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Differentiated Instruction between Application and Constraints: Teachers' Perspective

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Abstract: This study aimed to investigate the degree to which teachers in Qatar implement differentiated instruction as well as the impact of years of experience, qualifications, grade, school subjects and training on teachers' use of differentiated instruction. Also the study tried to explore the obstacles impeding the application of differentiated instruction. The study targeted all early childhood teachers (1,836) in 99 Qatar public schools spreading across the country. A random sample of 236 teachers, accounting for 12.9% of the population participated in the study. Following the mixed approach, the researchers used questionnaires and interviews to collect the data. The results showed no statistically significant differences among the respondents in the degree of application of differentiated instruction due to training and qualifications; however, statistically significant differences were detected in relevance to years of experience, grade, and the subject being taught. The study also found an agreement among teachers on the obstacles they face during their application of differentiated instruction, most notably the teaching load, class size, and time. The study concluded with recommendations for education providers, teachers and researchers.

Keywords: *Differentiated instruction, application, constraints, teachers, early childhood.*

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Introduction

According to Al-Khalidi (2003), differences in needs, interests, attitudes, skills and beliefs define the role of every individual in life. If taken for granted that each individual has the right in a quality learning that develops his knowledge, abilities and skills that qualify him for a better life and to perform his role effectively, these differences should become a source of power instead of barriers (Qmra, 2018). However, this divergence presents a major challenge to educators in their classrooms. Logic dictates the need to diversify teaching processes through curricula and pedagogy to meet individuals' differences; therefore, it is absurd to expect students to learn the same 'what' within the same 'when' and 'how' (Good, 2006). It is only by providing opportunities consistent with their attributes and abilities, learners can achieve better; education built in isolation from the needs, inclinations and abilities of learners will not reach its destination (Bayoumi & Al-Jundi, 2018).

Research has reported a discrepancy in the quality of education presented to learners at different parts of the world. This is manifest in the results of the Trends in International Mathematics and Science Study (TIMSS)(2015) organized by the International Association for the Evaluation of Educational Achievement; nearly 49 countries from different parts of the world participated in the study, and the results showed that 17 countries scored below the anticipated level. This is one of the reasons behind researchers in the field looking for better teaching methods and strategies to help solve the problem and bridge the gap in educational attainment. This does not exempt children in the Arab countries where schooling takes place under centralized educational systems that overlook the differences between learners, their characteristics and their readiness, not to mention the use of traditional teaching methods and strategies, where the focus is on memorization (Kojak, 2008).

The report of the United Nations Educational Scientific and Cultural Organization (UNESCO) on Arab countries described education as "often spoon-feeding received in one direction, which does not stimulate the development of the critical spirit of learners" (UNESCO, 2012, p 5). Teachers focus on test achievement rather than on quality learning that

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promotes higher-thinking skills (Netterville, 2002). Within such a model of education, slow-learners lag behind their peers while the gap keeps widening until they become helpless learners and/or end up dropping school; on the other hand, the advanced students also lose their opportunities to challenge their potentials (Good, 2006). Hence, differentiated instruction has received the attention of educators in many countries as the means to get all learners to their fullest potentials (Aldossari, 2018; Morgan, 2014; Santamaria, 2009).

The international conventions have insisted on the right of each individual to get an equal opportunity for an education without distinctions based on social, cultural, ethnic or religious basis (Kojak, 2008). Consequently, differentiated instruction has received a great deal of care and attention in many international platforms, which have emphasized the need to account for the differences between learners and the importance of diversifying teaching curricula and methods to provide learners with education that best corresponds to their individualities, abilities and interests (Bayoumi & Al-Jundi, 2018; Morgan, 2014; Santamaria, 2009). Al-Halisi and Al-Sharif (2012) stated that differentiated instruction considers the different needs and requirements of learners, their past experiences and different learning patterns, and then responds to these and makes it the basis for planning and teaching (Al-Taweerqi, 2009).

According to Tomlinson (2000), differentiated instruction is a process carried out by teachers through reorganizing their classrooms to provide the best possible education for every learner. Learners are engaged through different teaching methods designed to suite their different interests, needs and abilities so that all learners have different ways to access information and express their learning (Aldossari, 2018). As many studies have emphasized (Al-Bultan, 2017; Al-Halisi & Al-Sharif, 2012; Al-Mahdawi, 2014; Al-Raa'i, 2014), this will improve the quality of learning, increase the learners' motivation and achievement, improve their performance levels and help them become creative.

