THE QUANTITY AND QUALITY OF TEACHING: THE WAY FORWARD FOR TEACHERS IN GHANA

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ABSTRACT: *The Government of Ghana has since independence in 1957 made a number of reforms to the educational system with the aim to achieve efficiency, accessibility and equity in service delivery. Significant progress in all these areas has since been made over the years. However, what remains a challenge is the quality of education in terms of learning outcomes. This paper is part of a longitudinal study on teaching effectiveness in Ghana. Using a representative sample of 99 teachers in 73 primary schools, this paper examines teacher classroom behaviors. Based on classroom observations, it came out that the teachers emphasized more on the quantitative aspect of teaching which is basic to instruction. The quantity of instruction is necessary but insufficient for successful learning. A combination of quantity and quality of instruction in their right proportions is what can lead to successful student learning. Implications of the findings for teacher professional development are drawn.*

KEYWORDS: The quantity and quality of teaching, and teacher professional development.

INTRODUCTION

One of the key findings of educational effectiveness research (EER) is the importance of the classroom level as a predictor of student learning outcomes (Creemers & Kyriakides, 2008; Reynolds, Sammons, De Fraine, Townsend, & Van Damme, 2014). Decades of research has revealed the significance of teaching as the most important predictor of student learning outcomes (Muijs et al., 2014; Scheerens & Bosker, 1997). Therefore, researchers from developed countries

have centered on the classroom and classroom processes as an important determinant of student learning outcomes (Townsend, 2007). While the evidence points to the quantity and quality of teaching as most critical for learning, little of this strand of research has been conducted in developing countries, particularly in sub-Saharan African countries (Fleisch, 2007; Riddell**,** 2008; Scheerens, 2004; Thomas, Kyriakides, & Townsend, 2016).

While features of effective teaching identified in developed countries are relevant and useful for understanding effectiveness, it is equally evident that teaching effectiveness is context specific (Saunders, 2000; Riddell**,** 2008). As a matter of priority, there is the need for research on effective teaching that captures the peculiarities of developing countries. Students assigned to ineffective teachers, one after the other have significantly lower achievement than those assigned to a sequence of highly effective teachers (Sanders & Rivers, 1996). It is particularly desirable to have effective teachers in all schools since the effects of poor teaching linger into many years after children have left school (Wendel, 2000). But precisely what constitutes effective teaching, and how can such practices be determined and promoted in schools?

As part of a longitudinal study on teaching effectiveness in Ghana, this paper presents a descriptive perspective of teaching as observed in classrooms. Direct classroom observations of teaching can enable the collection of rich information about teacher classroom behaviors (Hiebert & Grouws, 2007). We use the conceptual framework of the dynamic model of educational effectiveness (Creemers & Kyriakides, 2008) in collecting data on quality teaching. It was envisaged that the findings might generate data from which effective policies and interventions can be crafted for teacher professional development. The rest of the paper is arranged as follows: First, a brief background of teaching and learning in Ghana. This is followed by a review of literature to put the study in perspective. Then, the method through which data was collected to illuminate the research topic is presented. In the concluding part, we present the findings, recommendations and conclusion.

Background
Students in developing countries generally learn much less than what their curricula states they should (Glewwe & Kremer, 2006). Boissiere's (2004) review of studies from developing countries revealed a large discrepancy between the official time for teaching and the actual instructional time (i.e., a reduction in time on task of between 30-50%). Similarly, Abadzi's (2007) study on teacher absenteeism in Tunisia, Morocco, Ghana and Brazil revealed that children were getting as little as 39% of the instructional time specified in their respective curricula. As to be expected, teacher absenteeism was found to have a statistically significant negative effect on the tests scores of fifth graders in Burkina Faso, Cameroon, Cote d'Ivoire, Madagascar and Senegal (Michaelowa, 2001). Specifically to Ghana, sector performance reports of the Ministry of Education have consistently indicated the quantity and quality of teaching in schools to be inadequate for meeting set standards

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(Al-Hassan, 2009; MOE, 2013). For example, teacher absenteeism was reported to be at 27% in primary schools; and that from a school year of 197 days, the average days worked by teachers was 80 days (MOESS, 2008). As to be expected, student learning outcomes as measured by the National Educational Assessment (NEA) and the Basic Education Certificate Examination (BECE) have consistently been very low. For example, in the NEA 2013 for grade 6 Mathematics, 50% of pupils achieved at the minimum competency level, and only 10% achieved at the proficiency level (MOE, 2014). A similar trend had been recorded in the NEA for 2005 and 2007 (Allsop, Attah, Cammack, & Woods, 2010).

