrooms is unfeasible (Tomlinson, 2005). Franz (2009) opines that teachers' knowledge and understanding of the effectiveness of differentiated instruction would enable them to integrate it into their classroom instructions to meet the diverse needs of all learners. Therefore, teaching with student differences in mind allows teachers to plan varied approaches to what students need to learn, how they will learn it, and how the students can express what they have learned in order to increase the likelihood that each student will learn as much as they can as efficiently as conceivable. In the same way, Langley (2015) indicated that when teachers acquire the knowledge of differentiation, they would have a simpler time implementing it into their lessons and that will enhance students' ability to meet the requirements of the National Curriculum. As such, implementing differentiation usually encompasses modifying the content, process, product, and learning environment for each learner while considering the readiness, interest, and learning profile of each individual (Tomlinson, 2005). Tomlinson notes that teachers who adopt differentiated strategies during teaching, engage students in activities that show mastery of an educational concept in a way the students prefer, based on their learning styles. The literature that exists in differentiation include the concept of differentiation and differentiated planning, general leadership practices, and good staff development practices" (Richardson, 2007). However, there is inadequate literature on teachers' knowledge of differentiation, and how they practice differentiation in the classroom. The insight of teachers' knowledge of differentiation, and how they use differentiation, will serve as directories for educational leaders to know and be able to respond to teachers needs in the successful implementation of differentiation in schools. This study will make known teachers' knowledge and practices of differentiation practices in Basic Schools in Effutu Municipality. This would enable Headteachers, classroom teachers, resource teachers and other stakeholders of the Municipality to organize and attend the requisite professional development trainings to equip themselves with the knowledge and practices towards the implementation of differentiation for their schools. Again, the results of the study could be considered when making educational policies such as Special and Inclusive Education programmes in the Municipality at the Municipal Education Directorate. When teachers get enhanced knowledge and understanding of differentiation, it promotes a successful application of the components of differentiation in the classroom. The study only focused on evaluating teachers' knowledge and how they practice differentiation, at the fifteen (15) selected Schools in the Municipality. Therefore, the results would not be the true reflection of all schools in the Effutu Municipality. Essentially, the measure of students' achievement as a result of the implementation of differentiation were not assessed. Therefore, this study does not have evidence to support the claim that differentiation is the best strategy for enhanced students' achievement.

Methods

A qualitative case study was employed to collect information from teachers, of Public Basic Schools in the Effutu Municipality, in order to get an understanding of their perspectives as well as have a detailed account of their knowledge of differentiation and how they implement differentiation in their classrooms for learners with Special Educational Needs (SEN) in their respective schools. In the opinion of Hall, Meyer and Rose (2012), qualitative researchers carefully examine every small happening in a situation that can assist them make careful decisions and generate inductive idea about the context. Creswell and Plano Clark (2010) stated that qualitative methods provide larger knowledge claims that generates theory or pattern based on diverse meanings and experiences of individuals, social, cultural and history. Also, Creswell (2009) describes case study as an in-depth exploration of bounded process or individual system based on extensive data collection.

Participants

A multi-stage sampling of the purposive and random sampling techniques was used as the sampling techniques for the study. Sixty (60) Basic School teachers, were randomly sampled, to provide information on teachers' knowledge of differentiation and how they practice differentiation. The teachers were drawn from fifteen (15) Public Schools of the Effutu Municipality of the Central Region of Ghana which were also purposively sampled. The participants were sample from a total population of four-hundred and five (405) participants in twenty-seven (27) schools, and a targeted population of ninety (90) participants from fifteen (15) Public Primary Schools. The 60 teachers who formed the study participants were selected from the ninety (90) targeted population using some specific codes which were assigned through a combination of the school's name and the class the teacher teach. The suffix of the codes ranged from p1 to p6 for the primary, whereas the prefix was three letters chosen from the name of the school. For instance, a teacher who teaches primary 5 class in Winneba M/A was assigned a distinct code of WMAp5. From these assigned codes, a computer software called R was used to randomly select the 60 teachers to form the sample for this study.

Validity and Reliability

The reliability of the question items of the questionnaire was determined through the Cronbach's Alpha using Statistical Package for Social Sciences (SPSS) version 20. The Cronbach's Alpha reliability coefficient measures the internal consistency among question items on a Likert scale. The Cronbach's Alpha value obtained for the internal consistency of the question items of the questionnaire was 0.85. According to Atindanbilla (2013) co-efficient of reliability value above 0.7 is considered good and reliable. Since, the Cronbach's Alpha coefficient for this study is far more than 0.7, it can be deduced that the internal consistency is better and the research instrument very reliable. Moreso, a pretest involving twelve (12) Public Basic Primary School teachers in the Cape Coast Municipality was part of the means to determine how consistent the research instrument could be over time.

