

The Impact of Differentiated Instruction in a Teacher Education Setting: Successes and Challenges

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Abstract

This study examined the impact of using a differentiated instructional approach to teaching second year students pursuing an undergraduate course in curriculum studies at a tertiary institution. These prospective teachers varied in terms of their interests, experiences, personal circumstances, and learning preferences. Four hundred and thirty-four students in two education campuses took the course over a period of one semester. Half of the student body experienced differentiated instruction while the other half was exposed to the whole- class instructional approach. At the end of the course, an assessment was made to determine the extent to which differentiated instruction had a positive impact on students' general understanding of the course. Findings of the study revealed that students at both campuses responded favourably to the differentiated instructional approach, with 90% of participants reporting higher levels of intellectual growth and interest in the subject. Assessment of student learning revealed that the majority of students in the differentiated classrooms demonstrated sound understanding of major concepts taught in the curriculum studies course. Almost all of the students (99%) expressed willingness to experiment with differentiated instruction in subsequent practicum sessions during their tenure at the university, and 88% indicated a desire to use a differentiated instructional approach in their classrooms upon graduation.

Keywords: Differentiated instruction, Teacher education, Tertiary institution

1. Introduction

Recent research suggests that while graduates from teacher education institutions in Trinidad and Tobago generally understand the concept of differentiated instruction, they often experience difficulty integrating content, process, and product differentiation in their classrooms (Joseph, 2013). This difficulty may be a result of the failure of teacher preparation institutions to expose prospective teachers to differentiated instruction through classroom teaching and modelling. Given government's burgeoning interest in greater inclusion of all students with special needs, there is an urgent need to address the question of learner variance in classrooms of the nation's schools (Trinidad and Tobago, Ministry of Education, 2008). Sizer (1985), Stradling and Saunders (1993), believe that since educators no longer have the legitimate choice about whether to respond to academically diverse student populations in classrooms, perhaps the time has come for them to decide on how to respond.

A close look at teacher education institutions may reveal that many instructors teach and assess every student in the same way using the same material without paying attention to learner variance. If this is a true picture of our teacher preparation institutions, then a case can be made for these 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) that 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; (d) the central job of schools is to maximize the capacity of each child. Contemporary classroom teachers, therefore, will need to develop classroom routines that attend to, rather than ignore learner

variance in readiness, interest and learning profile. To achieve this ideal, teacher education institutions must put in place systems that support effective teaching and modelling of differentiated instruction. Tomlinson and Imbeau (2010) describe differentiation as “classroom practice with a balanced emphasis on individual students and course content.” 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.

1.1 Key elements of differentiated instruction

1.1.1 Student readiness

Theory and recent research support the position that teachers should consciously adjust curriculum and instruction in response to student readiness, interest, and learning profile. Vygotsky’s (1978) theory relating to learner readiness, for example, suggests that teachers should teach within a child’s zone of proximal development – the difference between what a child can do alone without guidance and what the child can do with scaffolding or support. If the teacher can push the child into his/her zone of proximal development, and coach with a task slightly more complex than the child can manage alone, then the child, through repetition, will master new skills and learn to become an independent thinker and problem solver. Byrnes (1996) suggests that if material is presented at or below the mastery level, then no growth will occur. In like manner, if material is presented well above the zone, children will be confused and frustrated. Teachers, therefore, must pay attention to student readiness as an important component of differentiated instruction.

Tomlinson and Imbeau (2010) caution, however, 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. And 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).

1.1.2 Student interest

As in the case of student readiness, addressing student interest can be also important to student academic development. 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 student 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. Interest-based differentiation is directly linked to studies in motivation which show enhanced student engagement with the task, greater evidence of student creativity and productivity, as well as higher level of intrinsic motivation when instruction is modified to cater to student interest (Amabile, 1983; Bruner, 1961; Sharan & Sharan, 1992). As classrooms become more diverse, teachers can no longer think in terms of *how* can students be motivated. Rather, classroom teachers must consider *what* motivates individual students and how work can be designed appropriately to meet these varying interests (Schlechty, 1997).

1.1.3 Student learning profile

Students often have different learning preferences. While some students prefer to interact with groups or the whole class, others feel more comfortable working alone. Many students are visual or kinesthetic learners; others are verbal or auditory learners. 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 profile include learning environment preferences, group orientation, cognitive styles, and intelligence preferences (Santangelo & Tomlinson, 2009). Research indicates that students at the primary and secondary school levels achieve more when instruction matches their learning preferences (Sternberg, 1997; Sternberg, Torff & Grigorenko, 1998).

1.1.4 Content differentiation

It is reasonable to assume that once teachers have a good understanding of students' level of readiness, interests and learning profiles, that 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 sub-topic, 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 or tapes or 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.

1.1.5 Process 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 that 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 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).

1.1.6 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; allow for varied modes of expression. Santangelo & 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 & 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.

1.2 Modelling differentiation

Any attempts at modelling differentiation must be done with the understanding that there is no one way to differentiate instruction. At the tertiary level, the notion of differentiation becomes problematic since this is not generally the traditional mode of instruction used by professors. Tulbure (2011) posits that differentiating instruction in higher education poses a challenge both for teachers as well as researchers. She argues that since a great deal of empirical proof is needed to demonstrate the superiority of differentiated instruction over the whole-class instructional approach, a combination of both approaches might be the way to go.

Notwithstanding some of the challenges associated with differentiation, research by Ernst and Ernst (2005) reveals that university students generally responded favourably to the differentiated instructional approach, when professors differentiate the instruction. Brimijoin (2002) argues that education professors in teacher preparation institutions have a responsibility to model appropriate differentiated instruction to novice teachers. Research on novice teachers indicates that rather than focus on differentiating instruction to meet student needs, novice teachers tend to focus more on classroom management issues, teacher centred-pedagogy, and instructional planning (Fuller & Brown, 1975; Hollingsworth, 1989; Lidstone & Hollingsworth, 1992). With little or no support from cooperating teachers, principals, and education professors, novice teachers often miss the opportunity to understand and appreciate the value of differentiating instruction to address student variance.

2. Purpose of the study

The purpose of this study was to determine the relationship between measures of student achievements in a second year undergraduate curriculum studies course and implementation of differentiated instruction over a period of one semester of the school year. Three research questions set the parameters for this study:

- What are the successes and challenges associated with the implementation of differentiated instruction at the tertiary level?
- What is the relationship between differentiated instruction and student achievement in curriculum studies over a period of one semester?
- What are prospective teachers' perceptions about differentiated instruction and its potential impact on their classroom practice?

3. Course Overview

The curriculum studies course is a compulsory second year general education course for all students pursuing studies leading to a bachelor of education degree. The purpose of this course is to engage prospective teachers beyond the mechanics of curriculum planning and development to the point of tackling questions such as: What is education? What should be taught? Why should some activities be chosen and others not? Who decides what should be taught? The major learning outcomes of the course include: critical assessment of various approaches to curriculum; an evaluation of the impact of educational philosophies, learning theories and sociological positions on curriculum planning, development, and design; development of curriculum guides applying relevant curriculum design principles; and an evaluation of existing curriculum at the primary and secondary school level. Students are also expected to demonstrate understanding of the role of politics and centralized decision-making in curriculum planning, development, and implementation as well as develop solutions to major problems involved in curriculum implementation.

Students were exposed to continuous assessment activities ranging from concept checks and article reviews to seminar presentations and case studies. While there was no final examination for this course, students were required to demonstrate mastery of the major concepts by engaging in curriculum development activities as well as an evaluation of existing curriculum at the primary and secondary school level.

4. Implementing Differentiated Instruction in a Teacher Education Setting

While differentiated instruction is increasingly becoming popular in many elementary and secondary schools internationally, very little is written about this practice in institutions of higher learning (Santangelo & Tomlinson, 2009). Attempts at implementing differentiated instruction may, therefore, be seen as a new approach to teaching and learning at institutions of higher learning, particularly in the Caribbean. Table 1 provides a description of various strategies researchers of this study used to model differentiated content, process and product in a teacher education setting.