The low academic standards notwithstanding, a large component of the national budget is spent on education (World Bank, 2013). The global average expenditure on education is 6% of GDP (World Bank, 2013). Ghana spends on an annual basis 7% of her GDP on education, with over 94% of that budget going into paying salaries of teachers and other education sector workers (Casely-Hayford et al., 2013; Wereko & Dordunoo, 2010). Furthermore, Ghanaian teachers earn 1.2 units of GDP per capita over the Education for All Fast Tract Initiative (FTI) benchmark average salary of 3.5 units; and 0.5 units over that of the sub-Saharan African average of 4.2 (UNESCO, 2012). Given the huge investment in the teaching force, understanding how they contribute to learning is a key to improving both educational effectiveness and efficiency. In this context, as part of the larger effort for school improvement, the study used the conceptual framework of the dynamic model of educational effectiveness (Creemers & Kyriakides, 2008) in studying the teaching factors that have an impact on student learning gains in Ghana. The objective of this paper is to present a descriptive report of the teaching characteristics observed in the classrooms.

LITERATURE REVIEW

One of the key findings of EER is the importance of the classroom level as a predictor of student learning outcomes (Creemers & Kyriakides, 2008; Reynolds et al., 2014). Thus far, an ever-growing knowledge base on effective teaching practices has been built (Muijs et al., 2014). The findings suggest that effective teachers through their instruction and classroom management can create a learning environment that is motivating for student engagement and learning (Creemers & Kyriakides, 2008). Also, the most consistent findings of studies conducted in different countries link student achievement to the quantity and quality of instruction (Muijs et al., 2014).

Variables related to quantity of teaching
Student learning is linked to the quantity and spacing of instruction; with the more effective teachers allocating more time, and actually spending more of their time for teaching (Brophy & Good, 1986). Also, time on task and opportunity to learn (OTL) are critical factors for student learning gains (Creemers & Kyriakides, 2008). Time is an instrument to measure for instance the

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opportunity pupils get to learn the curriculum, or to give struggling learners better opportunities to master the basics of the curriculum, and the efficiency of classroom management (van de Grift, 2007). The instructional variable time has two interrelated aspects: how much time is spent teaching and how much time students spend on learning tasks (Good et al., 1976).

However, increasing instructional time does not always lead to an increase in the time students spend on learning tasks (Archer & Hughes, 2011). A distinction is made between time-on-task or engaged time and academic learning time (ALT). Whereas time-on-task refers to the portion of time during which students are paying attention to a learning task (e.g., listening to teacher, or doing homework); ALT refers to the amount of time during which students are successful in meaningful learning (Huitt, Monetti, & Hummel, 2009).

The amount learnt is related to exposure to content, which is determined by the length of school year and school day (Brophy & Good, 1986). Also, the amount learned reflects both study time and curricular focus which can maximize both time on task and OTL (Grouws & Cebulla, 2000). The teacher can increase OTL or content coverage with the use of the following (Walberg & Paik, 2000): 1) by examining the curriculum and deciding what is important for learning; 2) selecting critical skills and objectives, whiles deemphasizing the less critical; and 3) use of parsimonious ways of delivering instruction by avoiding digressions, decreasing transition time, whiles increasing opportunities for learning. Assigning homework is another strategy that can lengthen study time (Kauchak & Eggen, 2012). However, to maximizing the impact of homework, effective teachers not only provide homework, but also provide feedback to reinforce what has been done correctly, and re-teach what has not (Walberg & Paik, 2000).

Furthermore, the teacher's ability to create a productive classroom environment that is orderly and focused is critical for maximizing engagement rates (Anderson, 2004). Classroom management includes the way the teacher navigates the classroom, interacts with students, and demonstrates purposefulness in student learning (Redding & Walberg, 2012). It consists of all teacher thoughts, planning, actions and routines that create a productive learning environment for promoting a task oriented behavior in classrooms (Anderson, 2004). Effective teachers conserve instructional time by planning activities to fit learning materials; set and convey both procedural and academic expectations; ensure that transition between activities or lessons is smooth; and monitor learning, and provide feedback for student work (Evertson & Weinstein, 2006).

The findings summarized above concerned with the impact of the quantity of an academic activity on student learning outcomes. The *quantity* of instruction can be seen as necessary but insufficient for successful learning. A combination of *quantity* and *quality* of instruction is what can lead to successful learning (Archer & Hughes, 2011).

Variables related to the quality of teaching

The form and quality of a teacher's organized lessons can be divided into those dealing with giving information (structuring), asking questions (soliciting), providing feedback (reacting), and application opportunities (Kyriakides, 2005). Student learning is enhanced when they spend most of the time being taught or supervised by teachers, rather than working on their own (Muijs & Reynolds, 2000). Effective teachers ensure that students efficiently acquire, rehearse and connect background knowledge with new learning (Rosenshine, 2012). Learning is also maximized when material is actively presented by beginning with overviews and/or reviews of objectives, outlining the content to be covered, and giving signals of transitions between lesson parts (Brophy & Good, 1986). Attention must also be drawn to key points and subparts of lessons; with summaries, and reviews of the main ideas at the end (Westwood, 1996).

Furthermore, teacher questioning can be used for eliciting classroom discourse, and for supporting student cognitive engagement (Cotton, 2003). This includes questioning by the teacher of students, students of the teacher, and as well among students (Good & Brophy, 1986). Teacher questioning is the single most effective strategy for promoting student engagement and learning regardless of grade level or content area (Kauchak & Eggen 2012). It can be used for the following (Jacobsen, Eggen & Kauchak, 2009): 1) to diagnose the understanding of learners and their motivation for learning; 2) to facilitate communication, and to alert learner focus and attention on key points in a lesson; and 3) for reviews of essential content.

Teacher questions are classified into two categories (i.e., fact and higher order questions (Gall, 1984): Whereas fact questions require students to recall previously presented information; cognitive questions require students to engage in independent and critical thinking. There should be a mix of product questions and process questions in which students are not only required to give answers but to also explain the rationale behind answers (Creemers & Kyriakides, 2008). Teacher questioning should be at beginning of a lesson, after every short presentation, and during summaries at the end (Muijs et al., 2014). Effective teachers ask questions that reflect an optimal match of the content, learning objectives and the needs of students (Stronge, Ward, & Grant, 2011). Such teachers also provide feedback resulting either from student questions or from their answers to the questions (Muijs et al., 2014): Most questions should elicit correct or at least substantive answers. Correct answers should be acknowledged in a positive and businesslike fashion. And when an answer is partially correct, the teacher needs to prompt students to find the remaining part of the answer. On the other hand, when an answer is incorrect, the teacher needs to point out swiftly and politely that the answer is wrong and why.

Additionally, effective teachers monitor student learning with the use of both informal and formal assessments (Cotton, 2003). Such teachers use both formative and diagnostic assessment in monitoring and providing appropriate feedback to students (Brophy & Good, 1986). Whereas

summative assessment can be used for summarizing what students have learnt at the end of an instructional segment or a lesson; diagnostic and formative assessments provide the fuel for teaching and learning (McTighe & O'Connor, 2005): Diagnostic assessment precedes instruction, and can be used to identify student prior knowledge and skill level, or any misconceptions on a topic. It occurs concurrently with instruction, and provides specific feedback to students and teachers on how to improve learning. According to Hattie (2009), effective teachers pay particular attention to the formative aspect of assessment in order to prevent student misconceptions about a topic or learning content area before they occur.

Also, the literature highlights the distinction between simply learning facts and gaining usable knowledge that is built upon learning how facts are interconnected, organized, and conditioned upon one another (Mayer, 2004). In this respect, teaching should be organized in a way that invites students to regulate and monitor their own learning behavior and in becoming independent and self-regulatory learners (Ellis & Worthington, 1994). For example, by teaching students efficient ways of approaching learning tasks, particularly those with learning problems, who commonly exhibit poor or inefficient learning styles (Westwood, 2005). The use modeling, cognitive coaching and scaffolding can help in this endeavor (Chinn, 2011). Cognitive modeling involves the articulation of the reasoning that learners can use in learning activities (Jonassen, 1991). In modeling, the teacher guides students on precisely how to go about a learning task, which can help in developing skills such as rehearsal, elaboration, organization, and meta-cognition strategies (Ellis & Worthington, 1994).

Scaffolding provides temporary framework to support learner performance beyond present capacities as follows (Archer & Hughes, 2011) :1) taking a complex skill and teaching it in manageable and logical pieces or chunks; 2) sequencing skills so that they build on each other; 3) selecting examples and problems that progress in complexity; 4) providing demonstrations and completed models of problems; 5) providing hints and prompts as students begin to practice a new skill; and 6) providing aids such as cue cards and checklists to help students remember the steps and processes that can be used to complete a task. According to Jonassen (1991), learners who experience difficulties in performing a task can imply insufficient prior knowledge or readiness level. In which case, the teacher should adjust the difficulty of the task by restructuring the task to supplant the lack of prior knowledge, or provide alternative tasks.

Also, in a typical classroom setting, students vary in terms of culture, age, socioeconomic background, attitudes, learning style and ability. Differentiation or adaptive instruction when skillfully implemented can cater for the needs of all learners (Creemer, 1994). This can be through assigning tasks based on the needs of students, or giving more time to slower learners to complete a learning task (Walberg & Paik, 2000). Differentiation of teaching however does not necessarily imply that students are not expected to achieve the same purpose. On the contrary, adapting

teaching to the needs of each student or group of students can ensure that all of them are able to achieve the same purposes (Creemers & Kyriakides, 2008).

As stated earlier, the conceptual framework of the dynamic model at the classroom level was used in studying effective teaching factors. The review next turns to the conceptual framework of the study.

The Dynamic Model of Educational Effectiveness

The dynamic model is multi-level in nature and refers to factors operating at four different levels: the student, classroom, school and educational system (Creemers & Kyriakides, 2008). The teaching and learning situation is emphasized, and the roles of the two main actors (i.e., teacher and student) are analyzed. Above these two levels, the model refers to school factors which are expected to influence teaching and learning by developing and evaluating school policy for teaching and policy for improving the school learning environment (SLE). At the highest level, the model refers to the influence of educational systems in developing and evaluating educational policy for teaching and learning.

Specifically, at the classroom level, the dynamic model refers to eight factors found to be related to student achievement (e.g., Brophy & Good, 1986; Muijs et al., 2014). The eight factors are: orientation, structuring, questioning, teaching modelling, application, management of time, teacher role in making classroom a learning environment, and assessment. These eight factors do not refer only to one approach of teaching such as structured or direct teaching (Joyce, Weil & Calhoun, 2000) or to approaches associated with constructivism (Schoenfeld, 1998). An integrated approach in defining quality of teaching is adopted. For example, the dynamic model does not refer only to skills associated with direct teaching and mastery learning such as structuring and questioning but also to orientation and teaching modeling which are in line with theories of learning associated with constructivism (Brekelmans, Sleegers & Fraser, 2000). Table 1 below presents the main elements of the teaching factors included in the model.

Table 1. The main elements of each teacher factor included in the dynamic model

Factors	Main elements
1) Orientation	a) Providing the objectives for which a specific task/lesson/series of lessons take(s) place; and b) challenging students to identify the reason why an activity is taking place in the lesson
2) Structuring	a) Beginning with overviews and/or review of objectives; b) outlining the content to be covered and signalling transitions between lesson parts; and c) drawing attention to and reviewing main ideas.
3) Questioning	a) Raising different types of questions (i.e., process and product) at appropriate difficulty level; b) giving time for students to respond; and c) dealing with student responses.

4)Teaching modelling	a) Encouraging students to use problem solving strategies presented by the teacher or other classmates; b) inviting students to develop strategies; and c) promoting the idea of modelling.
5) Application	a) Using seatwork or small group tasks in order to provide needed practice and application opportunities; and b) using application tasks as starting points for the next step of teaching and learning.
6) The classroom as a learning environment	a) Establishing on task behaviour through the interactions they promote (i.e., teacher-student and student-student interactions); and b) Dealing with classroom disorder and student competition through establishing rules, persuading students to respect them and using the rules.
7) Management of time	a) Organising the classroom environment; and b) Maximising engagement rates.
8) Assessment	a) Using appropriate techniques to collect data on student knowledge and skills; b) analysing data in order to identify student needs and report the results to students and parent; and c) evaluating their own practices.

Also, a major distinction of the model as compared to the integrated models developed in the 1990s (i.e., Creemers, 1994; Scheerens & Bosker, 1997; Stringfield & Slavin, 1992) is that a specific framework to measure the functioning of effectiveness factors is used. The model refers not only to how frequently each effectiveness factor is present in a class, school, or educational system, but also to *qualitative* characteristics of the functioning of each factor. Thus, each factor is defined and measured using five dimensions: *frequency, focus, stage, quality, and differentiation* (see Creemers & Kyriakides, 2015).

A summary review of the measurement dimensions of the dynamic model can be as follows (Creemers & Kyriakides, 2006): The *frequency* dimension refers to the quantity of an activity associated with each teacher factor. The frequency dimension is probably the easiest way to measure the effect of a factor, and almost all the models before the dynamic model (i.e., Creemers, 1994; Schereens & Bosker, 1997; Stringfield & Slavin, 1992) were concerned with this dimension of effectiveness factors (Creemers & Kyriakides, 2006). However, the frequency dimension of a factor may not always be linearly related to student learning outcomes. It is assumed that after an optimal value of using for example personnel monitoring system is a school, monitoring may not have an additional effect on learning outcomes. On the contrary, this may result in a negative effect on teacher behavior in terms of teaching; and ultimately on student learning outcomes (Creemers & Kyriakides, 2006). For these reasons, the dynamic model goes further by considering the qualitative aspects of teacher classroom behavior (*focus, stage, quality, and differentiation of teaching*).

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The *focus* dimension of teaching activities reveals the functioning of the factor at classroom. Two aspects of focus (*specificity* and *purpose)* of each factor are measured. Whereas the first aspect refers to the specificity of activities which can range from specific to general, the second aspect addresses the purpose for which an activity takes place. An activity may be expected to achieve a single or multiple purposes. For example, under the focus dimension of Orientation, the teacher is not only expected to provide the aim of a lesson to students, but to also link the activities in a lesson to a unit or number of lessons as covered in previous lessons. This enables students to gain a complete picture of the learning activities which can result in their understanding of the lessons and consequently successful learning.

Also, teaching activities associated with a factor can be measured by taking into account the *stage* at which they take place. It is expected that teaching factors need to take place over a long period of time to ensure that they have a continuous direct or indirect effect on student learning (Creemers, 1994). The continuity of a factor can also be achieved when the teacher is flexible in adapting the activities related to a factor by taking into account the needs of students. For example, based on the teacher' assessment through questioning, if the orientation activities in the lessons appear not to be well understood by the students, there will be the need to repeat the activities so that all students are able to identify with the aims of the lesson.

The dimension *quality* refers to the properties of the specific factor itself. For example, the measurement of quality refers to the properties of an orientation task and especially whether the activities are clear to students. It also refers to the impact that a learning task has on student engagement in learning. For example, a teacher may present the reasons of doing a task simply because they have to do it, or that the activity is part of their teaching routine without having much effect on student participation. On the other hand, other teachers may encourage students to identify the purposes that can be achieved by doing a task which can increase their motivation towards a specific task/lesson/series of lessons (Kift & Field, 2009).

Finally, the dimension *differentiation* refers to the extent to which activities associated with a factor are implemented in the same way for all the students in a class. In a typical classroom, students differ in SES, prior knowledge, and learning style; all of which can affect their learning. Differentiation or adaptive instruction when skillfully implemented can cater for the needs of all learners (Creemer, 1994; Westwood, 1996). This can be through assigning tasks based on the needs of students, or giving more time to slower learners to complete a learning task (Walberg & Paik 2000). At the same time, differentiation of teaching does not necessarily imply that students are not expected to achieve the same purposes (Kyriakides & Creemers, 2006). On the contrary, adapting teaching to the special needs of each student or group students may ensure that all of them will able to achieve the same purposes.

METHODS

Participants
The primary school population in Ghana is (N=19,854) made of public schools (N=14,112) and private schools (N=5,742) (MOE, 2012). The study was conducted in the Upper East Region, one of the ten regions of Ghana, which has a total school population of (N=701). Using the stage sampling procedure, three out of the ten districts of the region were randomly selected. Thereafter, schools (N=73) representing 10% of the school population in the region were randomly selected. Then, all grade six teachers (N=99) served as participants. The chi-square test did not reveal any statistically significant difference between the sample and the population in terms of teacher qualifications (X^2=1.48, d.f.=1, p=0.22). The sample is representative of primary schools in Ghana in terms of the background characteristics for which statistical data of this region are available.

The quantity and quality of teaching
The dynamic model specifies one high-inference observation instrument, two low-inference observation instruments, and a student questionnaire for the purpose of collecting data on quality teaching (Creemers & Kyriakides, 2008). Between May and July of the 2014 school year, the researcher visited each of the schools and observed mathematics lessons of each of the teachers for an average of 40 minutes. This paper presents data emanating from the second-low inference observation instrument. It is important to note data was collected for each of the teachers (N=99).

Descriptive statistics: the sample
Table 2 below presents descriptive statistics of the teacher sample by gender, age, experience and educational qualifications.

Table 2: Descriptive statistics concerning teacher age, experience and qualifications

Variables		Frequency	%
Gender	Male	81	81
	Female	18	18
Age	Under 25	37	37.4
	Between 26 and 35	48	48.5
	Between 36 and 45	11	11.1
	Between 46 and 55	3	3.0
Highest Certificate	School Certificate (e.g. SSCE, GCEA Level)	33	33.3
	Teacher Certificate/Diploma from Training College	53	53.5
	Bachelor of Education/ other Bachelor's Degree	13	13.1
Teaching Experience	0 - 3 years	51	51.5
	4 - 7 years	25	25.3
	8 - 13 years	18	18.2
	14 + years	5	5.1

As can be observed from the table, majority of the teachers 82% are male whiles 18% are female. Also, 37% of the teachers are 25 years of age or below, 49% are between the ages of 26 and 35, 11% are between the age of 36 and 45, whiles 3% are between the age of 46 and 55. Also, 33% of the teachers are holders of Senior High School Certificate or General Certificate of Education (A level), 53% are holders of teachers' certificates or diplomas awarded by teacher training colleges, whiles 13% are holders of a bachelor of education degree or other more general bachelor degrees awarded by universities. As far as teaching experience is concerned, 52% of the teachers have up to 3 years experience, 25% have between 4 to 7 years experience, 18% have between 8 to 13 years experience and 5% have from 14 and above experience.

Descriptive statistics: quantity and quality of teaching
The second low-inference observation instrument of the dynamic model refers to the following five factors: orientation, structuring, teaching modeling, questioning, and application (Creemers & Kyriakides, 2008). The measurement dimensions are as follows: frequency, stage, focus, quality, differentiation. Whereas the frequency dimension measures the quantitative aspect of teaching, the rest of the dimensions measure the qualitative aspect. Specific teaching activities for each of the five factors are indicated in the instrument. The observer is to record the number and sequence of the teaching activities related to each of the five factors under each of the measurement dimensions for each teacher. The time used in minutes for each teaching activity is also recorded. The frequency dimension is determined by the number of teaching activities for each factor, and the time in minutes used by each teacher for each teaching activity. This takes into account the number of tasks that take place in a typical lesson for a teaching factor as well as how long each task takes place. It also helps in determining the importance teachers attach to each of the five factors in their teaching practice. The stage dimension is determined by assigning a weight for each teacher based on the number of teaching activities undertaken for each factor. Under the focus and qualitative dimensions, specific teaching activities with codes are specified. For example, under the focus dimension of orientation, the observer is to indicate if an orientation activity was related to a specific task, code=1, the whole lesson, code =2, or unit or unit of lessons, code=3. Based on the number of activities recorded under these codes, weights are calculated for each teacher for the focus and quality dimensions. Also, for each of the five factors, the observer is to indicate the number of differentiation activities provided by the teachers. For example, in posing a question, the teacher may strategically call on a girl, a boy or a weaker student. Based on a count of the number of differentiation activities provided by each teacher under each of the teacher factors, a score is calculated for each teacher for differentiation. A satisfactory Cronbach's alpha coefficient of 0.84 was attained for the data emerging from the instrument. Table 3 below presents descriptive statistics of the data from the instrument.

Table 3. Data on quantity and quality of teaching

Teacher factors	Measurement dimension	Mean	SD	Min	Max
Orientation	Frequency	2.98	.70	2.0	4.0
	Stage	.11	.30	.0	1.0
	Focus	.35	.05	.33	.50
	Quality	.34	.03	.33	.50
	Differentiation	.04	.13	.0	.5
Structuring	Frequency	3.81	.78	.0	6.0
	Stage	.65	.65	.0	2.0
	Focus	.46	.12	.00	.66
	Quality	.47	.34	.00	1.00
	Differentiation	.03	.09	.00	.33
Application	Frequency	11.60	1.58	8.0	16.0
	Stage	.79	.71	.0	2.0
	Focus	.44	.09	.33	.66
	Quality	.45	.09	.33	.66
	Differentiation	.23	.24	.00	.66
Modeling strategies	Frequency	6.11	1.26	4.0	9.0
	Stage	1.28	.69	.0	2.0
	Focus	.46	.09	.33	.66
	Quality	.46	.06	.33	.66
	Differentiation	.26	.19	.00	.66
Questioning	Frequency	5.08	.92	4.0	7.0
	Stage	1.15	.65	.0	2.0
	Focus	.46	.08	.33	.66
	Quality	.50	.08	.33	.70
	Differentiation	.29	.14	.00	.66

As can be observed in the table, the rows for the frequency dimension for all the teacher factors, it appears the teachers allocated a greater proportion of time for Application activities. For example, whereas for the frequency dimension of Application, the mean was 12 minutes, the frequency dimensions of Orientation, Structuring, Modeling, and Questioning recorded mean values of 3, 4, 5 and 6 minutes respectively. Also, a closer inspection of the means and standard deviations for the dimensions of the five factors gives an indication that the teachers emphasized very much more on the quantitative aspect of teaching as compared the qualitative. For example, for the frequency dimensions of Application, the mean is 11.60 (SD=1.58); for Orientation, the mean 2.98 (SD=0.70); for Structuring the mean is 3.81 (SD=0.78); for Modeling strategies, the mean is 6.11(SD=1.26); and for Questioning, the mean is 5.08 (SD=0.92). On the other hand, the means and standard deviations under the rest of the dimensions (stage, focus, quality and differentiation) are comparatively very low. This is an indication that the teachers did not pay much attention to

those dimensions in their teaching. For example, under Orientation, the stage dimension recorded a mean value of 0.11 (SD=0.30); under focus, a mean value of 0.35(SD=0.05); under quality, a mean value of 0.34 (0.03); under differentiation, a mean value of 0.04 (SD=0.13). Particularly, of all the dimensions, differentiation recorded the lowest mean values. This is an indication that differentiation of teaching in which the needs of varied students (i.e., ability level and learning styles) was relatively not catered for by the teachers.

The instrument enabled the collection of additional information about the teachers' practice. In next to follow, details of the teachers' behaviors in respect of the five factors (orientation, structuring, application, modeling and questioning) and their dimensions are presented.

1) Orientation. As presented in Table 3, the teachers used an average of 3 minutes ranging from 2 to 4 minutes for a total number of 112 orientation activities. For the stage dimension, the average weighting obtained for orientation activities was 0=78.8, 1=21.2. This implies that very few orientation activities used in the lessons. Under the focus dimension, whereas in 79 or 70.5 % of the orientation activities, the teachers merely stated the aim of the lesson as a routine in their practice, for 33 or 29.5 % of the activities, the teachers provided to the students the aim of the lesson, and as well the link of the lesson to previous lessons. Under the quality dimension, whereas 92 or 82.1% of the orientation activities were typical or routine; 20 or 17.9% related to learning (i.e., the teachers attempted to link the orientation activities with the past experiences of the students). Also, whereas in 23 or 21.6% of the orientation activities, the teachers differentiated their teaching, in 89 or 79.4% of the activities, the teachers did not.

2) Structuring. The teachers used an average of 4 minutes ranging from of 0 to 6 minutes for a total number of 170 activities related to structuring. Under the stage dimension, the weighting obtained for the activities was 0= 59.1; 1=34.6; 2=6.3. Under the focus dimension, out of the total number of activities, whereas 69 or 40.6% were related to the structure previous lessons; 78 or 45.9% were related to the structure of the day's lesson; and 23 or 13.5% to a unit or a number of lessons. Under the qualitative dimension, 114 or 67.2% of the activities appeared to be clear to the students; whiles 56 or 32.9% appeared not to be clear to the students. Also, in 37 or 21.8% of the activities, the teachers provided differentiation opportunities to the students, whiles in 133 or 78.2 % of the activities, the teachers did not.

3) Application. The teachers used an average of 12 minutes ranging from 8 to 16 minutes for a total of 268 application activities. Under the stage dimension, the weightings obtained for the activities were 0=17.7, 1=74.1 and 2=8.2. This implies that although much of the teaching time was allocated to application activities, the activities did not vary a great deal. Under the focus dimension, whereas 146 or 54.5% of the activities concerned with only a part of the lesson; 103 or 38.4% concerned with the whole lesson; and 19 or 7.1% concerned a unit or a number of lessons.

Under the qualitative dimension, 187 or 69% of the activities required students to simply recall rules and definitions, or perform algorithms with no relation to the underlying concepts; 81 or 31% required the activation of cognitive strategies to solve the problems which can develop deeper levels of understanding concepts or ideas. Also, in 119 or 34.4% of the activities, the teachers provided differentiation opportunities to the students, whiles in 149 or 65.6%, the teachers did not.

4) Modeling strategies. The teachers used an average of 6 minutes ranging from 4 to 9 minutes for a total of 361 modeling activities. Under the stage dimension, the weightings obtained for the modeling activities were 0 =2.3, 1=39 and 2=58.7. Under focus, 203 or 56.2% of the modeling activities could be used in the lesson only; 121 or 33.5% could be used in a unit of the lessons; and 37 or 10.2% could be used across units of lessons. The quality dimension measures the teachers' role in the modeling activities. Out of the total number of the modeling activities, 212 or 58.7% were given by the teacher; 78 or 21.6% through guided discovery; and 71 or 19.6% through self-discovery. Also, whereas in 111 or 30.8% of the modeling activities, the teachers provided differentiation opportunities to the students, in 249 or 69.2% of the activities, the teachers did not.

5) Questioning. The teachers used an average of 5 minutes ranging from 4 to 7 minutes for a total number of 443 questions. Under the stage dimension, the weightings obtained for the activities were 0=11.9, 1=57.4, and 2=30.7. Under the focus dimension, 279 of the questions were for a specific task; 131 for the whole lesson; and 33 covered a unit or a number of lessons, representing 63%, 29.6% and 7.4% respectively. The quality dimension measures the type of questions posed (i.e., product or process questions). Out of the total number of questions, 291 or 65.6% were product questions which did not require higher level thinking (i.e., the students were not asked to assign the reasoning behind their answers); 152 or 34.4% were process questions requiring the students to provide the reasoning behind their answers to the questions. Also, whereas in 130 or 29.3% of the questioning activities, the teachers provided differentiation opportunities to the students, in 313 or 70.6% of the activities, the teachers did not.

DISCUSSION

Based on the data presented above, it is clear that the teachers emphasized very much more on the quantitative aspect of teaching than the qualitative. For example, even though the teachers allocated a greater proportion of time for application activities, the qualitative dimensions of those activities recorded very low mean values. Overall, it can be inferred that the teachers varied very little in their classroom behaviors in relation to the qualitative dimensions (i.e., focus, stage, quality and differentiation). The quantity of instruction can be seen as necessary but insufficient for student learning gains. A combination of the quantity and quality of instruction in the right proportions is what can lead to successful learning (Archer & Hughes, 2011).

Teachers are expected to allocate adequate time for each teacher factor and as well pay attention to the qualitative aspects of each factor (Creemers & Kyriakides, 2006). Particularly, 69% of the activities under Application required students to simply recall rules and definitions, or perform algorithms with no relation to the underlying concepts for learning; whereas 31% of the activities required the activation of cognitive strategies to solve problems. Similar findings were reported in a South African study (Carnoy et al., 2008). Teaching students to activate cognitive strategies in solving problems has the potential to develop in them independent or self-reliant learning skills (Walberg, 2003).

Also, based on the standard deviations reported for all the measurement dimensions of the five teacher factors, it appears the teachers did not vary a great deal in their teaching behaviors. Particularly, the teachers' behaviors with respect to the stage, focus, quality and differentiation dimensions of Orientation, Structuring, Modeling and Questioning recoded very low means. For example, for Orientation, under the stage dimension, the mean recorded was 0.11 (SD=0.30); under the focus dimension, the mean was 0.35 (SD=0.05), under the quality dimension, the mean was 0.34 (SD=0.03); and under differentiation, the mean was 0.04 (SD=0.13).

Effective teachers promote learning by communicating to students what is expected of a learning activity and why (Porter & Brophy, 1988). In so doing, students might identify with the objectives of the lesson, spend their time and effort in the lessons, which ultimately can lead to desired learning outcomes (Creemers & Kyriakides, 2006). As indicated earlier, the qualitative aspects of the orientation activities of the teachers were largely typical, and did not require critical thinking. Effective teachers are expected to not only state the aim of a lesson, but to also involve students in finding the reasons for activities in lessons (Creemers & Kyriakides, 2006).

Similarly, under the qualitative aspects of structuring, 67.2% of the activities appeared not to have been understood by the students. Students learn more efficiently when teachers actively structure new information and relate new content to what they already know (Brophy & Good, 1986). Also, a total of 268 activities were recorded under modeling strategies. Out of this number, 58.7% were given by the teachers; 21.6% through guided discovery; and 19.6% through self-discovery (see chapter four: section 4.4.3). Although teachers are expected to provide students strategies for solving problems, they are also expected to offer a balance between the activities in order that students can develop their own strategies for problem solving (Kyriakides et al., 2002).

Also, in teacher questioning there should be a mix of product questions and process questions (Creemers & Kyriakides, 2009). Out of a total of 443 questions posed by the teachers, 65.6% were product questions which did not require higher order cognitive thinking. Similarly, it was only in 22.1% of the questions that the students were invited to comment on the answers provided by their colleagues. The findings are in line with studies in Ghana indicating that students' classroom

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discourse is very limited due to the command and inflexible nature of teaching (e.g., Agbenyega & Deku, 2011; Mereku**,** 2003; Opoku-Asare, et al., 2014).

In a typical classroom, students differ in terms of their learning style, ability and SES. Differentiation or adaptive instruction geared to the characteristics and needs of individual students when skillfully implemented can improve the learning of all students (Creemers, 1994). The differentiation dimensions of the five teacher factors under the Second-low inference observation instrument recorded the lowest mean values. It can therefore be inferred that differentiation of teaching was very limited with this sample of teachers. Similar findings were reported in studies in Ghana (e.g., Agbenyega & Deku, 2011; Kuyini & Desai, 2008).

Overall, the findings suggest that the teachers emphasized more on the basic elements of direct teaching, with very little on the qualitative aspects (i.e., stage, focus, quality and differentiation dimensions). The quantity of a teaching activity might not necessarily lead to an increase in the time students spend on learning tasks, or in the total amount of learning (Archer & Hughes, 2011). A combination of *quantity* and *quality* of instruction is what can lead to learning success. Moreover, the quantitative aspect of teaching is basic to instruction: teachers exercising more advanced skills to do with the qualitative aspect of instruction can have better student learning outcomes (Kyriakides et al. (2009). The more effective teachers are those who also incorporate in their teaching more advanced skills such differentiation of teaching (Kyriakides & Creemers 2006).

CONCLUSION

The objective of this paper was to present a descriptive perspective of teaching characteristics as observed in Ghanaian classrooms. It was envisaged that the findings might generate data from which effective policies and interventions can be crafted for teacher professional development. The concern about teacher quality in many parts of Africa and the role teacher education should play in its improvement has become an important subject on the continent (Lauwerier & Akkari, 2015). Poor instructional quality and lack of professional commitment by teachers have been recognized as particularly problematic, and thus raising the prospect that teacher education programme structure and content might be lacking in producing teachers capable of improving quality in schools (Aboagye, 2008).

Unfortunately, both pre-service and in-service training for teachers are superficial and inadequate with little impact on teacher classroom practices (Lauwerier & Akkari, 2015). Even for professional teachers, there is often a profound mismatch between the key competencies required of them to function adequately in the classroom, and the teaching skills they attain in their initial training (Akyeampong et al., 2011). Teacher training programs place more emphasis on subject

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content knowledge than on the pedagogical knowledge and skills required for teaching (Adu-Yeboah, 2011). To achieve the ultimate aim of teacher education in Ghana will require the adoption of a pedagogy that utilizes cohorts, applied knowledge, reflective practices, and research (Amakyi & Ampah-Mensah, 2014)**.** In addition, increasing opportunities for teacher continuing professional development can upgrade the skills and academic competences of practicing teachers to be effective in their practice (Asare & Nti, 2014).

The research on effective teacher professional development (Antoniou, Kyriakides, Creemers, 2011; Demetriou & Kyriakides, 2012), recognizes that teachers are professionals who should be given an opportunity to select what they would like to learn from a variety of research-based ideas about improving students' learning; provides long-term, ongoing opportunities for teachers to reflect upon their experiences; provides opportunities for teachers to study and gather data on the effects of changes in their teaching approach. Also, studies in the field of teacher professional development have also demonstrated the practical use of measuring both the quantitative and qualitative characteristics of teacher behaviour, in terms of being able to implement more focused and effective teacher training courses based on each teacher's specific professional development needs (Antoniou, Kyriakides & Creemers, 2015).

As evidenced in this study, it will be important for teacher professional development programs in Ghana and countries of similar characteristics to craft training programs that incorporate both the quantitative and qualitative aspects of teaching. Also, in the context of Ghana, the eight teaching factors of the dynamic model (i.e.,orientation, structuring, questioning, teaching modelling, application, management of time, teacher role in making classroom a learning environment, and assessment) were found to have a huge effects on learning outcomes (see Azigwe, 2016). It is therefore recommended that those factors be used in teacher professional development programs. This way, we may be effective in our teaching. The study is however limited in the fact that the data on teacher classroom behaviors was collected by only one observer (i.e., the first author). As a result, cross validation of the data was not possible. Future studies can use multiple observers for data collection so as to enable cross validation.

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