Caribbean Curriculum
Vol. 20, 2013, 31–51.

DIFFERENTIATING INSTRUCTION: Experiences of Pre-Service and In-Service Trained Teachers

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This study sought to investigate what pre-service and in-service trained teachers understand by *differentiated instruction*, and the extent to which they practised differentiating instruction in their classrooms. Three hundred and seventy-nine participants were randomly drawn from selected primary and secondary schools situated in the north-eastern, central, southern, and western parts of Trinidad. Findings of the study revealed that 58% of the respondents understood the concept of differentiated instruction. However, the majority of teachers did not differentiate content and product in their classrooms. While responses from participants in the questionnaire survey indicated that teachers generally understand and engage in process differentiation, responses from focus group interviews suggested that this type of differentiation is not a planned and conscious strategy. The study also highlighted various challenges related to implementation of differentiated instruction. These include the lack of time for planning adequate teaching, limited space for group work, and lack of administrative support.

Introduction

A major objective of many teacher education programmes is that prospective teachers develop sound pedagogical skills and competencies to meet the varying needs of learners in the classrooms. However, this ideal is not always achieved since some graduate teachers continue to experience severe challenges in bridging the gap between theory and effective classroom practice. If this is the general experience of pre-service and in-service trained teachers, then a case can be made for teacher preparation institutions to transform their programmes to reflect the realities of 21st century schools (Chesley & Jordan, 2012). One way to accomplish this is to emphasize differentiated instruction not merely as an instructional strategy, but rather as a critical teaching and learning philosophy that all prospective teachers should be exposed to in teacher education programmes (Ireh & Ibeneme, 2010). This philosophy, according to Tomlinson and Imbeau (2010), is based on the following set of beliefs: (a) students who are the same age differ in their readiness to

learn, their interests, their styles of learning, their experiences, and their life circumstances; (b) the differences in students are significant enough to make a major impact on what students need to learn; (c) students will learn best when they can make connections between the curriculum and their interests and life experiences; and (d) the central job of schools is to maximize the capacity of each child.

Popularized by Carol Ann Tomlinson (2001), differentiated instruction is a deliberate and conscious method of planning and teaching to address student variance. It is an approach to teaching essential content in a way that addresses the varied learning needs of students, with the intention of maximizing the potential of each learner (Tomlinson, 2001). This approach is characterized by strategies that use assessment of each individual student for readiness, interest, and learning preference in order to modify instruction in one of three ways: by content, process, or product. Differentiation is strongly contrasted to traditional practices that use a whole-group lecture format, where student learning and participation are more passive and unresponsive to individual needs (Gibson & Hasbrouck, 2008; King-Shaver, 2008).

Differentiation is also contrasted to *tracking* or *streaming*, where students are grouped according to their varying abilities. This may be done either in separate classes as part of the formal operating structure of the school, or informally by means of special homogeneous instructional grouping within their respective classes (Ansalone, 2010). Early proponents of tracking argue that this practice facilitates individualized instruction, and eliminates the probability of boredom experienced by advanced students due to the participation of slower students (Kirkland, 1971). Opponents, however, believe that tracking represents a "veiled attempt to reproduce and legitimate the stratification system," which offers inferior educational opportunities to children of working-class parents (Ansalone, 2010, p. 6). In reviewing the research on tracking, Ansalone (2010) posits that in the final analysis, little support is available for the assumption that tracking improves the academic achievement of all students. He concludes that tracking is a "defective strategy that may create a restricted learning trajectory for students which can impact on academic competency" (p.14).

Key Elements of Differentiated Instruction

Tomlinson and Imbeau (2010) describe differentiation as "classroom practice with a balanced emphasis on individual students and course content" (p. 14). They posit that at the core of the classroom practice of differentiation is the modification of curriculum-related elements such as

content, process, and product, based on student readiness, interest, and learning profile.

Student readiness. If teachers are to effectively differentiate instruction, then they must not only understand the concept, but they must also feel motivated to integrate differentiation into the classroom (Latz, Speirs Neumeister, Adams, & Pierce, 2009). One way to begin this process is by paying attention to student readiness. Tomlinson and Imbeau (2010) caution that readiness is not a synonym for ability, and the two terms should not be used interchangeably. For them, *readiness* suggests a temporary condition that should change regularly as a result of high-quality teaching; whereas *ability* refers to a fixed state based on some form of innate or inborn trait. Tomlinson (2005a, 2005b) posits that the concept of student readiness encompasses student knowledge, understanding, and skills in relation to the instruction a teacher is planning. The goal of readiness differentiation is to ensure that all students are provided with appropriately challenging learning experiences (Santangelo & Tomlinson, 2009). For example, teachers may choose to differentiate based on student readiness by varying the levels of difficulty of the material studied in class (Anderson, 2007).

Student interest. Student interest refers to "that which engages the attention, curiosity, and involvement of a student" (Tomlinson & Imbeau, 2010, p. 16). Therefore, when teachers differentiate instruction according to students' existing interests, such students are motivated to connect what is being taught with things they already value. Interest-based differentiation also encourages students to discover "new interests" (Santangelo & Tomlinson, 2009). In a classroom setting, for example, teachers may choose to differentiate key skills and materials to be learned by aligning them with particular students' interests in several areas such as music, sports, or wildlife.

Student learning profile. When differentiation is based on learning profiles, students are provided with opportunities to learn in ways that are natural and efficient. For example, students may be given the opportunity to work alone, with partners, or as a group. They may also be provided with work spaces that are conducive to various learning preferences—a quiet place or with music playing; in a dimly lit room or one with bright lights; work spaces with tables instead of desks (Anderson, 2007). Key factors in student learning profiles include learning environment preferences, group orientation, cognitive styles, and intelligence preferences (Santangelo & Tomlinson, 2009).

Content differentiation. It is reasonable to assume that once teachers have a good understanding of students' level of readiness, interests, and learning profiles, they will be more likely to engage in effective and appropriate content, process, and product differentiation (Santangelo & Tomlinson, 2009). Tomlinson (2005a, 2005b) explains that content comprises not only *what* is taught, but *how* students access the material taught. She suggests that, to a large extent, *what* is taught should remain relatively constant across learners, with teachers varying *how* students get access to specified content to address learners' needs. Some strategies for content differentiation include: providing text materials at varied reading levels of complexity; curriculum compacting; using small group instruction to re-teach or reinforce content; providing text on audiotape; supplementing oral presentations with videotapes and visual demonstrations; providing note-taking organizers; highlighting or summarizing key portions of text; and using manipulatives (Tomlinson, 2005a, 2005b).

Clearly, differentiating content requires teachers to either modify or adapt how they give students access to the material they want the students to learn. Heacox (2002) concurs that one way teachers can differentiate the content or curriculum they teach is by providing students with the opportunity to choose a subtopic within a main topic or unit. As each student presents the information on their subtopic, the whole class learns more about the topic in general. Anderson (2007) suggests that teachers may choose to differentiate content by using flexible grouping, where students can work in pairs, small groups, or alone, using books, tape, or the Internet as a means of developing understanding and knowledge of the topic or concept. It is important to note that while all students should be encouraged to work at their own pace, each student has the responsibility for meeting specified deadlines for class projects.

Process (activities) differentiation. Like content differentiation, process can also be differentiated in response to readiness, interest, and learning profile (Tomlinson, 2005a, 2005b). According to Anderson (2007), differentiating the process within a lesson refers to "how the learners come to understand and assimilate facts, concepts, or skills" (p. 50). Strategies for effective process differentiation include: tiering activities to various levels of complexity to optimize every student's classroom experience; providing directions at varied levels of specificity; varying the pace of work; offering multiple options of expression; giving students alternative topics on which to focus; creating activities that are harmonious with students' preferred modalities of learning (Sylwester, 2003; Tomlinson, 2005a, 2005b). These activities are referred to as

"sense-making" activities, which allow students to increase their understanding of the topic being taught (Tomlinson, 2005a). It is important to note that the process is differentiated not only by how the teacher decides to teach (lecture for auditory learners; centres for tactile learners; small group and whole group), but also by the strategies the teachers encourage students to use to facilitate thorough exploration of the content taught. This can be done by way of higher-order thinking, open-ended thinking, discovery, reasoning, and research (Bailey & Williams-Black, 2008).

Product differentiation. Tomlinson (2005a, 2005b) suggests that products are culminating assessments that allow students to demonstrate how much they understand and how well they can apply their knowledge and skills after a significant segment of instruction. Product differentiation should offer students multiple pathways to show mastery of common learning goals. Effective product differentiation assignments should offer students clear and appropriate criteria for success; focus on real-world relevance and application; promote creative and critical thinking; and allow for varied modes of expression. Santangelo and Tomlinson (2009) also believe that it is important for teachers to provide students with adequate scaffolding and support, as well as opportunities for peer and self-evaluation. Bailey and Williams-Black (2008) suggest that differentiating the product allows students to self-select a way to show they have learned the material that was taught. They argue that when students self-select their product, they normally choose a method that will provide them success, which most likely will coincide with their own learning profiles.

Obstacles to Differentiating Instruction

Studies show that many teachers hesitate to integrate differentiation into the classroom for several reasons. These include: a general lack of administrative support (Hertberg-Davis & Brighton, 2006); fear of lowering student test scores by deviating from the prescribed curriculum (VanTassel-Baska, 2006); challenge of dealing with student behavioural problems (Hertberg-Davis & Brighton, 2004; Knopper & Fertig, 2005; Westberg, Archambault, Dobyns, & Salvin, 1993); teacher resistance to a change in teaching style (Tieso, 2004); lack of time to plan for differentiation (Hertberg-Davis & Brighton, 2006; Knopper & Fertig, 2005; Westberg et al., 2005); and uncertainty about parents' reaction to differentiation (Knopper & Fertig, 2005). Notwithstanding these obstacles, differentiation works best when teachers are motivated, and when principals and school administrators provide the enabling

environment to support the implementation of differentiation techniques in the classroom. Tomlinson and Imbeau (2010) concur that effective differentiated instruction is inseparable from a positive learning environment, high-quality curriculum, assessment to inform teacher decision making, and flexible classroom management.

Purpose of the Study

This study sought to investigate what pre-service and in-service trained teachers understand by differentiated instruction, and the extent to which these teachers practise differentiating instruction in their classrooms. Pre-service teachers are those who enter teacher education institutions to pursue a Bachelor of Education (B.Ed.) degree without any prior teaching experience. In-service teachers are those who enter teacher education institutions to pursue studies after they have taught for some time in the school system. Three research questions served to focus this investigation:

1. *What are teachers' understandings of differentiated instruction?*
2. *How do teachers differentiate their instruction at the primary and secondary school levels?*
3. *What factors hinder or encourage the implementation of differentiated instruction in schools?*

Methodology

This study utilized a survey instrument with 36 items, covering three objectives arising from the research questions outlined above. For most of the survey items, respondents were required to express their opinions on a 5-point Likert-type scale. Some of the responses required the use of open-ended items to elicit comments from respondents on their understanding of differentiated instruction and the extent to which they used differentiated instruction in their classrooms. The instrument was pilot-tested, and feedback was used to improve the instrument before distributing the questionnaire to the research sample.

One hundred part-time students studying for a B.Ed. degree were each given five questionnaires to distribute randomly to teachers in selected primary and secondary schools situated in the north-eastern, central, southern, and western parts of Trinidad. This exercise was done as part of the requirements of a curriculum studies course that focused on teachers' experiences in the workplace. Out of 500 questionnaires

distributed, 379 were completed and returned—an overall 76% response rate.

Focus group interviews were used as a complementary instrument to collect qualitative data for the study. A purposive sample was drawn to participate in focus group discussions. There were two heterogeneous focus groups comprising five persons each. All questions were the same for both groups to facilitate consistency in analysis. These questions were designed to obtain additional information about participants' attempts at differentiating process, and focused on strategies teachers used to assist students in exploring concepts taught in the lesson. The following five questions were used for 1-hour-long focus group discussions:

1. *What strategies do you use to assist students in exploring concepts taught in the lesson?*
2. *How often do you use graphic organizers in your teaching?*
3. *How often do you use role playing in your teaching?*
4. *What other types of learning strategies do you have students use to explore the content being taught?*
5. *Do you deliberately set out to differentiate or vary the activities in the lesson? Why? Why not?*

In this study, females made up the greater portion of respondents with teaching experience ranging from 0–4 years to over 30 years (see Table 1).

Table 1. Years of Teaching Experience

Years of Teaching	No. of Teachers
0–4	80
5–10	101
11–15	74
16–20	29
21–25	26
26–30	27
30+	42

Academic qualifications of teachers ranged from B.Ed. degrees in Primary Education, Secondary Education, Special Needs Education, and

Early Childhood Care and Education to diplomas in Education and Teaching. Based on the distribution of years of teaching experience in Table 1, 48% of the participants possess approximately 10 years' teaching experience, while 34% of respondents have 11–25 years' teaching experience. Only 18% of the participants of this study are veteran teachers with over 26 years' teaching experience. It is noteworthy that approximately 70% of the participants possess B.Ed. degrees and Teachers' Diplomas, as can be seen in Table 2.

Table 2. Teachers' Academic Qualifications

Qualifications	No. of Teachers
B.Ed. (Primary)	118
B.Ed. (Secondary	18
B.Ed. (ECCE)	10
B.Ed. (Special Needs)	13
Teachers' Diploma	105
Other	115

Table 3 shows that 71% of the participants teach at the primary level, while 29% of the teachers operate at the secondary level of the school system. The table also shows that the majority of the participants (64%) are in-service trained teachers, while 36% are pre-service trained teachers.

Table 3. Level of Teaching and Type of Training

Teaching Level	No. of Teachers	Type of Training	No. of Teachers
Primary	271	Pre-Service	137
Secondary	108	In-Service	242

Data Analysis

The data analysis process involved sorting, labelling, and categorizing all 379 survey questionnaires obtained from the study. Frequency tables were developed for recording and tabulating demographic responses with the aid of the Statistical Package for the Social Sciences (SPSS)

software. These demographic responses included questions related to gender, teaching experience, qualifications, level of teaching, and type of training. Using the SPSS software, variables from the survey were put in the correct form and checks were made for missing values. Totals from all responses were recorded and percentages were calculated for each response. Nine open-ended questions were included to capture qualitative responses on how participants defined differentiated instruction, as well as their experiences in implementing differentiated instruction in the classrooms. Focus group interviews were also conducted to obtain qualitative data for the study.

Qualitative data analysis for the open-ended questions and focus group interviews was done without the aid of a software program. The procedure for the open-ended questions involved careful checking for patterns in responses, identifying emerging themes, and paying attention to alternative explanations provided by participants. Both focus group sessions were audiotaped, and information from the recording was reviewed several times to obtain verbatim accounts of focus group interviews. Information from the focus group sessions served to clarify unclear elements of the study. Techniques used to ensure credibility or validity of the focus group process involved verbatim accounts of focus group interviews, use of recording devices to capture data, and participants' review of the researcher's synthesis of interviews.

Findings of Research Questions

Three hundred and seventy-nine teachers participated in a survey that required them to indicate, on a 5-point Likert-type scale, their understanding of differentiated instruction. They were also asked to indicate how they differentiated their instruction at the primary and secondary school levels, and what factors hindered or encouraged implementation of differentiated instruction in schools.

Discussion of Likert-Type Responses

Research Question 1

What are teachers' understandings of differentiated instruction?

Survey items 6–12 addressed this research question. Responses from participants indicated that 58% of the teachers understood the concept of differentiation. These responses mirrored those found in educational journals and textbooks on the concept of differentiated instruction. Responses from participants also indicated that a larger number of

primary school teachers demonstrate understanding of the concept of differentiation than their counterparts at the secondary level. When asked whether they felt that differentiated instruction should only be incorporated for gifted and talented students, the majority (88%) responded *no*, while only 12% responded *yes*.

Based on these responses, one can assume that the majority of teachers in the study have a clear understanding of differentiated instruction. However, this assumption was further tested by teachers' responses to three specific aspects of differentiation, namely, content, process, and product differentiation. In Table 4, survey items 6–12 addressed the issue of content differentiation by asking about the use of a variety of resource materials for handling differences in reading levels; grouping students according to readiness levels; exempting students who demonstrated mastery of the material; and the establishment of learning centres in the classroom.

Table 4. Percentage of Responses on Survey Items Relating to Content Differentiation

Survey Items	Very Freq.	Freq.	Occ.	Rarely	Never	No Resp.
6. I use a variety of resource materials for handling differences in reading levels	13.7	43.8	33.2	7.4	.5	1.5
7. I group students according to readiness levels	9.2	38.5	32.2	14.2	4.2	1.7
8. I re-teach to small groups who need support or further explanations	23.2	47.8	24.5	2.9	1.1	.5
9. I exempt those students who have already mastered the material	2.6	9.2	31.3	28.0	28.0	.9
10. I establish learning centres in my classroom	10.0	27.4	34.8	18.7	6.9	2.2
11. I allow students to work alone	18.5	40.4	31.1	7.9	1.3	.8
12. I allow students to work with peers	28.5	47.2	21.6	1.3	.3	1.1

In Table 5, survey items 13–15 and 24–26 addressed the issue of process differentiation to determine how students made sense of the content taught to them in class.

Table 5a. Percentage of Responses on Survey Items Relating to Process Differentiation

Survey Items	Very Freq.	Freq.	Occ.	Rarely	Never	No Resp.
13. I use a series of related tasks of varying complexity	14.0	53.8	27.7	3.7	0	.8
14. I use independent learning strategies	7.9	48.8	33.8	6.1	.8	2.6
15. I use peer teaching approaches	13.5	40.9	35.4	7.9	1.6	.8

Table 5b. Percentage of Responses on Survey Items Relating to Process Differentiation

Survey Items	Responses to Process Differentiation
24. How often do your students work in groups?	• 53% of respondents indicated that their students work in groups some of the time • 39% stated that their students work in groups most of the time • only 8% indicated that their students worked in groups all of the time
25. If your students do work in groups, how are the groups organized?	• 41% of respondents stated that groups were organized randomly • 34% of respondents indicated that they grouped students according to abilities • only 4% indicated that students were grouped according to interests • 12% indicated that their students were grouped according to learning profiles • 9% of respondents stated that they allowed students to choose their own groups

Survey Items	Responses to Process Differentiation
26. How often do groups change?	• 62% of respondents indicated that groups changed when there was a new unit or project • 28% of respondents reported that they changed groups when the behaviour warranted the change • only 2% indicated that group changes are made each time students request a change • 8% of respondents reported that learning groups were chosen and remained the same

Survey items 16–23 and 27 addressed the issue of product differentiation (see Table 6). These items were designed to discover how students demonstrated their knowledge or understanding of a topic taught in class. These survey items asked whether teachers exposed students to different forms of assessments and the extent to which choices are given in completing assignments.

Table 6. Percentage of Responses on Survey Items Relating to Product Differentiation

Survey Items	Very Freq.	Freq.	Occ.	Rarely	Never	No Resp.
16. I allow students to write a book report	3.7	14.8	34.8	24.0	19.3	3.4
17. I allow students to perform a play	5.3	22.7	43.8	18.2	8.4	1.6
18. I have students debate an issue	4.7	21.1	37.2	23.0	11.3	2.6
19. I have students investigate an issue	8.7	37.2	37.2	13.2	1.1	2.6
20. I have students design a game	4.5	8.7	25.9	39.3	18.7	2.9
21. I have students create a story	15.3	32.7	29.8	10.3	9.5	2.4
22. I have students compose a song	5.3	15.3	37.5	19.5	19.5	2.9

Survey Items	Very Freq.	Freq.	Occ.	Rarely	Never	No Resp.
23. I encourage students to compare and contrast	16.4	45.6	27.7	6.6	1.1	2.6
27. How often are students given choices in how they complete their assignments or projects?	1.1	12.7	60.7	17.4	5.8	2.3

Research Question 2

How do teachers differentiate their instruction at the primary and secondary school levels?

Survey items 29 and 30 addressed this research question. These responses were grouped into three categories—content differentiation, process differentiation, and product differentiation.

Table7. Percentage of Responses on Survey Items Relating to Content, Process, and Product Differentiation

Survey Items	Content Diff.	Process Diff.	Product Diff.	No Response
29. How do teachers in your school differentiate instruction?	6.5	87.9	1.3	4.3
30. How do you differentiate instruction in your classroom?	3.8	84.1	3.5	8.6

It is important to note that the majority of respondents who differentiated process were in-service trained primary school teachers with approximately 10 years' teaching experience, as opposed to their secondary school counterparts.

Discussion of Open-Ended Responses

Research Question 3

What factors hinder or encourage the implementation of differentiated instruction in schools?

Survey items 32, 33, 35, and 36 were open-ended questions that addressed research question 3. Major challenges identified included:

time, resources, administrative support, and accommodation. It is interesting to note that when asked whether what was learnt at their previous teacher education programme adequately prepared them for differentiation, more teachers with approximately 10 years' teaching experience responded *yes* than their counterparts with over 20 years' teaching experience.

When asked about possible challenges teachers experience in implementing differentiated instruction in the classroom, one participant with 16–20 years' teaching experience responded as follows:

> "*Group work and learning centres require space, and differentiating instruction is hard to do when there is limited space and very large numbers of students in class.*"

Another participant with 11–15 years' teaching experience said:

> "*The authority figures are not always willing to cooperate with this method."*

A teacher with 4 years' experience put it this way:

> "*There is only one challenge that I face which is, the traditional teachers believe that the old form of teaching is right and any new method is wrong.*"

When asked about some of the challenges in implementing differentiated instruction, a teacher with 16–20 years' experience identified the following:

> "*Lack of time for planning adequate teaching; limited space for group work; lack of support from administration.*"

Another teacher with 11–15 years' experience cited the following as a major challenge to implementing differentiated instruction:

> "*A loaded curriculum which is sometimes not suitable for the children's abilities, but must be done for examination purposes.*"

A veteran teacher with over 30 years' experience admitted that a major challenge to implementation is "*time management, since differentiating instruction requires more preparation and planning.*"

Summary of Focus Group Findings

Two focus group sessions were conducted to probe deeper into teachers' understanding of process differentiation. This was necessary since survey

findings revealed that while participants in the study did not engage in content and product differentiation, the majority seemed to have a clear grasp of the techniques involved in process differentiation. Two major themes emerged from focus group discussions: (a) strategies teachers use to teach concepts; and (b) strategies students use to explore content.

Strategies Teachers Use to Teach Concepts

Findings from the question on teaching strategies revealed that teachers generally engaged in process differentiation by using a variety of approaches to assist students in exploring concepts taught in the lesson. Respondents from both focus groups indicated that they frequently used group work to facilitate interaction among students with varying abilities. The majority of teachers also frequently used graphic organizers, especially in creative writing classes, and role playing to assist students, mainly in the infant classes. One in-service trained teacher at a primary school said: "*my classes are very interactive with lots of manipulatives. I use guest speakers and often take students on field trips.*" However, one respondent explained that he did not use any of these strategies because his head of department insisted on the traditional lecture and drill method to ensure that students in the Standard 5 classes pass the Secondary Entrance Assessment (SEA) examination. He stated that: "*when the head of department is not around, I engage students in fun activities to stimulate learning.*"

Strategies Students Use to Explore Content

While the first theme focused on *how* teachers taught, this theme concentrated on *what* activities teachers encouraged students to use to explore the content taught in class. Findings from the question on strategies students use to explore content revealed that teachers frequently used strategies such as experimentation, library searches, video clips, and technology as a means of encouraging students to explore the content taught in class. One teacher from a privately-run primary school said that "*my seven-year-old students often develop their own power point slides for class presentations.*" Another teacher stated that "*I have students read in pairs so that the strong readers can help the weaker ones.*" An in-service trained teacher operating from a privately-run preschool said that "*the major teaching strategy is the use of play to teach concepts. I teach number concepts through play. At the preschool level, learning is done through play.*"

Discussion and Conclusions

Three research questions set the parameters for this study. The following is an analysis of each of these research questions.

Research Question 1

What are teachers' understandings of differentiated instruction?

Based on responses obtained from the survey, one can conclude that the majority of teachers demonstrate good understanding of the concept of differentiated instruction. Responses from participants also indicated that a larger number of primary school teachers demonstrate understanding of differentiation than their counterparts at the secondary school level. It was also observed that teachers with approximately 10 years' teaching experience showed a better understanding of differentiated instruction than those who had taught for over 20 years. However, upon closer examination of key components of differentiation, there is evidence to suggest that this understanding may be merely theoretical in some cases. Consider, for example, content differentiation that requires teachers to either modify or adapt how they give students access to learning materials. When asked about using a variety of resource materials for handling differences in reading levels, 58% of the participants indicated that they did so frequently. But less than half of the respondents indicated that they often grouped students according to readiness. The implied contradiction here is that while teachers are exploring a variety of ways to address differences in reading levels, little attempt is made to group students according to readiness. This goes against a major principle of content differentiation, which suggests that students should work at their own pace (Berger, 2000). Still, one can admit that there are also appropriate reasons for heterogeneous groupings based on the particular goals of the lesson.

Another point of contradiction has to do with teacher willingness to re-teach a lesson to small groups of students who needed additional support, yet the majority (58%) of these teachers rarely or never exempted students who demonstrated mastery of the material taught. This suggests that little attention is given to curriculum compacting or the use of acceleration techniques to cater to the needs of advanced learners. These apparent inconsistencies in responses may be a result of lack of clear understanding of the application of appropriate content differentiation strategies in the classroom.

A different picture emerges with process differentiation. Based on responses from participants on the questionnaire, it can be concluded that

teachers have a clear grasp of key techniques involved in differentiating process aimed at helping students make sense of the content taught to them in class. These teachers were largely in-service trained primary school practitioners with approximately 10 years' teaching experience, as opposed to their secondary school counterparts. The majority of these teachers indicated that they frequently used a series of tasks of varying complexity. They also indicated frequent use of peer teaching approaches and independent learning strategies. This was further emphasized in focus group sessions.

Findings from the study suggest that both in-service and pre-service trained teachers do not consciously engage in product differentiation. The majority of respondents indicated that they rarely or never provided students with various ways of demonstrating what they have learned from the unit of study. For example, teachers rarely or never gave assessment activities such as writing book reports, participating in debates, or performing a play. Other activities such as designing a game, creating a story, or composing a song were also not given to students as assessment options. Ireh and Ibeneme (2010) argue that differentiated products challenge students at all levels to make decisions and to be responsible for their own learning, as well as afford them the opportunities to demonstrate what they know through products that are representative of their unique learning preferences, interests, and strengths. It is interesting to note, however, that of all the options presented for product differentiation, teachers showed greater preference for *compare and contrast* as an assessment activity. This suggests that the majority of teachers in the study favoured the traditional cognitive-based assessment over those activities that generally appeal to students who are creative, artistic, and musical.

Research Question 2

How do teachers differentiate their instruction at the primary and secondary school levels?

Responses related to this research question were grouped into three categories—content differentiation, process differentiation, and product differentiation. Based on participants' responses, it is clear that the majority of teachers differentiate process in their classrooms. This is consistent with earlier findings where the majority of teachers demonstrated understanding of what it means to differentiate process by providing varied levels of support and accommodations. One can conclude that these teachers engage in activities that Santangelo and Tomlinson (2009) describe as harmonious with students' preferred

modalities of learning. These activities include: tiering student learning activities to various levels of complexity; giving students alternative topics on which to focus; and varying the pace of work. But further discussions in focus groups indicated that the majority of teachers did not deliberately set out to differentiate process.

While this may very well be the case, those teachers most likely to differentiate (deliberately or not) are primary teachers with approximately 10 years' teaching experience. As discovered earlier, these teachers seem to have a better understanding of differentiation than their counterparts in the secondary school system with over 20 years' teaching experience. One reason for this could be that teacher education institutions are now paying greater attention to exposing students to the concept of differentiated instruction than in previous years. The fact that more primary school teachers seem to demonstrate understanding of differentiation than secondary school teachers suggests that more can be done in teacher education programmes to deepen understanding of the concept among those studying to become secondary school teachers.

Research Question 3

What factors hinder or encourage the implementation of differentiated instruction in schools?

While it is expected that novice teachers would encounter difficulties in implementing differentiated instruction, this study found that all teachers, including veteran practitioners, encountered various obstacles to differentiating their instruction. These challenges ranged from limited time for planning and inadequate resources, to lack of administrative support and teacher resistance to change. Similar challenges to implementation were also highlighted in works by Hertberg-Davis and Brighton (2006); Knopper and Fertig (2005); and Tieso (2004). One of the respondents summed up the implementation challenge as follows: "*Lack of time for planning adequate teaching; limited space for group work; lack of support from administration.*"

Planning for differentiated instruction requires time, support, and adequate learning spaces for group interaction. If these requirements are not adequately met, then one can understand the challenge teachers face in attempting to integrate differentiation instruction in their classrooms. But the study highlighted a different type of challenge, which relates to teachers' ability to differentiate content and product. While responses from respondents indicated that they engage in process differentiation, one is uncertain about the extent to which this type of differentiation is a planned and conscious strategy. When asked whether they deliberately

set out to differentiate or vary the activities in their lessons, the majority of participants in the focus group sessions indicated that they did not deliberately set out to differentiate process (activities). However, the practice of varying activities comes naturally as part of what they learned as trained teachers. Only two participants from privately-run schools indicated that they consciously set out to vary activities since the principal of the school required them to do so.

Findings from this study revealed that while teachers generally understand the concept of differentiation, the majority of participants do not engage in content and product differentiation. Part of the reason is that teachers find it difficult to implement differentiation because of limited time and resources. The other part of the reason has to do with uncertainty among teachers about how to integrate content and product differentiation, given the preference by school officials for standardized testing at the primary and secondary levels. And while many teachers demonstrated ability to vary activities, they admitted that they did not consciously engage in process differentiation.

Given these findings, it seems that more can be done at teacher preparation institutions to expose prospective teachers to differentiated instruction through classroom teaching and modelling. To achieve this ideal, teacher education institutions may need to revise the existing curriculum in a way that would encourage greater participation among instructors in exploring differentiated instructional approaches to teaching at this level. No doubt, there will also be need for professional development to assist instructors in obtaining the necessary tools to effectively differentiate their instruction. Perhaps, there is need also for a follow-up study to determine whether this strategy will make a difference in prospective teachers' ability to engage in effective and appropriate content, process, and product differentiation. But even if prospective teachers are exposed to differentiated instruction at the teacher preparation institutions, upon entry into the classroom, these teachers will continue to experience a high level of frustration, unless school administrators provide the enabling environment to facilitate effective practice of differentiated instruction in response to students' readiness, interests, and learning profiles.

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