Materials

A close ended questionnaire was used in collecting the data. The questionnaire was adapted from Rodriguez (2012) and Whipple (2012), though originally created by Tomlinson and Allan (2000), to select items that were suitable in the contexts of this study. Although, some of the items on the original instruments were modified to suit the local context of this study, the survey items corresponded with the knowledge, awareness and extent of usage or implementation of differentiation, thus components of differentiation established by Tomlinson. The research instrument was pre-tested to determine its validity and reliability. The results of the pretest led to further modification of the instruments. Some open-ended questions which could have interfered with the analysis, were closed according to the responses received.

Procedure for Data Collection

There was a formal visit to the respondents' environment to enhance familiarization and gain their consent prior to the data collection. Creswell (2012) emphasizes the need to respect the site where the research takes place. The researcher first sought permission from the various Heads of the Schools involved in the study. After, a permission was obtained from the Municipal Director of Education, who officially informed the various head teachers and staff for their cooperation and assistance. To also ensure accurate and high response rate, respondents' confidentiality and anonymity were assured which facilitated the data collection

process. The period of the data collection took approximately two months. A period of at least 30 minutes was allowed for each respondent during the data collection. This was to obtain complete and accurate responses that will ensure smooth analysis of the data. The researcher coded and entered the data into a statistical software programme called SPSS version 20 to create a database for the analysis. "A code is a set of rules that translate answers into numbers and vice versa" (Fowler, 2009, p.146). In cases of missing or incomplete responses, the modal response was substituted to ensure complete analysis of the data. Since, the data was qualitative or made of categories, simple statistical techniques such as frequency distribution tables and graphs were used to present part of the data where appropriate. Also, non-parametric tests such the chi-square test was also performed on variables to see whether a frequency distribution between variables fit a specific pattern.

Discussion and Evaluation of Results

Results

Table 1 below shows data on strategies teachers use to implement differentiation using twelve the vital components.

Table 1: *Teachers' Knowledge on Strategies for Implementing Differentiation*

		Extent				
	Knowledge about	**Excellent**	**Good**	**Fair**	**Poor**	**Total**
1	Learning contract	24 (40.0%)	23 (38.3%)	9 (15.0%)	4 (6.7%)	60 (100%)
2	Tiered Assignment	13 (21.7%)	26 (43.3%)	17 (28.3%)	4 (6.7%)	60 (100%)
3	Independent projects/Investigate	16 (26.7%)	26 (43.3%)	15 (25.0%)	3 (5.0%)	60 (100%)
4	Independent study	21 (35.0%)	28 (46.7%)	9 (15.0%)	2 (3.3%)	60 (100%)
5	Curriculum compacting	13 (21.7%)	26 (43.3%)	17 (28.3%)	4 (6.7%)	60 (100%)
6	Interest centre / interest groups	16 (26.7%)	26 (43.3%)	15 (25.0%)	3 (5.0%)	60 (100%)
7	Learning centre / learning station	21 (35.0%)	28 (46.7%)	9 (15.0%)	2 (3.3%)	60 (100%)
8	Varied instructional materials	13 (21.7%)	26 (43.3%)	17 (28.3%)	4 (6.7%)	60 (100%)
9	Provision for learner's choice	16 (26.7%)	26 (43.3%)	15 (25.0%)	3 (5.0%)	60 (100%)
10	Flexible grouping	21 (35.0%)	28 (46.7%)	9 (15.0%)	2 (3.3%)	60 (100%)
11	Varying questions	13 (21.7%)	26 (43.3%)	17 (28.3%)	4 (6.7%)	60 (100%)
12	Pre-assessment data to differentiate learning experiences`	16 (26.7%)	26 (43.3%)	15 (25.0%)	3 (5.0%)	60 (100%)

Source: *Field data 2023*

Table 1 displays the number of teachers and the proportion they form under each of the four ratings in the knowledge of the strategies to implement differentiation in the classroom.

Primarily, **learning contract** offers an agreement between the teacher and learner where certain freedoms are put in place for designing and completing work. Twenty-four (24) teachers representing 40% of the respondents showed excellent knowledge on the implementation of learning contract. This was followed serially by Good, Fair and Poor each with 23 (38.3%), 9 (15%) and 4 (6.7%) respectively. Since, only 6.7% of the respondents indicated poor awareness of learning contract, it can be concluded that teachers have a

greater awareness of learning contract as the strategies for implementing differentiations in the selected teachers.

Tiered assignment means that teachers ensure multiple assignments are given to different learners at the same time that are related to the same concept or topic but different in complexity. This too recorded a good knowledge, consistent with that of learning contract with a maximum value of 26 representing 43.3%. This was followed by 17 (28.3%) indicating fair knowledge and 13 (21.7%) also having excellent knowledge. The least value of 4 representing 6.7% presented poor knowledge about this strategy to implement differentiation. The good score from the teachers, is an indication of they having good knowledge of tiering assignment for learners.