Given the importance of early learning in building learners' personalities, research has emphasized the importance of childhood education (Al-Ghamdi, 2018; Al-Halisi & Sharif, 2012). The first eight years of a child's life are one of the most influential learning times and make the ideal stage for instilling important qualities and developing different skills. This is not to deemphasize the importance of the following stages, but rather because of its critical impact on developing children's mental capacities for social behavior, constructing their personalities, and bearing a lifetime impact (Al-Halisi & Al-Sharif, 2012). As Raffi, founder of the Canada Center for Childhood Honors, says, "When you pay attention to the beginning of the story, you can change its entire course" (United Nations International Children's Emergency Fund [UNICEF], 2009). This prompted the current study to focus only on the first years of education for the importance of differentiating instruction during this stage.

However, research in education has indicated that applying differentiated instruction may face difficulties that slowdown or block its progress (Al-Bultan, 2017; Al-Raa'i, 2014; Al-Maghribi, 2016; Atiya, 2009). These constraints may relate to teachers' understanding and perceptions of differentiated instruction, requirements for preparation and implementation, barriers to students themselves, or the density of classes, among others.

The current study is unique because it adds to the international literature practices and perspectives from another part of the world. To the best of the researchers' knowledge, this is the first study that deals with differentiated instruction in Qatar and one of the few studies in the Arab region that aim at identifying the factors and the constraints pertinent to applying differentiated instruction.

Literature Review

Differentiated instruction increasingly attracts the attention and interest of more researchers and educators. Shareefa and Moosa (2020) carried out a study to explore the volume of research conducted particularly in this area; the results of the study revealed, as projected, a great international interest in differentiated instruction and unveiled the efforts of scientists in developing a diverse knowledge base dedicated for research studies and scientific efforts in this important area of education.

The extant literature registers the impact of differentiated instruction on learners' development vis-à-vis achievement, critical thinking, communication skills, motivation, self-perception and attitudes. For example, Koeze (2007) and Al-Ghamdi (2018) found that differentiated instruction has a significant impact on increasing students' achievement and motivation for learning. While Al-Halisi and Sharif (2012) confirmed the same positive impact on students' achievement in English language, in light of the first levels of Bloom taxonomy (remembering, understanding, and application), Hassanein (2016) findings confirmed the effectiveness of using differentiated learning strategies on fourth grade achievement and development of creative, critical thinking and communication skills. Sharbini (2017) adopted similar stance when reporting the effectiveness of using differentiated instruction strategies on the achievement, meditative thinking and self-motivation among first-year students when teaching geography. In addition, Bayoumi and Al-Jundi (2018) linked students' achievement, ability to retain learning, and motivation to learn math to multiple intelligence-based learning strategies. Abdul Al-Bar (2018) on the other hand connected between differentiated instruction and the development of immediate and deferred students' achievement in mathematics, the skills of solving math problems among slow-learning students at the primary level, students' achievement in mathematics, and problem solution skills.

Concerning thinking and language skills, the study of Abanmi (2018) found differences in creative thinking skills and students' attitudes towards interpretation course 'Al-tafseer' in favor of the experimental group. Abdul Al-Qader (2019) investigated the impact of differentiated instruction on certain language skills of third-grade primary students and reported differences in favor of the experimental group in the amount of language structure and language performance. In their turn, Al-Rushoud and Nofal (2017) investigated the effect of a training program based on differentiated instruction on the achievement of third-grade students in science; the results showed differences in achievement, self-perception and parallel thinking in favor of the experimental group.

Solpuk-Turhan et al. (2019) carried out a study to investigate the characteristics of inspiring teachers. The results showed that the most important inspiring teachers are those who can be considered the most successful in the teaching profession, who care about the individual differences between their students and plan to educate them accordingly and evaluate their students fairly. According to this study, the most important criteria of a successful educator is to be a therapist and a facilitator to the best he can to maintain a successful educational environment that ensures that all students reach their full potentials and support students' development in various ways through influencing their internal and external motivation.

Literature hosts studies that investigated the impact of differentiated instruction in relevance to variables such as years of experience, qualification, grade level, school subjects and teacher training. For example, Affholder (2003) studied the extent to which years of experience affect the primary school teachers' use of differentiated instruction. The results of the study came in favor of teachers with more years of experience at the expense of those with little or no experience. However, the Hobson's (2008) study showed little impact for the years of experience on teachers' use of differentiated learning strategies in the classroom. On the other hand, Siam and Al-Natour (2016) did not report any statistically significant differences between the degree of teachers' use of differentiated instruction and years of experience. While Al-Harbi (2017) and Al-Bultan (2017) found no relationship between the variables of years of experience and scientific specialization and the degree to which teachers apply differentiated instruction, Al-Bultan (2017) and Filiz and Durnali (2019) reported statistically significant differences due to training courses. Christian (2005) confirmed the impact of a training program on using differentiated instruction where the results showed an improvement in teachers' performance in favor of teachers who did undergo training compared to those who did not.

In terms of the obstacles, Netterville (2002) emphasized that one of the biggest obstacles facing primary school teachers' application of differentiated instruction is teachers' extra load and the need for more time and effort to plan and prepare for differentiated instruction. Good (2006) and Al-Bultan (2017) also reported constraints like the need for more time and effort in planning, and the lack of support and professional development provided to teachers. Those studies also distinguished between the learning strategies that require a lot of time and effort in planning and preparation such as multiple intelligence, learning contracts, and problem solving, and other strategies that do not require that much of time and effort such as think-pair-share. In his turn However, Burns (2004) highlighted the discrepancy among teachers in applying differentiated instruction due to the secondary school teachers' resistance who are committed to cover the entire content.

The Harman's (2014) study also aimed to identify the barriers teachers face while applying differentiated instruction. The researcher concluded that teachers should be provided with continuous professional development, models of lessons as references for teachers especially at the outset of the process and should be provided with opportunities to share experiences with their colleagues. Among the most prominent obstacles teachers face, Siam and Al-Notour (2016) reported poor administrative support, poor parent support, time constraints and lack of educational resources. In a study carried out by Aldossari (2018) to identify the most important obstacles and challenges facing teachers of public education while applying differentiated instruction, the results indicated that the student individual differences ranked first, followed by challenges related to the school environment, the nature of differentiated instruction, teacher challenges and, finally, challenges related to training.

It is important that this literature review denotes the methodology followed by the aforementioned studies that share similar objectives with the current study. In general, the methodologies these studies followed were either the mixed method, the descriptive, or the experimental or quasi-experimental, the way that best serves the objectives of each study. The current study agreed with several studies when following the mixed approach. For example, Siam and Al-Natour (2016) followed the mixed approach by collecting data using surveys and interviews, while the study of Hobson (2008) used surveys and observations. In general, the majority of those studies (Affholder, 2003; Al-Bultan, 2017; Aldossari, 2018; Good, 2006; Netterville, 2002) agreed with the current study on adopting the descriptive approach using the survey as the main tool for data collection. On the other hand, several other studies (Abanmi, 2018; Abdul Al-Qader, 2019; Abdul Al-Bar, 2018; Al-Rushoud & Nofal, 2017; Al-Ghamdi, 2018; Bayoumi & Al-Jundi, 2018; Halisi & Sharif, 2012) differed from the current study by following the experimental or quasi-experimental approach. Finally, the current study targeted the primary grades, similar to the most of the reviewed studies (Abdul Al-Bar, 2018; Abdul Al-Qader, 2019; Affholder, 2003; Al-Bultan, 2017; Aldossari, 2018; Al-Ghamdi, 2018; Bayoumi & Al-Jundi, 2018; Burns, 2004; Christian, 2005; Good, 2006; Halisi & Sharif, 2012; Hassanein, 2016; Koeze, 2007; Netterville, 2002), while differed in the age with (Al-Harbi, 2017; Al-Rushoud & Nofal, 2017; Abanmi, 2018; Harman, 2014; Hobson, 2008; Sharbini, 2017; Siam & Al-Natour, 2016).

This convergence in the methodology between the current study and the available literature should gain the findings of this study more confidence; it is an opportunity to compare the immediate results with those of similar studies at an international level, a chance to become a distinctive addition to global literature.

Theoretical framework

The differentiated instruction gets support from the theory of multiple intelligences (Gardner, 1989) the principles of constructivism (Vygotsky, 1978) and Bloom taxonomy (Kojak, 2008). Accordingly, differentiated instruction employs multiple teaching entries, educational activities and tasks, and varies between group and individual learning, and small and cooperative groups (Bayoumi & Al-Jundi, 2018). According to Kojak (2008), the psychologist's attempts in integrating the set of social and psychological theories into differentiated instruction aim at bringing the learner to the ultimate level of learning and balanced growth. Vygotsky believes that the mind grows and develops through the exposure to new experiences that challenge his abilities and level of thinking; the new conflicting learning context prompts the learner to create solutions and assimilate the new knowledge into his prior experiences (Tomlinson, 2000).

Operational Definition

Differentiated instruction: Researchers and scholars differed in describing the nature of differentiated instruction. For example, Kojak (2008) and Atiya (2009) described it as an educational system. On the other hand, Tomlinson (2005) considered differentiated instruction a way of thinking, while others (Al-Raa'i, 2014; Obeidat & