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Science Tutors' Knowledge of Differentiated Instruction in Colleges of Education in Volta Region, Ghana

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ABSTRACT

The purpose of the study was to explore science tutors' knowledge of differentiated instruction in the Colleges of Education in the Volta Region of Ghana. The study employed sequential explanatory design. The participants were 32 science tutors from Colleges of Education in the Volta Region of Ghana, who were purposively selected on the basis of having direct instructional contacts with students all the time and their teaching experiences within and outside colleges. Questionnaire, Rating Scale and Interview were used to collect data. It was found that science tutors have different knowledge on content, learning style, learner interest, learner diversity, process, product and lesson planning. The findings also revealed that majority (80%) of science tutors who did not differentiate instruction in their classrooms have the knowledge of differentiated instruction but their failure to make use of DI was due to scarcity of time, complex nature of DI, high level of workload. The results also revealed that, majority (80%) of the science tutors did not use their assessment feedback to guide their instruction. These science tutors said marking schemes were always given to the students for self-correction. The results from classroom observation showed that these tutors do not teach to meet the diverse needs of learners. Majority of the participants still hold to traditional classroom teaching strategies based on one size-fits-all approach which proved to be ineffective. The study recommended that mentoring universities should organize workshops on the differentiated instructional for tutors and mount course in DI for student teachers.

Keywords- Differentiated, Instruction, Science tutors, Volta Region, College of Education.

I. INTRODUCTION

Teachers differentiate instruction by matching student characteristics to instruction and evaluation. Differentiated instruction (DI) allows all students to access the same content by tailoring entry points, learning tasks, and results. In a differentiated classroom, students access content, acquire information, and demonstrate understanding differently (Hall, Strangman & Meyer, 2003).The knowledge and attitude of tutors are crucial in implementing DI. DI ensures that all children in a classroom have equitable access to educational opportunities and resources. Tutors are expected to meet the needs and interests of every student in the classroom. Differentiated instruction better meets students' academic needs (Tomlinson, 2004). Tutors are under pressure to ensure every student's academic success matches their talents. Differentiated instruction gives all students a fair, equal, and significant chance to get a high-quality education. Johnson (2003) suggested that educators must create an environment where every student may thrive. Teachers assist pupils to reach their learning potential. Teachers are under pressure to enhance learning standards while fulfilling the needs of all students.Tutors must use successful instructional alternatives to teach academically varied group(s). Teachers are constantly forced to modify their lessons to provide positive, exciting, demanding, collaborative, and

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supportive learning environments that meet each student's academic needs. They must help create educational environments that optimise students' learning possibilities and help them build the necessary information and skills. Beecher and Sweeney (2008) said education should assist each learner to reach their full potential. DI enables educators to tailor content to the specific needs of their students and also maximising learning potential. Tutors must initiate and implement DI to ensure its integrity. For DI to be successful, tutors' attitudes are crucial.

Differentiation is one answer to these challenges, according to Rock, Gregg, Ellis, and Gable (2008). Rock, Gregg, Ellis, and Gable (2008) found that a varied education increases student creativity, flexibility, and achievement. The DI's ultimate goal is to provide a learning atmosphere and opportunity for all students (Anderson, 2007).

DI is seen globally as a means to support learners with various requirements. It asks teachers to re-evaluate their classroom practises by involving all students in instruction (Anderson, 2009). Ghana's situation is discouraging. Ghana agreed to the Education for All (EFA) initiative, which states that every child of school age should get a free and quality education (Ministry of Education, Youth and Sports [MoEYS], 2004; Ministry of Education [MoE], 2012, 2013). Every child in Ghana has the right to a proper education (MoE, 2003; MoE, 2013). The government of Ghana seeks to educate all school-age children through FCUBE, EFA, and Inclusive Education (IE) programmes, among others (Gadagbui, 2008). The GoG wanted to adopt IE at the basic level, while the MoE's Strategic Plan (2003-2015) envisioned it by 2015. Casely-Hayford, Quansah, Tetteh, Adams & Adams, 2011).

The inclusive education strategy aims to "meet Ghanaians' different schooling demands" nationally and internationally (MoE, 2013, p. 5). The IE policy direction "recognises the varying learning demands of several types of school-age students" (MoE, 2013, p. 5). The IE policy seeks to provide opportunities for all educators to "address the diverse learning needs" of every individual in the Ghanaian education system in a learner-friendly atmosphere so that every learner has the "best possible opportunities to learn and equitable access to quality teaching and learning" (MoE, 2013, p. 6). Appropriate curricula, teaching styles, and resources should be used (UNESCO cited in MoE, 2013).

Several studies highlight the diversity of Ghanaian basic school students and the necessity to accommodate them (Gyimah, 2011; Agbenyega & Deku, 2011; MoE, 2013; UNICEF Ghana, 2014). Gyimah (2011) claims that some basic schools in Ghana are implementing IE (also called mainstreaming). This is done to strengthen the need to include all learners of different abilities in classroom teaching and learning (Gyimah, 2011). However, Ghana's education system rarely differentiates instruction for inclusion (Kuyini, 2010). Teachers have little knowledge of inclusivity to help and manage such pupils in basic schools (Casely-Hayford et al., 2011). Kuyini and Desai (2006), insufficient skills in inclusive practises (Kuyini and Desai, 2007), and insufficient support for individual learners with diverse learning needs (Kuyini and Desai, 2008; 2009).Thus, they use general rather than customised teaching approaches. These elementary teachers don't alter curricula to match students' needs (Kuyini & Abosi, 2014).

Alhassan (2014) reports that most basic school teachers still use the 'traditional deficit-medical' model (a restricted view of biological autism) to teach students with special needs, despite calls for new tactics. Moreover, Ghana's teaching techniques are dogmatic and don't value student diversity (GES cited in Agbenyega & Deku, 2011). Teachers in Ghana's conventional classes don't successfully cater to students with learning challenges (Dotse, 2012; Gyasi, 2011; Henne, 2013; Thomas, 2012). Some teachers criticise students for not understanding lessons and punish them severely to get them to study harder (Agbenyega, 2006). Kuyini and Abosi (2014) revealed that DI (which they named "Adaptive Instruction") is an essential competency domain for teaching learners with learning difficulties in regular classrooms. It is largely absent in the Ghanaian education system. Per recurrent calls for a paradigm shift from traditional methods of instruction to differentiation to fit learners' educational requirements, DI tendencies in the Ghanaian educational system seem dismal.

The researcher found that basic school teachers' failure to use differentiated instruction may be linked to the training they obtained from colleges of education and universities in the country. Colleges of education must be targeted to solve this problem since most elementary school teachers are trained there.

II. LITERATURE REVIEW

Meaning and Concept of Differentiated Instruction

The strategies, methods, pedagogies and techniques of teaching and learning can be coined into one shell to be called Differentiated Instruction (DI). The DI paradigm which is gaining ground in many educational circles in the world calls for redirecting teachers to think about their methodologies, management and contents, and also invite learners to be engaged in the process to the benefit of all (Palmer & Maag, 2010).

Launder (2011) defined DI as the modification of a blend of the content, process and product in order to meet the readiness, interests, learning style and learning needs of all learners in a particular classroom and a way to ensure that they all have the chance to excel. Gangi (2011), also opined that DI is a strategy of teaching that accounts for the differing learning needs of learners by accommodating their differences and abilities through

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the variation of the methods and materials. According to (Edwards, Carr, & Siegal, 2006), DI is an instructional approach used by educators to meet the academic and behavioural needs of a wide variety of diverse learners within the same classroom setting.

Manning, Standord, and Reeves, (2010) opined that DI represents instruction that every learner receives but not the instruction every other child is receiving. These definitions of DI emphasize the relevance of fairness and equity over equality in the classroom. Pettig (2000), DI is described as a practical approach that challenges teachers to change their classroom practices to improve classroom learning for all learners. These confirm the need to satisfy the learner's learning needs and the need to help every learner to benefit from learning, rather than teaching to curriculum needs and assessment purposes.

According to Valiande and Koutselini (2009), social justice and equity (SJE) in education can only be met if and only if teachers identify the means to address the diversity of their learners. Launder (2011) accounted that classroom diversities prove that teachers must employ teaching practices that give every learner the opportunity to learn. Valiande and Koutselini (2009) stated that, several researchers and scholars reveal that the only solution to the problem of learners' multiple cultures in modern classrooms lies in the theory and practice of DI. Considering the toil of educational think tankers in search of effective instructional practices that would help to educate diverse learners in Ghanaian basic school classrooms, differentiation of instruction perhaps proves to be the answer.

The use of DI provides several benefits to learners as well as teachers in diverse ways. With DI, learners are able to get a better access to the curriculum, increase their understanding in the content taught to them and enjoying its learning to the fullest (Tomlinson, 2001; Anderson, 2007; Franz 2009; Gangi, 2011).

DI helps teachers to address the learning needs of each learner by teaching to their readiness levels through their learning styles and interests (Gangi, 2011). Again, DI helps teachers to accommodate learners who have mastered the lesson content and are ready to be challenged when they teach to learners' readiness level. And with the tools of DI, teachers can challenge learners to learn as far as they can go towards further academic achievement and success (Levy, 2008).

Another significant benefit of DI is its motivation-driven nature. Gangi (2011) again reports that DI motivates learners to learn harder when they are given the chance to choose learning activities that they are required to complete. This, according to Anderson (2007) would enable learners to be motivated to learn to the brim. Also "a combination of a differentiated curriculum and the options for student choice are ideal for promoting success for learners with disabilities and it can improve outcomes for other students as well" (Servilio, 2009, p10). No matter how slowly a learner learns, when he/she is able to complete a task on his/her own, he becomes intrinsically motivated and would be compelled to do more. When teachers use DI, all learners of different ability levels improve in the comprehension of the taught content, and thereby resulting in a more positive learning experience (Franz, 2009).

Furthermore, learners' choices of learning processes that best reveal their unique individual skills as they participate in DI allow them to take responsibility for their own learning. Painter (2009) confirmed that learning becomes more interesting, fun, and significant when learners are given the opportunity to choose their learning activities through the use of DI. The learner centred nature of DI allows learners to be independent and responsible learners throughout their learning endeavours.

In another development, teachers also benefit from the use of DI within the classroom, according to Franz (2009). When DI is employed, learners became more independent and teachers are able to create an exciting, active learning environment and at the same time facilitate their learning which reduces the teacher's workload in the long run (Franz, 2009). In this regard, DI permits teachers to teach their learners how to learn. This consequently agrees with the Chinese adage that emphasizes the relevance of "teaching people how to fish rather than fishing for them". When learners are trained in this manner, they would not wait for their teachers' instructions before they learn, they would rather initiate and sustain their own learning since they have been taught to do so on their own. This would guide and help them to learn for and by themselves throughout their learning endeavours.

DI compels educators to provide relevant remediation for learners with special needs and offers appropriate opportunity to challenge gifted learners (Franz, 2009). This enables no child to be left behind (Sondergeld & Shultz, 2008) and prevents having them experience frustration (Franz, 2009). With DI, classrooms become active learning environments, and the roles of learners and the teachers change dramatically. The teacher's role changes to a facilitator of students' learning while the learners became more independent learners (Beecher & Sweeny, 2008). Anderson (2007) states that, the ultimate inspiration to the teacher who differentiates instruction is taking care of all learners by providing a learning environment and opportunities that exclude no child. Several countries that aim to educate every learner in their schools are opting for DI due to its effectiveness (Palmer & Maag, 2010).

Differentiated Instruction: Strategy for Training Student Teachers in Colleges of Education in Ghana

Differentiating instruction in higher education may differ from differentiating in basic schools because

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of the inherent differences in the two environments. These differences have the potential to impact how differentiation of instruction occurs in higher education. In higher education, the common expectation is that a topic will only be covered once in a class. This reality poses a challenge for instructors in higher education to revisit or re-teach a topic when students need further explanations or some other form of differentiation. Therefore, these instructors would need to be purposeful when utilizing class time.

A second complication of the environment is that instructors in higher education seldom have their own classroom and, as such, may be limited in how much they can modify the classroom environment (Chamberlin & Powers, 2010), whereas basic school teachers usually have their own classroom. Among the few studies within higher education, findings show how differentiation in higher education has challenges and benefits that are both similar and different from the findings in basic schools. For example, Santangelo and Tomlinson (2009) conducted a qualitative self-study in an introductory graduate education course using differentiated instructional strategies such as supplemental readings, tiered assignments, interest-based centers, independent study projects, flexible groupings, flexible timelines, and reading comprehension support. Santangelo and Tomlinson (2009) found that effective differentiation requires a considerable amount of time, effort, and dedication from the instructor.

Although preparing for any college course can be deemed as considerable, preparing for a course that engages differentiated content, processes, and products is more intensive. Santangelo and Tomlinson (2009) also found that differentiated instruction gave each student the opportunity to acquire knowledge and understanding of course content and activities based upon their individual readiness, interests, and learning profiles. Ernst and Ernst (2005) explored the characteristics of differentiated instruction in an undergraduate political science classroom by evaluating student and instructor responses to this teaching method.

In implementing a case study methodology, the principles of differentiated instruction were applied to a public policy course taught to 35 undergraduates during a spring semester (Ernst & Ernst, 2005). Their findings revealed that students generally responded favourably to the differentiated approach, reporting higher levels of intellectual growth, interest in the subject, and satisfaction with the course when compared to students in the non-treatment group. Likewise, the instructor's evaluation of the approach was generally positive, though the considerable time commitment in teaching a differentiated class and concerns connected to the fairness of the approach were perceived as limiting factors. Student responses further revealed that they have a need to know, as opposed to basic school students who are less likely to question the intentions of the instructor or the fairness of the course. College-level students have a tendency to want to know the instructor's motivations.

Moreover, college students can be philosophically opposed to the differentiated instructional method while at the same time report that they enjoyed the class and found assignments to be rewarding and aptly challenging. Chamberlin and Powers (2010) conducted a quasi-experimental pre-test and post-test control group study using differentiated instruction in an undergraduate first-year maths course at two universities. For the course, three instructors taught a section for pre-service teachers using similar differentiated instructional methods while four instructors utilized traditional methods that formed the control group. A variety of quantitative and qualitative methods were used to measure the outcomes of the instructional methods.

The results indicated the experimental group made higher gains on maths scores from pre-test to post-test when compared to the control group. The results also revealed that the undergraduate students successfully met the course objectives and that the participants in the experimental sections perceived the course more positively due to the differentiated instructional methods. Chamberlin and Powers (2010) found that for differential instruction, explicitly identifying the course learning objectives early was important, and organizing the course by units or chapters was also helpful. They determined that differentiating every class or every assignment was not necessary. They likewise recommended to begin small, incorporating just one or two ideas at a time and maintaining a log of learning objectives and student progress while also permitting different products for class projects.

Responding to student interest and learning profiles, along with incorporating a variety of instructional formats, provides students opportunities to learn in their preferred style. Diversity in higher education is on the rise; thus, the traditional one-size-fits all, teacher-centred model of lecture-style teaching sets students up for failure (Dosch & Zidon, 2014). Some instructors assume their job is done after they tell students the information. Telling or presenting is not effective pedagogy. Accomplished instructors teach in such a manner that students find both the information and skills meaningful (Wormeli, 2005).

Teachers should be trained in how to differentiate learning so that all students can reach their full academic potential. Teachers who do not have the training or experience to differentiate or adapt instruction may be inadvertently excluding some students from active participation in the learning environment (Alhassan & Abosi, 2014). This means that College of education science tutors must be willing to change their belief systems and practices in order to differentiate instruction. In order to facilitate this new

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growth, staff development must be provided to all the tutors at colleges of Education in order to impart the differentiated instruction approach into Student Teachers (ST).

The National Staff Development Council (2000) defined staff development as a deliberate effort to alter professional beliefs and understanding of school personnel toward an articulated goal using an intentional, purposeful program. In addition, this council asserted that professional development can provide the knowledge and skill building activities that raise the capacity of teachers and administrators to respond to external demands. Additionally, Benjamin (2006) concluded that differentiated instruction develops when teachers dialogue about their values in working with students, assessing student learning, establishing classroom rules, and designing curricula.

Teachers' Knowledge of Differentiated Instruction

A teacher who does not have the knowledge of something cannot consequently give it out to his/her learners. This assertion is supported by Spurgeon cited by Tsadidey (2002) that "Nothing comes out of a sack except what is in it", (p3). This basically means that, a teacher whose knowledge of DI is in lower level or lacking might be of low or no position to adopt or apply it in his/her classroom. Tomlinson (2005) further states that differentiation is not a set of strategies for such teachers "but rather a demographically necessary, ethically focused, pedagogically informed and empirically tested way of thinking about their work" (p10).

Specifically, when teachers possess the right knowledge and the effectiveness of DI, they will be far more likely to integrate it into their classroom instructions (Franz, 2009). However, Tomlinson, (2005) cautions that differentiation is not a recipe to be applied. It rather requires deep knowledge of its process, theories and ways through which the theory is translated into action (Franz, 2009).

According to Page as cited in Franz (2009), lack of knowledge and inadequate expertise in the use of DI usually deters teachers from attempting its use as a teaching strategy. Although many teachers see DI to be beneficial to learners, yet they often believe that its execution in their classrooms is not feasible (Tomlinson, 2005). Moreover, apart from the fact that teachers do not usually receive sufficient training on DI (Tomlinson *et al.*, 2003), those who have been trained adequately on it are discouraged to use it (Franz, 2009). This is because many teachers believe that implementing a new manner of instruction such as DI requires a great deal of effort to put into practice (Holloway, 2000). It is important to note that, the extent to which teachers understand DI is consequential to its implementation and practice by them (Whipple, 2012). This is because DI is a complex concept to understand and implement; its implementation can be inconsistent (Whipple, 2012). The gap between teachers' knowledge/understanding and practices of DI needs to be bridged if it would impact learners' attainments in a meaningful way (Whipple, 2012).

III. METHODOLOGY

The study employed a sequential explanatory research design which is under mixed method approach. Mixed method research is a systematic integration of both quantitative and qualitative methods in a single study in order to ascertain a deeper understanding and a full picture of a phenomenon (Yin, 2006). According to Rossman and Wilson cited by Koeze (2007), using mixed method entails a combination of qualitative and quantitative study methods and allows the researcher to "confirm or to collaborate findings" (p. 40). A combination of qualitative and quantitative data allows researchers to discover new insights into studies (Koeze, 2007).

IV. POPULATION AND SAMPLE SIZE

The sources of data for this study were collected from science tutors of the colleges of education in Volta Region, Ghana. Volta Region has six colleges of education and out of these six colleges, and five of them are public colleges of education. All the five colleges are mixed sex colleges except St. Teresa's Colleges which is single sex. The target population of the study is all the science tutors in the five public colleges of education in the Volta Region. The target population was 209 tutors from the five public colleges of education in the Volta Region. Accessible population is the portion of the population to which the researcher has reasonable access. 'It may be the subset of the target population' (Polit & Hungler cited in Ardilla, 2017, p.43). An accessible population for the study was thirty-two (32) science tutors from the five public colleges of education in the Volta Region.

Table 3.1 displays the statistics distribution of the participants.

Table 3.1: Colleges and Participants

Areas	Colleges	Participants (Science Tutors)
Hohoe Municipal	St. Teresa's College of Edu	4
Hohoe Municipal	St. Francis College of Education	10

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North Dayi District	Peki College of Education	4
Akatsi South District	Akatsi College of Education	8
Ho West Municipal	Amedzorfe E.P. College of Edu	6
Total		**32**

Source: Field data 2020

One of the sampling techniques employed in this study was purposive sampling. Purposive sampling was used by researcher to select accessible population (sites and/or participants) intentionally, with some criteria and attributes in mind that address the research questions (Merriam, 2009). All the 32 science tutors who represented the accessible population were chosen by the use of census for the study. By adopting a census one is sure of the representative nature of the population and that the objectives of the study would be attained.

V. RESULT AND DISCUSSION

Table 4.2 Science Tutors' Knowledge of Differentiation based on Learner Diversity

Statement	SD (%)	D (%)	NC (%)	A (%)	SA (%)	MEAN	StD
Student teachers in my classroom are homogeneously the same	24(75.0)	2(6.3)	1(3.1)	3(9.4)	2(6.3)	1.66	1.29
Student teachers in my classroom have the same learning characteristics	25(78.1)	3(9.4)	0(0.0)	1(3.1)	3(9.4)	1.56	1.26
Every student teacher in my class has learning disabilities or abilities	30(93.8)	2(6.3)	0(0.0)	0(0.0)	0(0.0)	1.06	0.25
Students who are Gifted students are also special learners who need special and extra attention	17(53.1)	3(9.4)	0(0.0)	10(31.3)	2(6.3)	2.28	1.53
Lessons delivery must be done in such a manner to satisfy each individual in the classroom	21(65.6)	9(28.1)	0(0.0)	1(3.1)	1(3.1)	1.50	0.92
Lessons must be taught to all pupils generally in the same way	18(56.3)	4(25)	0(0.0)	7(21.9)	3(9.4)	2.16	1.53
Every learner in the same class should understand the content after teaching a lesson using the best single method of teaching	25(78.1)	4(25)	1(3.1)	2(6.3)	0(0.0)	1.38	0.83
Every student teacher in the classroom has his/her own learning interest	26(81.3)	3(9.4)	1(3.1)	2(6.3)	0(0.0)	1.34	0.83
Individual learners have their own learning culture and expectations	28(87.5)	2(6.3)	1(3.1)	1(3.1)	0(0.0)	1.22	0.66
Interest, cultures and expectations of student teachers should be considered when teaching (that is, if they have)	16(50)	6(18.8)	2(6.3)	4(25)	4(25)	2.19	1.49
Every individual student teachers' life situation impact on their learning greatly	18(56.3)	7(21.9)	5(15.6)	1(3.1)	1(3.1)	1.75	1.05

Source: Field data 2020

Table 4.2 was about Tutors' knowledge of differentiation based on learner diversity and interest. According to Kauchak and Eggen (2003), teaching has historically been a profession in search of knowledge that could inform classroom practice. This affirms the assertion that the extent of teachers' knowledge of DI is consequential to its practice and implementing by them (Whipple, 2012). In effect, teachers who are in the best position to differentiate instruction in their classrooms operate from strong and growing knowledge base (Tomlinson & Imbeau, 2010). Moreover, the implementation of DI requires deep knowledge of its process, theoretical framework and ways through which the theory is translated into action (Franz, 2009). It is in relation to these underpinnings that the colleges of education science tutors' knowledge was deemed necessary and however explored.

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Results from Table 4.2 indicated that 6.3% (2) of the respondents strongly agreed that Student teachers in their classrooms were homogeneously the same and 9.4% (3) of the respondent agreed to this assertion but 6.3% (2) of the respondents disagreed and 75.0% (24) strongly disagreed with this assertion. A mean score of 1.66 indicated that, the respondents disagreed with this assertion.

Table 4.2 shows that 9.4% (3) of the science tutors who participated in the study strongly agreed that 'student teachers in their classrooms have the same learning characteristics'. Also 3.1% (1) of them also agreed to this assertion but 9.4% (3) of the respondents disagreed that student teachers in their classrooms had the same learning characteristics. About 78.1% (25) of the science tutors strongly disagreed to this statement as they were of the view that, each and every learner is unique and has his/her own learning characteristics. A mean score of 1.56 and a standard deviation of 1.26 indicated that, the science tutors used for the study disagreed to the statement that student teachers in the classroom had the same learning characteristics. It can be deduced from the analysis that each and every learner is unique and has his/her own learning characteristics.

Furthermore, 6.3% (2) of the science tutors strongly agreed that gifted students were also special learners who needed special and extra attention and 31.3% (10) of them agreed to this assertion but 9.4% (3) of the respondents disagreed to the statement that, gifted students are also special learners who need special and extra attention and 53.1% (17) of the respondents strongly disagreed to this statement. A mean score of 2.28 indicated that in every five Tutors, at least two of them agreed that gifted students are also special learners who need special and extra attention.

Table 4.2 also indicated that, 6.3% (2) of the science tutors agreed that every learner in the same class should understand the content after teaching a lesson using the best single method of teaching while 25% (4) of the tutors disagreed to this assertion. Also 78.1% (25) of the science tutors strongly disagreed to every learner in the same class should understand the content after teaching a lesson using the best single method of teaching and a mean score of 1.38 indicates that the respondents disagreed with this statement.

On the statement "every student teacher in the classroom has his/her own learning interest and every individual learner has their own learning culture and expectations". A mean score of 1.34 and 1.22 was respectively obtained indicating that most of the respondents disagreed to the statements. Finally, a mean score of 1.75 indicated that the respondents disagreed that every individual student teachers' life situation impacted on their learning greatly.

Table 4.3: Science Tutors' Knowledge of Differentiation based on Learner interest

Statement	SD(%)	D(%)	NC(%)	A(%)	SA(%)	Mean	StD
Every student teacher in the classroom has his/her own learning interest	0(0.0)	0(0.0)	3(9.4)	6(18.8)	23(71.9)	4.63	0.66
Individual learners have their own learning culture and expectations	0(0.0)	0(0.0)	1(3.1)	10(31.3)	21(65.6)	4.62	0.55
Interest, cultures and expectations of student teachers should be considered when teaching (that is, if they have)	0(0.0)	4(12.5)	1(3.1)	7(21.9)	20(62.5)	4.34	1.04
Every individual student teachers' life situation impact on their learning greatly	0(0.0)	3(9.4)	1(3.1)	5(15.6)	23(71.9)	4.50	0.96

Source field data 2020
***Key:* Strongly Disagree(SD)=1, Disagree(D)=2, Not Certain(NC)=3, Agree(A)=4 Strongly Agree(SA)=5**

Table 4.3 talked about tutors' knowledge of differentiation based on learner interest. Results from Table 4.3 indicated that 71.9% (23) of the science tutors strongly agreed that student teachers in their classrooms had their own learning interest and 18.8% (6) of the respondents agreed to this assertion but 9.4% (3) of the respondents were not sure of this assertion. The mean score of 4.63 showed that the participants had high knowledge that student teachers had their own learning interest.

Table 4.3 revealed that 65.6% (21) of the respondents believed that student teachers had their own learning culture and expectation, while 31.3% (10) of the science tutors agreed to the fact that their student teachers had their own learning culture and expectation. Only 3.1% (1) science tutor was not sure of their statement. However, a mean score of 4.62 and a standard deviation of 0.55 showed that at least four (4) out of five (5) science tutors are in support of this assertion.

With respect to interest, cultures and expectations, 62.5% (20) of the science tutors strongly agreed that the interest, cultures and expectations of student teachers should be considered when teaching, and 21.9% (7) of the respondents agreed to this, but 3.1% (1) of the respondents were not sure of this and 12.5% (4) of the respondents disagreed to this assertion.

Finally, Table 4.3 revealed that 71.9% (23) of the science tutors who participated in the study strongly

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agreed that, every individual student teachers' life situation impact on their learning greatly, and 15.6% (5) agreed to this statement whereas 3.1% (1) wasn't sure of it, but 3.1% (3) of the respondents disagreed to the assertion that, the life situation of every student teacher has an impact on their learning. A mean score of 4.50 showed that Tutors strongly agreed to this assertion.

Table 4.4 below talked about science tutors' knowledge of Differentiation with regards to learning style.

Table 4.4 Science Tutors' Knowledge of Differentiation based on Learning style

Statement	SD(%)	D(%)	NC(%)	A(%)	SA(%)	Mean	StD
Individual learner in the classroom has his/her learning style	0(0.0)	0(0.0)	1(3.1)	3(3.1)	28(87.5)	4.84	0.45
Every learner learns through a particular learning style	0(0.0)	0(0.0)	2(6.3)	7(21.9)	23(71.8)	4.66	0.60
Learning disabilities and abilities of every learner must be addressed through his/her learning style during teaching	16(50.0)	4(12.5)	1(3.1)	8(25)	3(9.4)	2.31	1.53

Source: Field data 2020
***Key:* Strongly Disagree: (SD), Disagree: (D), Not Certain (NC), Agree: (A) Strongly Agree: (SA), Standard Deviation: (StD)**

Table 4.4 was about tutors' knowledge of differentiation based on learning style.

Table 4.4 also indicated that 87.5% (28) of the respondents strongly agreed that every individual learner in the classroom had his/her learning style and 9.4% (3) of the respondents agreed to this. But 3.1% (1) of the respondents is not sure about this statement. A mean of 4.84 and a standard deviation of 0.45 depicted that almost all the respondents strongly agreed to this assertion. From the table 4.4, 71.8% (23) of the science tutors strongly agreed that, every learner learns through a particular learning style and 21.9% (7) of the respondents agreed to this. But 6.3% (2) of the science tutors were not sure of this statement.

Finally, 9.4% (3) of the respondents strongly agreed that learning disabilities and abilities of every learner must be addressed through his/her learning style during teaching. About 25% (8) of the science tutors agreed to this assertion but 3.1% (1) of the respondents were not sure of this statement and 12.5% (4) of the respondents disagreed to this assertion with 50.0% (16) of these respondents strongly disagreeing to this assertion. A mean score of 2.31 and a standard deviation of 1.53 indicated that less than half of the respondents agreed to this assertion as they are of the view that science tutors cannot address the ability of disability of every learner in the classroom.

Table 4.5 below talked about science tutors' knowledge of Differentiation with regards to lesson planning.

Table 4.5: Science Tutors' Knowledge of Differentiation based on Lesson planning

Statement	SD(%)	D(%)	NC(%)	A(%)	SA(%)	Mean	St.d
Learning needs of individual learners must be considered when planning lessons	0(0.0)	0(0.0)	1(3.1)	6(18.8)	25(78.1)	4.75	0.51
Lesson objectives should consider individual learner's needs	0(0.0)	0(0.0)	1(3.1)	3(9.4)	28(87.5)	4.84	0.45
Lessons should be planned considering pupils' differences	0(0.0)	0(0.0)	0(0.0)	8(25.0)	24(75)	4.75	0.44
The same lesson plan must satisfy all learners in the same class	4(12.5)	1(3.1)	0(0.0)	8(25.0)	19(59.4)	4.16	1.37

Source: Field data 2020
***Key:* Strongly Disagree: (SD), Disagree: (D), Not Certain (NC), Agree: (A) Strongly Agree: (SA), Standard Deviation: (StD)**

Table 4.5 was about Tutors' knowledge of differentiation based on lesson planning. Results from Table 4.5 indicated that, 78.1% (25) of the science tutors strongly agreed that the learning needs of individual learners must be considered when planning lessons, while 18.8% (6) agreed to this assertion but only 3.1% (1) of the respondents were not certain. A mean score of

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4.75 indicated that at least four (4) out of five (5) of the respondents strongly agreed to this assertion.

Table 4.5 also showed that 87.5% (28) of the respondents strongly agreed that when planning lesson objectives, there is the need to consider individual learner's needs, and 9.4% (3) of science tutors agreed that individual learner's needs must be considered when planning lesson objectives but 3.1% (1) of the science tutors were not sure about this statement.

Furthermore, 75% (24) of the science tutors strongly agreed that lesson should be planned considering the individual differences of the learner and 25.0% (8) of the respondents agreed to this. Results from Table 4.5 also pointed that, 59.4% (19) of the science tutors strongly agreed that the same lesson plan must satisfy all learners in the same class and 25.0% (8) of the science tutors agreed to this assertion.

Table 4.6 below talked about science tutors' knowledge of Differentiation with regards to Process.

Table 4.6: Mean score and for aspect of science tutors' knowledge on Content

Statement	Average Mean= **M**	Average Standard Deviation= **StD**
Learner Diversity	2	1.06
Learner Interest	4.53	0.8
Learning style	3.94	0.85
Lesson Planning	3.63	0.7

Average Mean score of 2.00 (1.06 of standard deviation) suggest that respondents had low knowledge level of learner diversity. The different level of colleges of education science tutors' knowledge on the nine DI sub-concepts is in consistent with the findings of Whipple (2012) which shown analogous variations of teachers understanding among six DI sub-concepts or components. On the contrary, science tutors' knowledge on process, interest and product differentiation were reported higher in the findings of this study and they seemed to be the three least understood sub- concepts in Whipple's study.

Contrasting several other studies (Hobson, 2008; Logan, 2008; Whipple, 2012; Woods, 2014) which indicated that teachers were knowledgeable of DI because they were given special education and training on it, this study found that science tutors have different level of knowledgeable of DI but had no professional education or training on it. This was manifested when the researcher asked them how they acquired the knowledge they had on the DI concepts. Majority of them admitted that "they learnt something little about it as an Introduction to Special Education course in their colleges "while a few of them affirmed to have known about it through "teaching experience". This is consistent with the findings of Abbati (2012) which revealed that the exceptionally high implementers of DI were evidenced by personal factors such as willingness to persevere and grow professionally, relatively long experience of teaching the same grade level or class, and solid classroom management skills. The finding of this study revealed that the teachers have not heard about differentiation of instruction before despite knowing about its concepts. This is in disparity with the findings of Valiande & Koutselini (2009) in which most of the teachers who participated in their research reported to have a heard a lot about DI but did not really know what it meant. In their study, some of the teachers who purported to have used differentiation in the past did not really differentiate their instruction but had the misconception they did so by using different teaching methods, materials and different teaching/ learning activities.

Some key issues from the interview conducted: He said that ''*oooh as for differentiated instruction, it is knowing how to address the needs of the students differently*''. From the response of Tutor 1, it is evident that his knowledge in differentiated instruction is inadequate. The varying level of science tutors' knowledge of the DI concepts (learners' diversity) is consistent with the findings of Whipple (2012) which revealed similar variations of teachers understanding among DI components or concepts. Results from the observation proved that the teachers barely differentiated instruction and scarcely use a variety of instructional strategies and activities.

Average Mean scores of 4.53 (0.80 of standard deviation) , 3.94 (0.85 of standard deviation) and 3.63 (0.70 of standard deviation) suggest that respondents have high knowledge level of learner interest, learning style and lesson planning respectively. However, while science tutors knowledge on learner interest, learning style and lesson planning differentiation were reported higher in the findings of this study, they appeared to be the lowest understood sub- concepts in Whipple's study.

Table 4.7: Science Tutors' Knowledge of Differentiation based on Process

Statement	SD(%)	D(%)	NC(%)	A(%)	SA(%)	Mean	St.d
Teaching/Learning activities should purposefully focus on individual learner's needs during lesson delivery	0(0.0)	0(0.0)	1(3.1)	11(34.4)	19(59.4)	4.56	0.56
Lessons should be taught towards completing the syllabus instead of	11(34.4)	9(28.1)	1(3.1)	3(9.4)	8(25.0)	2.63	1.64

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varying instruction to satisfy learner needs							
Each learner in the classroom should be allowed to choose his/her own learning style	4(12.5)	2(6.3)	0(0.0)	6(18.8)	20(62.5)	4.13	1.43
Study groups in the classroom should be formed based on learners' abilities, interests, styles and learning preferences	0(0.0)	4(12.5)	1(3.1)	19(59.4)	8(25.0)	3.97	0.90
Students should be provided with the choice to work alone, in pairs or in small groups during teaching/learning	0(0.0)	14(43.8)	0(0.0)	15(46.9)	3(9.4)	3.22	1.13
Some learners can be given individual attention during teaching and learning	11(34.4)	1(3.1)	0(0.0)	14(43.8)	6(18.8)	3.09	1.63
Different types of teaching approaches should be used during teaching and learning	0(0.0)	0(0.0)	0(0.0)	3(9.4)	29(90.6)	4.91	0.30
Tutor is familiar with being in learning contracts with learners	0(0.0)	0(0.0)	1(3.1)	4(12.5)	27(84.4)	4.81	0.47
Tutor is aware of engaging learners in tiered lessons	0(0.0)	0(0.0)	2(6.3)	4(12.5)	26(81.3)	4.75	0.57
Tutor is aware of scaffolding learners during teaching/learning process	0(0.0)	0(0.0)	0(0.0)	4(12.5)	28(87.5)	4.88	0.34

Source: Field data 2020
Key: **Strongly Disagree(SD)=1, Disagree(D)=2, Not Certain(NC)=3, Agree(A)=4 Strongly Agree(SA)=5, Standard Deviation=StD, Mean=M**

Table 4.7 was about tutors' knowledge of differentiation based on process. Results from Table 4.7, indicated that 59.4% (19) of the respondents strongly agreed that teaching/learning activities should primarily be based on individual learner's needs during lesson delivery and 34.4% (11) of the science tutors agreed to this but 3.1% (1) of the respondents were not sure of this statement. A mean score of 4.56 indicated that the respondents used for the study strongly agreed that, teaching and learning activities should primarily be based on individual learner's needs.

Table 4.7 also showed that 25.0% (8) of the science tutors strongly agreed that lessons should be taught strictly in order to complete the syllabus instead of varying instruction to satisfy learner needs and 9.4% (3) agreed to this assertion but 28.1% (9) of the respondents disagreed to this. The Table 4.7 also revealed that 34.4% (11) of the respondents strongly disagreed that lessons should be taught strictly in order to complete the syllabus and they were of the view that lessons should not be strictly taught with the aim of just completing the syllabus. Surprisingly, 3.1% (1) of the respondents were not sure of this statement. A mean score of 2.63 indicated that, out of 5 science tutors almost 3 of them are in support of this.

Furthermore, 25.0% (8) of respondents strongly agreed that grouping in the classroom should be formed based on learners' abilities, interests, styles and learning preferences and 59.4% (19) of the respondents also agreed. However, 12.5% (4) of the respondents disagreed to this assertion while 3.1% (1) of the respondents were not sure of this statement.

Table 4.7 also indicated that 18.8% (6) of the respondents strongly agreed that some learners can be given individual attention during teaching and learning while 43.8% (14) of the respondents also agreed to this statement but 3.1% (1) of the respondents disagreed to this assertion and 34.4% (11) of the respondents also strongly disagreed. A mean score of 3.09 indicated that at least 3 out of 5 of the respondents agreed to this assertion. With respect to variety of teaching approaches or strategies, 90.6% (29) of the science tutors strongly agreed that a variety of teaching approaches or strategies should be used during teaching while 9.4% (3) of the respondents agreed to this assertion. A mean score of 4.91 indicated that the respondents used for the study strongly agreed to this assertion.

Lastly, 84.4% (27) strongly agreed, and 12.5% (4) agreed that they were familiar with entering into learning contracts with learners. However, 3.1% (1) of the respondents were not sure that they are familiar with entering into learning contracts with learners. A mean score of 4.81 indicated that the respondents strongly agreed that they were entered into learning contracts with their learners.

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With regards to scaffolding, 87.5% (28) of the respondents strongly agreed that they were familiar with scaffolding learners in teaching/learning. Again 12.5% (4) of them also agreed to support 87.5% of respondents who strongly agreed. A mean score of 4.88 and a standard deviation of 0.34 indicated that all the respondents used for the study strongly agreed to this notion. Average mean of 4.10 represents Agree which means that respondents has high knowledge level on process.

Contrarily, the findings from the rating scale (observation) showed that 70% of the respondents do not meet the diverse learning needs on their learners. Again, science tutors poorly used instructional materials in terms of age appropriateness, availability and quantity. Apart from poorly employing classroom grouping during teaching, teachers scarcely teach to meet the diverse needs of learners. The findings suggest that there is a lower level of teachers' implementation and practices of DI. These findings contradict the calls that prompt teachers on the need to address learner variance, difference and diversity in the regular classroom (Jackson & Davis cited in Rose & Dyer, 2008), as well as Ampiah's (2008) appeal to teachers to adopt quality and evidence-based teaching practices that are effective in maximising the learning needs of all learners in Ghanaian basic school classrooms. The excerpts from interview below is also in agreement with the results from rating scale during the observation conducted.

Tr. 4: You know, every teacher wants to teach to satisfy her learners but sometimes due to time factor we forget about them and concentrate on what the course outline requires of us. But the student teachers have to understand.

Tr. 5: I teach to satisfy the course outlines requirements whether it's good or not because that is what is required of me, perhaps that's what can make them pass their exam. And my work will be measured by their passing of these exams or otherwise. Isn't it?

Table 4.8 below talked about science tutors' knowledge of Differentiation with regards to Product (Assessment).

Table 4.8: Science Tutors' Knowledge of Differentiation based Assessment (Product)

Statement	SD(%)	D(%)	NC(%)	A(%)	SA(%)	Mean	St.D
Questioning during teaching should only measure understanding and progress of learners on the content being taught	14(43.8)	8(25.0)	0(0.0)	7(21.9)	3(9.4)	2.28	1.46
Students should have the opportunity to work alone, in pairs or in small groups during classroom assessment	14(43.8)	2(6.3)	0(0.0)	5(15.6)	11(34.3)	2.91	1.86
Learners should have alternative assessment tasks for them to choose from	10(31.3)	11(34.3)	2(6.3)	7(21.9)	2(6.3)	2.72	0.60
Different assessment strategies should be employed before, during, and after teaching and learning	0(0.0)	0(0.0)	0(0.0)	6(18.8)	26(81.3)	4.81	0.40
All the learners must work on the same assessment tasks	16(50)	4(12.5)	0(0.0)	8(25.0)	4(12.5)	2.38	1.60
Assessment should not be separated from learning	0(0.0)	0(0.0)	0(0.0)	5(15.6)	27(84.4)	4.88	0.55

Source: Field data 2020

***Key:* Strongly Disagree(SD)=1, Disagree(D)=2, Not Certain(NC)=3, Agree(A)=4 Strongly Agree(SA)=5, Standard Deviation=StD**

Table 4.8 was about Tutors' knowledge of differentiation based on product (Assessment). Results from Table 4.7 showed that 9.4% (3) of the respondents strongly agreed that questions asked during teaching and learning process should only measure pupil's understanding and progress on the content being taught, with 21.9% (7) of respondents agreed that questions asked during teaching and learning process should only measure pupil's understanding and progress but 25.0% (8) of science tutors disagreed to the statement and 43.8% (14) of the respondents also strongly disagreed to this assertion as they were of the view that students should not be assessed on only what they were being taught. A mean score of 2.28 showed that when 5 of the respondents are randomly selected, less than 3 of them will agree to this assertion.

Table 4.8 displayed that, 34.3% (11) of the respondents strongly agreed that students should be given the choice to work alone, in pairs or in small groups during classroom assessment, 15.6% (5) of the respondents agreed to this assertion but from Table 4.8, 6.3% (2) of the respondents disagreed to this and 43.8%

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(14) of them strongly disagreed as they were of the view that student teachers should not be allowed to choose whether to be in groups or not because most of them will decide not to and even if they do, they would prefer to be in the same group with their friends, which will first of all defeat the purpose of the grouping. Furthermore, 6.3% (2) of the respondents strongly agreed that, the teacher should provide learners with a variety of assessment tasks for student teachers to choose from, and 21.9% (7) of the science tutors also agreed to this statement. However, 34.3% (11) of the science tutors disagreed to this assertion and 31.3% (10) of them strongly disagreed to this privilege as they were of the view that all learners should work on the same task so it will be easier to tell those who need help and those who do not.

Table 4.8 also showed that 81.3% (26) of the science tutors strongly agreed that, a variety of assessment tools/strategies should be employed before, during, and after teaching and learning, and 18.8% (6) also agreed to statement. A mean score of 4.81 indicated that, all the science tutors strongly agreed to the fact that assessment should start during the lesson planning and continue during lesson and even after the lesson, and that assessment should not stop but rather continuous. Finally, 84.4 (27) of the tutors used for the study strongly agreed that assessment should not be separated from learning, and 15.6% (5) of the respondents agreed to this assertion. A mean score of 4.88 indicated that almost all the respondents believed that assessment should always be part of the teaching and learning process.

From the excerpts, the interview confirmed all the elements under assessment except on ‘’what feedback from assessment are used for’’ with the results from rating scale during the observation conducted.

Tutor 8 was also asked about what he does with the feedback gotten from assessment, here is what he had to say. *Tutor 8: “feedback as in the results gotten from the assessment? Oh, I record the ones they did well to be used to grade them for the end of semester to be used to grade them”.* Researcher: what do you do with the feedback gotten from assessment? *Tutor 9: “the marks they get are used to grade them”* Researcher: Do you agree that a variety of assessment tools and strategies should be employed before, during, and after teaching and learning *Tutor 9: “oh yes, I do”* Researcher: why do you do that? *Tutor 9: “oh I assess them because I will need the results to grade them at the end of the semester”*

The researcher also observed from the rating scale that 80% (8) of the respondents scarcely applied assessment feedback to guide their instruction. This means that respondents scarcely apply assessment information to guide instruction, use instruction and scarcely use a variety of instructional strategies and activities.

The findings from the study contradict Ramaprasad’s (1983) position that feedback is a resource that provides performance-impact information, stating that "feedback is information about the difference between the actual level and the reference level of a device parameter that is used to modify the difference in some way" (p. 4). Furthermore, Black and Wiliam (1998) point out the importance of the teacher's oral feedback which helps students to reflect on their learning. They write, "The dialog between pupils and a teacher should be reflective in thought, focused on evoking and exploring understanding so that all pupils have an opportunity to think and express their ideas" (p. 8)

Table 4.9 below talked about science tutors’ knowledge on Differentiation with regards to Environment

Table 4.9: Science Tutors’ Knowledge of Differentiation based on Environment

Statement	SD(%)	D(%)	NC(%)	A(%)	SA(%)	Mean	St.D
Classroom should be flexibly structured to support a varied types of teaching strategies	0(0.0)	0(0.0)	0(0.0)	3(9.4)	29(90.6)	4.91	0.30
Learning Resources should vary to satisfy students’ interest and abilities	0(0.0)	0(0.0)	0(0.0)	1(3.1)	31(96.9)	4.97	0.18
Learning environment should be democratic for every learner	0(0.0)	1(3.1)	2(6.3)	8(25.0)	21(65.6)	4.53	0.76
Normal classroom environment should include learners with diverse learning needs	4(12.5)	0(0.0)	0(0.0)	3(9.4)	25(78.1)	4.41	1.34

Source: Field data 2020
***Key:* Strongly Disagree(SD)=1, Disagree(D)=2, Not Certain(NC)=3, Agree(A)=4 Strongly Agree(SA)=5, Standard Deviation=StD**

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Table 4.9 was about Tutors' knowledge of differentiation based on learner environment. Results from Table 4.8 showed that 90.6% (29) of the respondents strongly agreed to the assertion that classroom environment should be flexibly structured to support varied types of teaching strategies and 9.4% (3) of them agreed to this. A mean score of 4.91 confirmed this prerogative.

Table 4.9 also showed that 96.9% (31) of the respondents strongly agreed that, learning resources should be varied to satisfy students' interest and abilities and only 3.1% (1) of the respondents agreed to it. But a mean score of 4.97 indicated that all the respondents strongly agree to the fact that teaching and learning materials should be varied to satisfy the interest and ability of students.

The results from Table 4.9 also indicated that 65.6% (21) of the science tutors strongly agreed that the learning environment should be democratic for every learner and 25.0% (8) of the science tutors also agreed that learning environment should be democratic for every learner. However, 6.3% (2) of the science tutors were not sure of this statement and 3.1% (1) of the science tutors disagreed to this assertion as he was of the view that it was not possible to make the environment suit each and every learner, he believed that rather learners should be taught to adapt to different environment.

Finally, 78.1% (25), of the science tutors strongly agreed that the regular or normal classroom environment should include learners with diverse learning needs and 9.4% (3) of the science tutors also agreed to support the 78.1% who strongly agreed that normal classroom environment should include learners with diverse learning needs. The remaining 12.5% (4) of the science tutors strongly disagreed that, normal classroom environment should include learners with diverse learning needs as they were of the view that they cannot fit into the normal class because they might either slow down learning process or they will be left behind.

During the interview, three of the science tutors were asked about the type of learning environment they provide for learners. The excerpts below:

Tutor 1: *I structure my classroom environment to support a variety of activities like flexible grouping and individual work because I believe normal classroom environment should include learners with special needs, I do this for social inclusivity.*

Tutor 2: *Yes, my classroom is structured in support different learner with diverse learning needs, whether cultural, religious emotional or mental, I do this to allow diverse groups to learn side by side with each other.*

Tutor 3: *I have structured my classroom environment to support the diverse needs of my learners. I address the language, cultural, emotional and mental needs of my students.*

Consequently, the results indicated that majority of the general school and classroom environments did present physical features that were conducive for learning or differentiation. This is in agreement with Launder's (2011) assertions that a differentiated learning environment should be set up for differentiation by providing separate spaces for individual work and group instruction, majority of the classrooms observed in this study contained comfortable desks and work areas for individual needs and group instruction. This is also in line with Wormeli (2007) assertion which sees learning environment for DI as the physical space visa-visa the way it is arranged. This assertion also seat well with Gangi (2011) that, differentiating the classroom environment should provide the students with a more inviting atmosphere to learn.

VI. CONCLUSION

Based on the findings of this study, the study concluded that majority of colleges of education science tutors had varying knowledge in Differentiated Instruction.

The study also revealed that although there were signs of differentiated practices during their instructional process, science tutors did not cautiously use DI to engage the student teachers during instructional planning, practices and content. The researcher identified that these good signs were as a result of these science tutors using very good teaching methodologies or instructional practices and had also gained enough experience on the job.

Again, the findings from the interview response from respondents showed that the assessment results were just used as an evaluative tool, instead of using assessment feedback to positively improve upon teaching and learning. They only see assessment feedback as means to award grades and evaluate learners.

However, it was identified that science tutors differentiated their product or assessment during their teaching process. These tutors resulted to using different assessment strategies for assessing their student teachers learning process. They made very good use of alternative assessment to help those student teachers who fell short of paper and pencil test.

The findings of the study also revealed that the learning environment at Colleges of Education were very conducive for the use of different strategies of teaching. It was identified that furniture in the classroom were conducive for differentiation which was conducive enough and supported differentiated instruction.

RECOMMENDATIONS

The study recommends that;

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1. National Council for Tertiary Education (NTCE) should cautiously organize series of continuous professional development courses and workshops on the differentiated instructional strategies to give College of Education tutors hands-on training on DI.
2. Tutors in the Colleges of Education in Ghana should intensify the teaching of assessment procedures in differentiated instruction to prepare student teachers for effective handling of learners with diverse needs in the classroom. Though, it was revealed from the study that student teachers were introduced to assessing children with special needs and disabilities, the researcher believes that assessment in differentiation instruction goes beyond having knowledge on assessment practices in Special Education. When teachers have adequate knowledge in assessment procedures, they will be able to ensure novelty in assessment practices to foster participation of all learners with diverse learning needs in the classroom

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