Independent project or investigate is considered vital in implementing differentiation. Independent project or investigate allows learners to explore their interest in a topic and to apply the skills and knowledge to the topic under consideration. It also recorded a good knowledge as the maximum and poor knowledge as the minimum. That is, forty-three percent (43.3%) attained from 26 respondents have good knowledge on independent project 16 (26.7%) have excellent knowledge, 15 (25%) have fair knowledge whilst three (3) teachers, representing five percent (5%) have poor knowledge about independent project or investigate.

For **independent study,** is long-term research to investigate. The respondents also showed better knowledge in its implementation towards differentiation. This is because, only two (2) teachers representing 3.3% of the respondents had poor knowledge about independent study.

Also, the teachers gave the impression to have good knowledge about **curriculum compacting** as there was 26 (43.3%) being the maximum to indicate good awareness. Curriculum compacting pre-tests learner before a unit and eliminate instruction in the areas of competence. The rating was followed in the order of 17 (28.3%), 13 (21.7%) and 4 (6.7%) indicating fair, excellent and poor respectively about the teachers' knowledge of curriculum compacting.

Again, the implementation of **interest centre or interest groups** was evaluated. Interest centre/group acts as a vehicle for providing learners with meaningful enrichment when required assignments are completed. There was a maximum of 26 teachers, representing (43.3%) who indicated they have a good knowledge about it, followed by 16 teachers (26.7%) with excellent rate awareness, 15 teachers (25.0%) with fair knowledge and lastly 2 (5.0%) having poor knowledge about how to implement it in differentiated instruction classroom.

Learner centre or learning station involves the collection of materials where learners explore a topic or practice a set of skills. A good number of the teachers, that is 28 (46.7%) showed good knowledge in this aspect that with only 2 (3.3%) indicating poor knowledge in its implementation in their classrooms.

Varied instructional materials involve the use of materials according to the student's readiness, interest, cultural differences or other areas of learners' diversities. The results indicated that 26 respondents, representing (43.3%) of the teachers which forms the majority are aware and implement the varied instructional materials strategy in their classrooms in a good standing. This follows by 17 respondents, representing (28.3%) of the teachers who fairly implement it. Also, in the excellent rating were, 13 respondents, thus (21.7%) of the teachers and the remaining few who poorly implement it being 4 (6.7%).

Provision for learners' choice looks at the content, process and or product in the implementation of differentiation. Sixteen (160) respondents, representing 26.7% of the teachers rated excellent in implementing this strategy in differentiation. Three (3) teachers also representing 5% rated poor idea about this differentiation strategy. Likewise, 26 teachers representing 43.3% rated a good knowledge in its implementation with the remaining 15 also of a proportion of 25% rating fair idea about implementing this strategy in their classroom.

In **Flexible grouping,** learners are put groups for instruction or completion of a specific task or assignment, based on learner's abilities, interest and or readiness. The grouping could be change as and when needed. This aspect also recorded the majority of 28 (46.7%) having good knowledge, followed by 21 (35%) with excellent idea, 9 (15%) with fair idea and the least of 2 (3.3%) having poor knowledge in implementing this strategy in their classrooms.

Varying questions involves sorting questions asked learners in a discussion or during test based on their readiness, interest and learning styles. The evaluation results in the implementation of this strategy showed that 26 (43.3%) of the teachers which forms the majority know and implement this strategy in a good standing. It was followed by teachers who can implement it fairly with a proportion of 17 (28.3%). Also,

those who implement it in an excellent manner were 13 (21.7%) and the remaining few who rated a poor implementation was 4 teachers representing (6.7%).

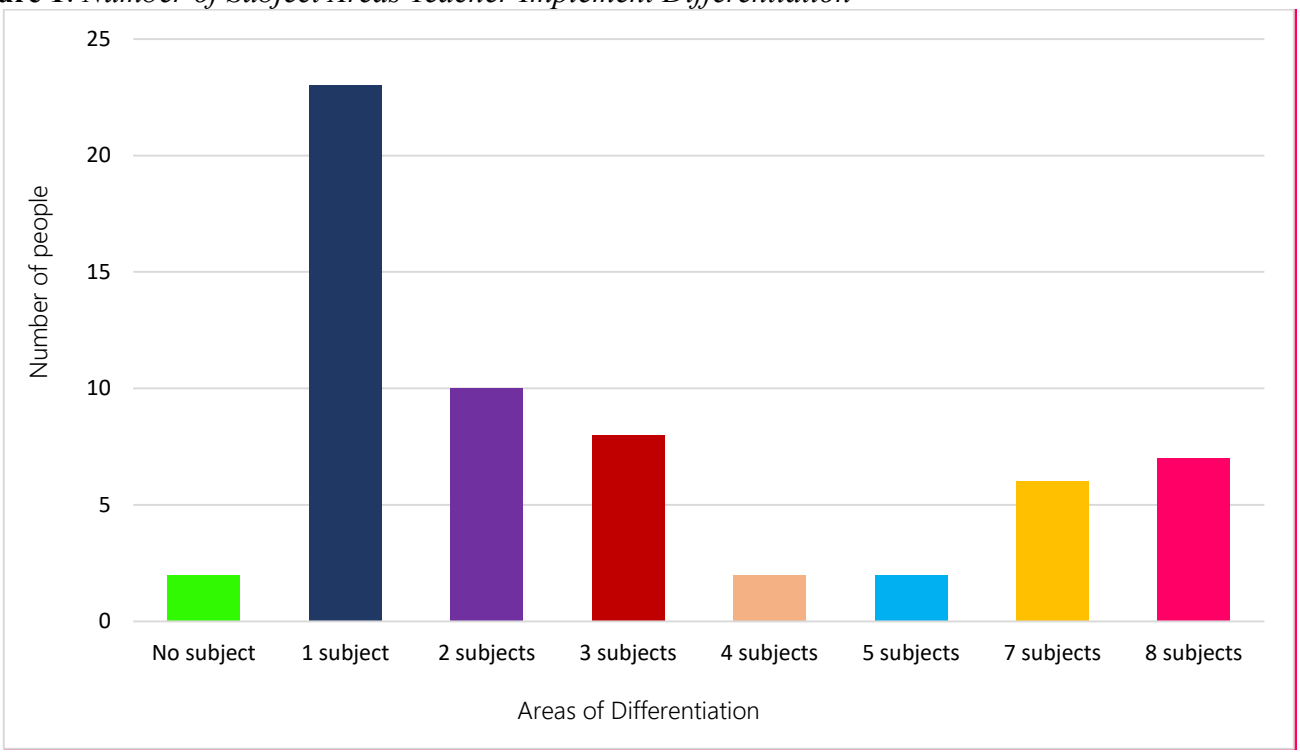
Pre-assessment data to differentiate learning experiences based on content, process and or product of differentiation. Sixteen (16) teachers representing 26.7% rated excellent in implementing this strategy, whereas 3 teachers also representing 5% rated a poor idea about the use of pre-assessment data to differentiate learning experiences. Also, 26 teachers representing 43.3% rated a good knowledge in its implementation while the remaining 15 also of a proportion of 25% rating fair idea about implementing this strategy in their classrooms.

The results obtained from the basic descriptive statistics of average and the standard deviation, showed that the proportion of teachers with poor knowledge about implement these strategies ranged from 3.3% to 6.67%. The data provided a concise information about the pattern of distribution. A maximum proportion of 6.7% of the teachers had poor knowledge each on learning contract, tiered assignment, varying questions, curriculum compacting and varied instructional materials. Also, a minimum proportion of 3.3% was observed each for independent study, learner centre or group and flexible grouping with regard to the poor knowledge of implementing those strategies of differentiation. The average proportion was 3.17% with a standard deviation of 0. 83%.

Moreover, fair knowledge ranged from 15.0% to 28.3%. The average proportion was 13.67% which varied by 3.55%. On the part of good knowledge, the range of proportion was from 38.8% to 46.7%. The average proportion was 26.25% with a standard deviation of 1.36%. In conclusion, the average proportion for teachers with excellent knowledge was 17.7% and with a standard deviation of 3.87% which ranged from 21.7% to 40.0%.

Fig 1, also displays data obtained for the frequency with which teachers implement differentiation, in eight subject areas (Mathematics, Natural Science, English, Social Studies, ICT, RME, Fante, Creative art or BDT), which were considered as universal courses at Basic School were level. The number of subject areas teachers implement differentiation was explored which ranges from zero (0) to eight (8). That is, a teacher may not implement differentiation in any of their subject area, may implement it in only some or may implement them in all the subject areas. The results of the distribution are presented in below:

Figure 1: *Number of Subject Areas Teacher Implement Differentiation*



Source: *Field data 2023*

Fig 1 above shows that out of the sixty (60) teachers, 2 (3.3%) do not implement differentiation in the subject areas they teach. Similarly, 23 (38.3%), 10 (16.7%) and 8 (13.3%) respectively implement differentiation in one (1), two (2) and three (3) subject areas. There were equal number of 2 teachers representing 3.3% each who implement differentiation in 4 and 5 subject areas. However, no teacher

implemented differentiation in 6 subject areas, there were 6 (10%) and 7 (11.7%) who implemented it in seven (7) and eight (8) subject areas respectively. The results displayed that most teachers implement differentiation in one subject area followed by two subject areas, next in three subject areas and then followed by eight subject areas. Associating 11.7 % of the teachers who implemented differentiation in all subject areas to 3.3% who did not implement it in any subject area, looks encouraging and promising if more developmental programmes are put in place for teachers, to create awareness and enhance their skills in implementing such strategies.

Nonetheless, the various subject areas were explored individually to see where teachers mostly implement differentiation. The results of the binomial responses to this assessment according to Yes or No is summarized in table below.

Table 2 describes that, aside English Language, more than half (50%) of the teachers apply differentiation in the other subject areas. It was revealed that the teachers mostly apply differentiation in BDT with a value of 44 (73.3%) and least value of 27(45.0%) in English Language.

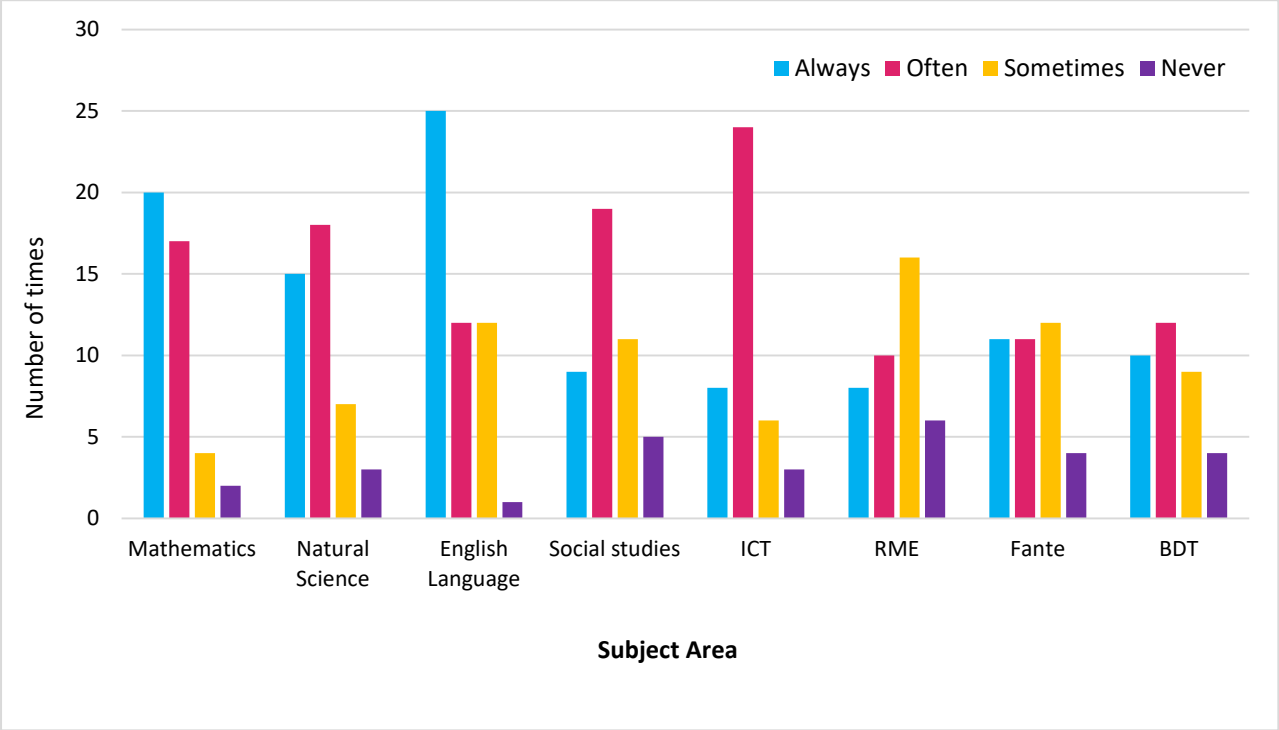
Table 2: *Subject Areas Where Teachers Apply Differentiation*

Subject	**Yes**	**No**	**Total**
Mathematics	36 (60.0%)	24 (40.0%)	60 (100%)
Natural Science	35 (58.3%)	25 (41.7%)	60 (100%)
English Language	27 (45.0%)	33 (55.0%)	60 (100%)
Creative Arts / Social studies	33 (55.0%)	27 (45.0%)	60 (100%)
ICT	38 (63.3%)	22 (36.7%)	60 (100%)
RME	42 (70.0%)	18 (30.0%)	60 (100%)
Fante	42 (70.0%)	18 (30.0%)	60 (100%)
Creative Art / BDT	44 (73.3%)	16 (26.7%)	60 (100%)

Source: *Field data 2023*

The summary representation of the frequency of implementation of differentiation in the various subjects is shown in figure 2 below indicates that English Language recorded the greatest number of teachers who always implemented differentiation in their teaching. ICT also had the highest number of teachers who often implement differentiation. RME also surpassed the rest in terms of the number of teachers who sometimes implement differentiation in subject areas. However, RME again recorded the highest number of teachers who never implemented differentiation in a subject area.

Figure 2: *Frequency of implementation of Differentiation in Subject Area*



Source: *Field data*

Hypothesis 1

To check if most teachers implemented differentiation in the population of teachers in the Effutu Municipal schools, a test for proportion was conducted at a hypothesized value of 0.5 and at 5% significance level. The test would be significant if the p-value is less than 0.05 significance level and vice versa. Table 3 below shows that the test for proportion was significant in ICT, Creative Art/BDT, RME and Creative Arts/Social studies whereas it was insignificant for Mathematics, English Language, Fante and Natural Science. Which means, there was enough evidence at 5% significance level to conclude that the proportion of teachers in the Municipality who implement differentiation in ICT, Creative Art/BDT, RME and Creative Arts/Social studies is more than 50% and this difference was statistically significant.

The results are presented as follows:

Table 3: *Result of Test for Proportion on Implementation of Differentiation in Subject Areas*

Subject	**Test Statistic Value**	**P-value**	**Conclusion**
Mathematics	2.4	0.06067	**Insignificant**
RME	4.2667	0.01943	**Significant**
English Language	0.6	0.7807	**Insignificant**
Creative Arts / Social studies	0.6	0.2193	**Insignificant**
ICT	4.2667	0.01943	**Significant**
Fante	9.6	0.00097	**Significant**
Natural Science	1.6667	0.09835	**Insignificant**
Creative Art / BDT	13.067	0.00015	**Significant**

Source: *Field data 2023*

Discussion

This part of the study presents the findings which were evaluated against empirical findings in literature. It speaks about the possible implication of the figures and the relation they have with existing literature.

Knowledge of Differentiation

The lack of knowledge and inadequate expertise in the use of differentiation usually daunts teachers from attempting to use it as a teaching strategy (Franz, 2009). Even though most teachers see differentiation to be beneficial to learners, they often believe that its execution in their classrooms is impracticable (Tomlinson, 2005). Kuyini and Desai (2008) in their study found that teachers poorly implemented differentiation and employed no differentiated strategies at all in some cases due to limited knowledge of differentiation. Similarly, Valiande and Koutselini (2009) in their evaluation of teachers' conception of differentiation and the effect of employing differentiation in mixed ability classrooms, also found most teachers to have heard a lot about differentiation but did not really know what it meant. Likewise, Whipple (2012) who also explored teachers' understanding of differentiation and their perceptions of their ability to implement differentiation in primary schools, found that teachers had a general level of understanding and implementation of differentiation. However, differentiation process, interest and product appeared to be least understood, despite the teachers' knowledge of differentiation. The results indicated that fifty percent (50%) of the study's participants do not differentiate their instruction based on readiness, interest or learning profile because they saw no need to do it. This finding goes to affirm a similar claim by Moon, Tomlinson and Callahan (1995). The analysis further revealed that most teachers had good knowledge about differentiation which made an 83.74% followed by content with 81.30% and then product with 79.61%. Also, lesson planning was next with 78%, followed by 73.75% for interest, and finally the process component with 68.8 %. In view of the poor aspect of teachers' knowledge about differentiation showed, that content was best as only 2% had poor knowledge against the worst recorded for process with 7.10%. Among the three components least understood in this study had only the process component to relate with that of Whipple (2012) findings. This suggest that the component of process should be focused and well taught to teachers. The result again disagreed with Kuyini and Desai (2008) findings of minimal understanding of differentiation as at most only 7.10% of the teachers in the Effutu Municipality had fair knowledge of a component of differentiation. Also, it was found that the extent of knowledge of components of differentiation does not depend on type of teaching specialization. As such, a teacher can pursue any specialization, however, policy-makers and teacher training institutions should put in place measures that will equip teachers with understanding of all the components of differentiation regardless of the path taken.

Knowledge of Strategies of Implementation of Differentiation

Hobson (2008) in a study of various differentiation strategies used by Middle School teachers and the frequency with which the teachers practice differentiation in their diverse group classrooms, found two types of teachers. Those who differentiate their instruction frequently, and those who barely differentiate their instructions. The study also found that most teachers were not really following the models of differentiation but were merely employing best pedagogical practices. The teachers were highly knowledgeable of differentiated assessment but exhibited the least rate of its practice/implementation, and the lowest area of their differentiation was on the learning environment. Additionally, an analysis based on the twelve (12) strategic variables found that the proportion of teachers with poor knowledge about the implementation of these strategies ranged from 3.3% to 6.67%. A maximum proportion of 6.7% of the teachers had poor knowledge each on learning contract, tiered assignment, varying questions, curriculum compacting and varied instructional materials. Also, a minimum proportion of 3.3% was observed each for independent study, learner centre or group and flexible grouping with regard to the poor knowledge of implementing those strategies of differentiation. The average proportion was 3.17% with a standard deviation of 0. 83%. Likewise, the range of proportion for fair knowledge about the strategies was from 15.0% to 28.3%. The average proportion was 13.67% which varied by 3.55%. For good knowledge about differentiation, the range of proportion was from 38.8% to 46.7%. The average proportion was 26.25% with standard deviation 1.36%. This was good as about one-third of the teachers have good knowledge on the above strategies of implementing differentiation. Lastly, the average proportion for teachers with excellent knowledge was 17.7% and with a standard deviation of 3.87% which ranged from 21.7% to 40.0%. In sum, most teachers have at least good knowledge which is encouraging. The result relates with Hobson (2008) finding where majority have good knowledge about the strategies.

Frequency of Use of Differentiation

Additionally, apart from the fact that teachers do not usually receive sufficient training on differentiation (Tomlinson et al., 2003), those whose capacity have been built adequately on it are reluctant to use it (Franz, 2009). This is because many teachers believe that implementing a new manner of instruction such as differentiation requires a great deal of effort to put into practice (Holloway, 2000). The result from the analysis for eight subjects shown that out of 60 teachers, 2 (3.3%) do not implement differentiation in any of the subject areas they teach. Again, 23 (38.3%), 10 (16.7%) and 8 (13.3%) respectively implemented differentiation in one (1), two (2) and three (3) subject areas. There were equal number of 2 teachers representing 3.3% each who implement differentiation in 4 and 5 subject areas. Whereas no teacher implemented differentiation in 6 subject areas, there were 6 (10%) and 7 (11.7%) who implemented differentiation in seven (7) and eight (8) subject areas respectively. The result indicated that most teachers implement differentiation in one subject area followed by two subject areas, next in three subject areas and then followed by eight subject areas. Moreover, it was found that English Language recorded the greatest number of teachers who always implement differentiation in teaching. Information Communication and Technology (ICT) also had the highest number of teachers who often implement differentiation. RME also surpassed the others, regarding the number of teachers who sometimes implements differentiation in subject areas. Finally, RME again recorded the highest number of teachers who never implements differentiation in a subject area. The distribution as can be seen in table 2 shows that, aside English Language, more than half (50%) of the teachers apply differentiation in the subject areas. That is, differentiation was mostly applied by teachers in BDT with a value of 44 (73.3%) and least value of 27(45.0%) in English Language. This finding confirms Tomlinson et al., (2003) study's results which found that teachers usually implement differentiations in classrooms. A test showed that more than 50% of teachers significantly apply differentiation in ICT, Creative Art/BDT, RME and Creative Arts/Social studies whereas it was insignificant for Mathematics, English Language, Fante and Natural Science. More emphasis should be placed on improving number of teachers who implement differentiation in subject areas especially in the core subjects.

Summary, Conclusion and Recommendations

Summary

The qualitative case study evaluated teachers' knowledge about differentiation and how they practice differentiation in Schools in the Effutu Municipality. Two hypotheses were tested to provide an insight to related research questions stated in this study. The researcher employed the Vygotsky (1978) socio-cultural learning theory as the theoretical framework to underpin the study. A multi-stage sampling method which involved purposive sampling and simple random sampling were used to select the samples. Descriptive statistics were used to analyse the data, as well as statistical tests like the Chi-Square test for independence and the test for proportion. Differentiation was explored under a Likert rating scale of *excellent, good, fair and poor in* twelve (12 thematic areas. The proportion of teachers who fell under each rating category for each of the twelve (12) strategies were used as the measure. The results of the study revealed that the proportion of teachers who have poor knowledge about implementing these strategies ranged from 3.3% to 6.67%. A maximum proportion of 6.7% of the teachers had poor knowledge each on learning contract, tiered assignment, varying questions, curriculum compacting and varied instructional materials. Similarly, a minimum proportion of 3.3% was observed each for independent study, learners' centre or group and flexible grouping with regard to the poor knowledge of implementing those strategies of differentiation. The average proportion was 3.17%, which also recorded a standard deviation of 0. 83%. Also, the range of proportion for fair knowledge about the strategies was from 15.0% to 28.3%. The average proportion was 13.67% which shown a difference of 3.55%. For the aspect of good knowledge, the range of proportion was from 38.8% to 46.7%. The average proportion was 26.25% with a standard deviation of 1.36%. This was good as about one-third of the teachers have good knowledge on the above strategies of implementing differentiation. In conclusion, the average proportion for teachers with excellent knowledge was 17.7% and with a standard deviation of 3.87% which ranged from 21.7% to 40.0%. Again, the study probed the frequency with which teachers use differentiation in the classroom and specific subject areas they use differentiation strategies. On a the same four-point Likert scale of *always, often, sometimes* and *never,* the frequency of implementation of differentiation by the teachers in the eight subject areas; showed that out of 60 teachers, 2 (3.3%) do not implement differentiation in any subject areas at all. Again, 23 (38.3%), 10

(16.7%) and 8 (13.3%) respectively implement differentiation in one (1), two (2) and three (3) subject areas. There was an equal number of 2 teachers representing 3.3% each who implement differentiation in 4 and 5 subject areas. While no teacher implemented differentiation in 6 subject areas, 6 (10%) and 7 (11.7%) of the teachers implemented it in seven (7) and eight (8) subject areas respectively. The study found that most teachers implemented differentiation in one subject area followed by two subject areas, next in three subject areas and then followed by eight subject areas. English Language recorded the highest number of teachers who mostly implement differentiation in teaching. ICT also had the maximum number of teachers who often implemented differentiation. RME also surpassed the others regarding the number of teachers who sometimes implement differentiation in subject areas. To end, RME again recorded the highest number of teachers who never implemented differentiation in a subject area. The distribution as seen in table 3 depicts that, aside English Language, more than half (50%) of the teachers apply differentiation in the subject areas. Thus, differentiation was mostly applied by teachers in BDT with the highest value of 44 (73.3%) and least value of 27(45.0%) in English Language. To assess if this distribution or proportion was statistically significant, a test of proportion was conducted. The results indicated that more than 50% of teachers significantly apply differentiation in ICT, Creative Art/BDT, RME and Creative Arts/Social studies. It was however, insignificant for Mathematics, English Language, Fante and Natural Science.

Conclusion

Individual differences make students very diverse and this extend to their learning needs. The study found that teachers' knowledge about the implementation strategies for differentiation was encouraging in Effutu Municipal based on the following: The range of proportion was, 38.8% to 46.7% which shown that one third of the teachers have good knowledge while 21.7% to 40.0% have excellent knowledge about the strategies. Overall, about half of the teachers have good knowledge about differentiation, and its implementation. Again, it shows that the proportion of teachers who have poor knowledge on how to implement these strategies ranged from 3.3% to 6.67%. A maximum proportion of 6.7% of the teachers had poor knowledge each on learning contract, tiered assignment, varying questions, curriculum compacting and varied instructional materials. Furthermore, a minimum proportion of 3.3% was observed each for independent study, learners' centre or group and flexible grouping with regard to the poor knowledge of implementing those strategies of differentiation. The average proportion was 3.17%, with a standard deviation of 0.83%. Likewise, the range of proportion for fair knowledge about the strategies was from 15.0% to 28.3%. The average proportion was 13.67% which shown a difference of 3.55%. For good knowledge, the range of proportion was from 38.8% to 46.7%. The average proportion was also 26.25% with a standard deviation of 1.36%. This was good as one-third of the teachers have good knowledge to implement any of the above strategies of differentiation. Also, the average proportion for teachers with excellent knowledge was 17.7% and with a standard deviation of 3.87% which ranged from 21.7% to 40.0%. The frequency of implementation of differentiation in the subject areas was very good as only 3.3% of the selected teachers do not implement it in any of the subject areas they teach. Moreover, the proportion of teachers who implement differentiation in core subjects like Mathematics, English Language and Natural Science were not significantly different from those who do not. This calls for attention to those subject areas as they form the foundation for higher learning. In conclusion, teachers' knowledge and implementation of differentiation in Effutu Municipality was encouraging and possibly would be better if more professional development programmes and supervision are rolled out to enhance teachers' knowledge and this would go a long way to enhance individual learners learning needs. The study therefore recommends as follows: Policy Makers and Heads of Basic Schools should ensure the use of differentiation by teachers in all subject areas due to its significant benefits in the lives of the learners. This relates to the finding where the proportion of teachers who employ differentiation were not significantly more than those who do not for the subject areas of Mathematics, English Language, Fante and Natural Science. This is very important as these subjects are core and that an enhanced knowledge and understanding and foundation in them, contributes immensely to their lives and national development as a whole. If further studies would be conducted, this study also recommends that; differentiation at the secondary education level could be explored. Replicating the study in other areas will be ideal to ascertain, the situation at such areas to inform policy decisions. Finally, how continuous professional development training on differentiation for teachers impact students' learning can be explored too.

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