Table 1. Strategies for Differentiating Content, Process and Product

<i>Strategies for differentiating content (topic)</i>	<i>Strategies for differentiating process (activities)</i>	<i>Strategies for differentiating product (assessment)</i>
• use of a variety of texts and resource materials for handling differences in reading interests	• use of tiered activities (a series of related tasks of varying complexity)	• providing students with a variety of assessment choices such as:
• grouping students according to interest levels and learning profiles	• use of independent learning strategies	(a) either writing an article review or presenting a critique to the class

giving different groups of students a different task related to the topic under discussion	use of flexible grouping, peer teaching, whole group teaching	(b) making a presentation on a curriculum topic of interest either in groups or as individuals
allowing students to work alone or with peers	providing various levels of scaffolding for students	(c) debating a curriculum issue
use of whole class instructional approach to introduce new modules and concepts	use of graphic organizers to assist students in understanding concepts	(d) designing or evaluating a curriculum
	engaging students in writing reflections in online journals	(e) participating in concept checks

Table 2. Strategies for Differentiating According to Student Readiness, Interests, and Learning Profiles

<i>Strategies for differentiating according to student readiness</i>	<i>Strategies for differentiating according to student interests</i>	<i>Strategies for differentiating according to student interests</i>
gathering pre-assessment readiness data by allowing students to complete an activity relating to definitions of curriculum, and major philosophical foundations of curriculum. This information was important to determine what type of initial scaffolding might be necessary for student understanding of key foundation concepts in the course	allowing choices in various activities (asking students to choose an assignment for completion at the next class)	varying the instructional formats over the semester period e.g. sometimes offering the same experience for all students and sometimes purposely matching the students' preferences with particular activities
using a tiered activity to improve or extend the students' understandings of key concepts	grouping students by common interests	varying student groupings e.g. using homogeneous and heterogeneous groups with students occasionally selecting their own groups
		using a combination of individual, small group and whole class instruction throughout the semester

5. Methodology

The study employed a mixed research method that involved the use of questionnaires, focus group discussions, teacher and student interviews, classroom observations, students' semester grades, and student reflections, to collect the relevant data from undergraduate students pursuing a three-credit hour course in curriculum studies leading to a bachelor of education degree at a teacher education institution. The total population comprised four teachers/facilitators and four hundred and thirty-four students from two teacher education campuses.

Questionnaires were used to obtain student information about differences in readiness, interests, and learning profiles. This information was important for arranging students into appropriate groups for classroom instruction and learning. Focus group interviews were also conducted to obtain qualitative data for the study. All focus group sessions were audio-taped 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 probe deeper into students' experience and

perception of differentiated instruction. 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 researcher's synthesis of interviews. There were seven focus groups comprising six to eight persons each. All seven groups were exposed to the same questions to facilitate consistency in analysis.

Teacher and student interviews provided additional information about student willingness to experiment with differentiated instruction in their classrooms while on practicum. During the semester, facilitators of the curriculum studies course conducted classroom observations which were also used as part of the data analysis exercise. Students were also asked to engage in reflection on their learning. These reflections were recorded on Blackboard (the learning management system used at the teacher education institution), and later used for data analysis.

Students' semester grades were also used as data sources for this study. These grades were obtained from three assignments, namely, a critical review, seminar presentations, and a curriculum evaluation exercise which required students to evaluate an existing curriculum in either the primary or secondary school sector. Since researchers were responsible for grading all course assignments, rubrics were developed collaboratively to minimize grading bias. These rubrics were discussed with students who were given the opportunity to make comments and suggest changes where necessary. The final product was posted on Blackboard weeks before the assignments were due.

Procedures for data analysis included sorting or organizing the data; generating themes and patterns; checking the emerging theories, inferences and postulations against the data; and searching for alternative explanations (Marshall and Rossman, 2010). 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, specialization, and learning profile.

Table 3. Information about the teachers/facilitators of the course

<i>Name</i>	<i>Gender</i>	<i>Tertiary-Level Teaching</i>	<i>Current Position</i>	<i>Highest Degree</i>
Stephen	Male	20-25 years	Assistant Professor	Ph.D.
Marlene	Female	20-25 years	Senior Instructor	M. Ed.
Gerard	Male	15-20 years	Instructor II	M. Ed.
Leela	Female	15- 20 years	Instructor II	M. Phil.

Table 4. Information about the students

<i>Factor</i>	<i>Categories</i>	<i>Frequency</i>	<i>Percentage</i>
Gender	Male	41	19%
	Female	178	81%
Teaching Experience	0-4 years	193	88%
	5-10 years	8	4%
	11-15 years	2	.9%
	16-20 years	1	.5%
	21-25 years	2	.9%
	26-30 years	8	4%
Specialization	Primary Education	96	43%
	ECCE	7	3%
	Special Needs Education	42	19%
	Agricultural Science	4	2%
	Integrated Science	4	2%
	Social Studies	12	6%
	Technical & Vocational Education	8	4%
	Physical Education	31	14%
	Mathematics	11	5%
	Language & Literature	4	2%

Learning Profile	Working Alone	60	27%
	Working in Groups	108	49%
	Working with the Whole Class	12	6%
	Working Alone/Working in Groups	23	11%
	Working Alone/Whole Class	5	2%
	Working in Groups/Whole Class	7	3%
	Working Alone/Groups/Whole Class	3	1%
	Verbal Learner	15	8%
	Kinesthetic Learner	49	28%
	Auditory Learner	19	11%
	Visual Learner	95	53%

Based on information presented in Table 4 above, it can be seen that students in the study varied in terms of their interests, experiences, personal circumstances, and learning preferences. The majority of the participants (88%) possess less than five years teaching experience, with 53% describing themselves as visual learners. It is also noteworthy that while 49% of participants enjoy working in groups, 27% of the respondents indicated a preference for working alone.

6. Results/Discussion

6.1 Successes and challenges in implementing differentiated instruction at the tertiary level

The following is an account of the experiences of four university teachers/facilitators (Stephen, Marlene, Gerard and Leela) in differentiating instruction in their curriculum studies classes over the period of one semester:

6.1.1 Stephen's experience

After several years of teaching curriculum studies, the decision to differentiate instruction came as a breath of fresh air as it provided greater opportunities for me to meet the varying needs of learners in my class. I first collected pre-assessment data using a student interest inventory questionnaire to understand student readiness, interest, and learning profile. This information was important for planning meaningful activities as well as grouping students in a variety of ways based on interest, readiness, and learning profile. Strategies used for differentiating content included the use of a range of relevant textbooks for the course; assigning different tasks to students for presentation of a topic under discussion; and the use of the student learning management system (Blackboard) to encourage discussion and sharing of ideas on the course. I found that whole group teaching worked particularly well for introducing a new topic for discussion.

The use of flexible grouping and peer teaching also worked well for process differentiation. In addition, students were encouraged to post their reflections on Blackboard journals where I was able to provide some form of scaffolding or support outside of the classroom setting. However, attempts at tiering activities proved somewhat challenging at this level.

A few students were skeptical at first about the notion of differentiating assessment for the course. However, when presented with the prospect of showcasing their best efforts, students readily agreed to explore the option of either writing an article review or presenting a verbal critique the article before the class; choosing a final project over a final written examination; choosing drama, music or poetry to present various aspects of the course content. In the end, class sessions were generally lively and engaging with optimum student participation in what might have been otherwise three hours of drudgery.

6.1.2 Marlene's experience

Students in my class were given the opportunity to indicate their learning preferences by responding to a questionnaire at the beginning of the semester. Based on the responses, these individuals were placed into small groups of threes or fours in the following categories:

- Verbal learners
- Visual learners
- Auditory learners
- Kinesthetic learners

Except for one or two isolated cases, all groups worked harmoniously in their planning and delivery of the oral presentations. From my observation, it was quite clear that the visual learners preferred visual representations of their work as was evident in the nature of their presentations, which included charts, pictures, videos, and the use of other forms of visuals. The auditory learners used dramatic presentations, poems, and in one instance, a song to convey information to their peers.

The use of small groups of students with similar characteristics proved to be an excellent instructional strategy. In most instances, students willingly remained after class to plan, discuss, and to assign roles and responsibilities for their upcoming presentations. These sessions provided the opportunity for students to engage in cooperative learning activities. As the students met and planned, it was quite evident that their similarities far outweighed their differences - a very crucial point for teachers as learners.

From an instructor's point of view, the practice of differentiation is an excellent strategy. However, process differentiation is very time consuming as it requires careful planning; and while differentiating product has many advantages for the learner, a considerable amount of time must also be spent constructing a rubric to assess students with diverse interests and learning preferences.

6.1.3 Gerard's experience

After students were given an overview of the course, it was suggested that the content be broken down into smaller manageable sub-topics which would be studied by all, but facilitated by presentations and peer teaching from assigned groupings. On first reflection, students thought that understanding the content would be a challenging task, best implemented and directed by a teacher-centred lecture approach. However, they recognized the benefits of peer teaching/learning and independent research, both from their own past experiences at the university and from prevailing academic discourse.

Students were assigned to small groups based on their common learning profiles (verbal, kinesthetic, auditory and visual) and their preferences to work in groups or alone. This information was gained from the questionnaire which they had previously completed. In most responses, there was not one dominating learning style; as such the two most dominant were selected to categorize individuals. The most common categorizations were as follows: visual-kinesthetic, verbal-visual, verbal-auditory, visual-auditory, verbal-kinesthetic and an equal dominance of all four. Individuals who shared the same dominant learning styles presented information in multiple ways: through drama, song, poetry, printed and spoken media, debates, charts, projections and sound recordings.

Differentiating content allowed students to use a variety of real life examples, anecdotes and simulations to make the content more meaningful. They were questioned by the lecturer and the class at the end of the presentations and they were able to defend strategies used and actions taken. They were also asked to elaborate on some aspects of content which might not have been fully understood. Generally, there was a high level of interaction throughout the sessions, even before and after each session. Some students admitted that they had been immersed in the traditional classroom setting and practices for so long, that it was initially difficult or challenging to freely explore different learning preferences. Even the habitually passive and introverted members of the class were able to share in the contributions and appreciate different points of view. What seemed interesting was that during the exercise, some students even did some self-evaluation of what they believed to be their preferred learning styles. From my observation, differentiated instruction allowed for building relationships of sharing, trust and cooperation, which are vital in creating an effective learning community.

6.1.4 Leela's experience

To differentiate content, students were allowed to select sub-topics emanating from a major topic. They were assigned to groups according to their learning profiles (verbal, kinesthetic, visual or auditory) as outlined in the questionnaires they completed prior to implementation. While some were initially reluctant to change from their regular groups, they eventually concurred and later indicated that they had different experiences working with others. A few persons asked to revert to their original groups but when the concept of differentiation was re-explained to them, they decided to participate. While most groups met the set deadlines, there were one or two groups that needed more time, which was readily facilitated. Groups were reconstituted frequently throughout the semester which allowed students to interact and build relationships with a number of different persons.

Differentiating content made learning more manageable since information was presented in smaller, structured parts. This practice generated a high level of motivation among students. The exercise encouraged interaction, collaboration, sharing of ideas, discussion and critical thinking. Students were able to negotiate and defend their

different perspectives and build consensus. They worked cooperatively with their group members even though they belonged to different ethnic groups, religious affiliations and gender.

Collectively each group devised different methods to present the content to the class. This meant they negotiated, resolved conflicts and cooperated with each other. Differentiated instruction therefore allows for critical and creative thinking. Students displayed their creativity through creative dramatic presentations, skits, and dance. The different modes of presentations included poems, songs, talk shows, drawings, charts and demonstrations which provided variation. These varied strategies readily appealed to different learning profiles and proved to be very effective. Students were very receptive to presentations made and they demonstrated much respect and appreciation for their peers, sometimes with rapturous applause. They showed enthusiasm, and interest was sustained throughout the duration of the class session. In addition, it was observed that collegiality improved and cordial relationships developed.

6.1.5 Successes and Challenges

Table 5 below provides a summary of the successes and challenges researchers of this study experienced while working with student in a differentiated classroom environment.

Table 5. Summary of Successes and Challenges

<i>Successes</i>	<i>Challenges</i>
1) Increased student motivation in approaching academic tasks 2) Improved study habits and problem solving skills for students 3) Students recognized the value of paying attention to different learning styles and the need to apply this approach to their classroom teaching during practicum 4) Bringing the topics of curriculum studies to life; increased meaning and understanding by making connections to real life classroom and world situations 5) Group cooperation and collaboration 6) Greater involvement, understanding and improved academic performance by all students 7) Building improved relationships between students and instructors.	1) A very time consuming exercise with long hours of planning, organizing and scheduling individuals and groups in a large class setting 2) Difficult to cater to individual needs and preferences especially those individuals who prefer to work alone 3) The examination culture which has pervaded teacher education institutions seemed to have great impact. Some students questioned the fairness of the process when assessments were differentiated.

7. Relationship between differentiated instruction and student achievement

Grades from coursework assignments were used to determine the relationship between measures of student achievements in the curriculum studies course and implementation of differentiated instruction over a period of one semester of the school year. Tables 6, 7, and 8 provide a summary of grades obtained in each of the three course assessments. Table 9 provides a summary of student final grades in the entire curriculum studies course. These grades reflect the performance of students who were exposed to a differentiated instructional approach (DI group) as opposed to those who followed the traditional whole class instructional approach (non- DI group).

Table 6. Comparison of Student Grades in Assignment No. 1

	Assignment No.1: Article Review									
	A+	A	A-	B+	B	B-	C+	C	F	Total
DI Group	3	22	39	41	51	24	26	12	10	228
Non- DI Group	5	8	10	22	39	27	63	17	15	206
Total	8	30	49	63	90	51	89	29	25	434

Table 7. Comparison of Student Grades in Assignment No. 2

	Assignment No.2: Curriculum Seminar								
	A+	A	A-	B+	B	B-	C+	F	Total
DI Group	34	58	51	44	23	6	8	4	228
Non- DI Group	18	41	39	49	42	8	8	1	206
Total	52	99	90	93	65	14	16	5	434

Table 8. Comparison of Student Grades in Assignment No. 3

	Assignment No.3: Curriculum Evaluation Project								
	A	A-	B+	B	B-	C+	C	F	Total
DI Group	13	13	59	62	41	18	16	6	228
Non- DI Group	0	20	54	77	30	4	10	11	206
Total	13	33	113	139	71	22	26	17	434

Table 9. Summary of Student Final Grades in Curriculum Studies Course

	Summary of Final Grades								
	A	A-	B+	B	B-	C+	C	C-	Total
DI Group	7	47	77	61	23	25	7	1	228
Non- DI Group	2	30	43	75	42	38	9	0	206
Total	9	77	120	136	65	63	16	1	434

Based on information presented in Table 9 above, it can be seen that students who were exposed to a differentiated instructional approach generally obtained higher grades than their counterparts who were taught in the traditional whole class instructional setting.

8. Students' perceptions about differentiated instruction and its potential impact on their classroom practice

Prospective teachers of the curriculum studies class were asked to participate in a survey which required them to share their perceptions about differentiated instruction and its potential impact on their classroom practice. One hundred and ninety-two (87%) of the two hundred and twenty students completed the survey. In Table 10 below, survey items 5-11 addressed students' perceptions about differentiated instruction.

Table 10. Percentage of Responses on Survey Items Relating to Students' Perceptions about Differentiation

Survey Items	Students' Responses to Differentiation
5. I believe that all instructors should use differentiated instruction in their classrooms.	Of the 192 respondents, 95% indicated agreement while only 3% disagreed.
6. I plan to use differentiated instruction in my practicum classes sometime in the future.	Almost all of the respondents (99%) indicated interest in using a differentiated instructional approach in their future practicum classes while at the university.
7. I will consider using differentiated instruction in my classroom upon graduation.	The majority of respondents (88%) indicated that they will definitely consider using differentiated instruction upon graduation, while only 12% stated that they might or might not consider the idea.
8. All teachers should be aware of their students' interests, readiness, and learning profiles.	98% of the prospective teachers indicated agreement, while only 2% disagreed.
9. I am satisfied with my instructor's use of differentiated instruction in the curriculum studies course.	Of the 192 respondents, 43% stated that they were very satisfied; 37% said that they were satisfied; while 17% reported that they were somewhat satisfied and 3% indicated dissatisfaction.

10. The use of differentiated instructional approach has stimulated my interest in curriculum studies.	The majority of respondents (90%) agreed that the differentiated instructional approach stimulated their interest, while 10% disagreed.
11. I believe that I have experienced higher levels of intellectual growth in the curriculum studies course as a result of my exposure to differentiated instruction.	The majority of respondents (91%) reported higher levels of intellectual growth as a result of exposure to differentiated instruction, while only 9% disagreed.

8.1 Summary of Focus Group Findings

Seven focus group sessions were conducted to gain deeper insights into students' experience with differentiated instruction during the semester. Each group comprised six to eight students who provided responses to the following six questions:

- Based on your experience in the curriculum studies class, what do you see as the benefits of differentiated instruction?
- What are the drawbacks (if any) of differentiated instruction?
- Would you attempt differentiated instruction in your practicum sessions? Why? Why not?
- Do you intend to use differentiated instruction as an instructional approach in your classroom after graduation? Why? Why not?
- What did you like most about studying in a differentiated instruction class environment?
- What did you dislike most about studying in a differentiated instruction class environment?

Findings from the first question in this category revealed that students generally shared the same views about the benefits of differentiated instruction. The majority of respondents commented on the ease with which learning was taking place because they were given the opportunity to choose the way they learn best. They described differentiated instruction as *"a more democratic teaching approach"* which gave them a chance to perform at their optimum level. One student put it this way: *"Differentiated instruction was useful for me. It was effective. It afforded me the opportunity to work with people other than the regular ones that I work with. I felt confident because I chose the mode of evaluation."*

When asked to identify the drawbacks of differentiated instruction, students indicated that it must be time consuming for teachers to differentiate. They were concerned that differentiated instruction provided the opportunity for them to showcase only their strengths. One respondent saw differentiation as *"a setback to students when they focus on their strengths and ignore their weak areas."* Another put it this way: *"the existing standardized assessment and other school practices and regulations may constrain effective use of differentiation."* One student cautioned that *"if the teacher is not comfortable or competent in using differentiation, the students will be at a loss."*

The majority of students indicated their intention to attempt differentiated instruction in their practicum sessions and gave the reasons as follows:

"I know that it is the best thing for students. It will present more opportunities for learning to take place in the classroom."

"Children also have different learning preferences. It will be unfair to stick to only one style of teaching."

"The traditional way is boring; this is more enjoyable; it makes learning fun and engaging."

"It allows for more effective teaching; differentiation caters for individual strengths of students."

A few students, however, expressed some reservations. They were not certain whether their practicum supervisor knew how to differentiate. As such, they believe that attempting differentiation may put them at risk of scoring low marks. And to ensure a high grade, one student said: *"I will do whatever the practicum supervisor wants."* This student believes that it may be difficult to differentiate for short practicum stints, and that the approach may be better suited for classroom practice after graduation.

The majority of students agreed that using differentiated instruction after graduation will give them an opportunity *"to practice freely," reach every learner, fulfill student needs."* One student believed that *"differentiated instruction should be the guiding philosophy of each teacher after graduation."* Another student stated, *"when I have my own class, I would have greater freedom and versatility with respect to time to try out new ideas."* Another student summed it up nicely by saying: *"In every class, there exists a whole range of abilities and in order to achieve social and academic success, I must use differentiated instruction."*

In response to question five, students provided the following explanations about what they liked most about studying in a differentiated instruction class environment. These include:

"I liked the idea of having to select what I preferred in terms of process as opposed to being given an approach or method."

"I liked the idea of the different modes of evaluation. I was able to use my preferred mode of learning."

"I was able to use my area of strength, that is, my oral skills."

"I was comfortable during this course. Stress was reduced. Presentations felt more natural and not burdensome."

"I was given choices. I liked that. The method, process or mode was not handed down to us."

The final question asked students to discuss what they disliked most about studying in a differentiated instruction class environment. One student admitted that at first, she didn't like the idea of being a "guinea pig," but her attitude changed during the course of the semester. Another student said: *"Sometimes I thought a mixed ability group would have been better since all students in my group had the same learning preferences."* One student said, *"it was difficult to concentrate at times when the presentation and learning style displayed did not appeal to me."*

9. Conclusion

This study examined the impact of using a differentiated instructional approach to teaching at a tertiary-level teacher education institution. It highlighted the successes and challenges instructors experienced in attempting to implement differentiated instruction, as well as student perception about differentiated instruction and its potential impact on their future classroom practice. The study also sought to determine the relationship between measures of student achievements and implementation of differentiated instruction over a period of one semester of the school year.

Findings of the study revealed that modelling differentiated instruction at the tertiary level yielded more positive than negative outcomes. Reflections from four university teachers/facilitators bore testimony of the successes achieved in utilizing strategies for content, process, and product differentiation. Some of these strategies included modifying or adapting how students were given access to learning materials. The use of flexible grouping was also effective when students were given the opportunity, as Anderson (2007) suggests, to work in pairs, small groups, or alone. When students are given choices about materials, activities, and assessments, they feel a sense of empowerment which serves to heighten interest in the course. Jensen (1998) agrees that when choices are provided, there is a corresponding increase in intrinsic motivation and learner engagement.

Notwithstanding the many successes associated with differentiated instruction, the researchers reported a few challenges in attempting to model differentiation at a tertiary-level institution. One such challenge was the considerable amount of time required for planning, organizing, and scheduling individuals and groups in a large classroom setting. Researchers also found it challenging to cater to individual needs as well as student preference to work alone rather than in groups or with the whole class.

Student perceptions of differentiated instruction were also encouraging with 90% agreeing that the differentiated instructional approach stimulated their interest in the curriculum studies course. Responses from the survey indicated that the majority of students (91%) reported higher levels of intellectual growth as a result of exposure to differentiated instruction. Eighty percent (80%) of respondents reported satisfaction with their instructors' use of differentiated instruction in the curriculum studies course. Focus group discussions corroborated survey findings on differentiated instruction and its potential impact on student classroom practice. Echoing the sentiments of the entire group, one student concluded that differentiated instruction should be *"the guiding philosophy of each teacher after graduation."*

An essential feature of this study was an attempt to discover whether there was any relationship between implementation of differentiated instruction and student achievement in the curriculum studies course over a period of one semester. This was done by comparing the performance of students exposed to differentiated instruction with those who followed the traditional whole class instructional approach. Findings revealed that at the end of the semester, students in the differentiated instruction groups obtained higher grades than their counterparts in the curriculum studies course. The study also corroborates the findings of Ernst and Ernst (2005) which concluded that students generally responded favourably to the differentiated instructional approach when professors differentiate the instruction. However, while the study provided positive outcomes for a course in curriculum studies, there is need for further research to determine the extent to which a differentiated instructional approach is equally successful in other subject domains. Still, the study is useful because it adds to the burgeoning discourse on differentiated instruction at a time when many tertiary level instructors continue to teach and assess every student in the same way using the same material without paying attention to learner variance. If adopted more widely, a differentiated instructional approach has the potential to revolutionize teaching and learning at the tertiary level.

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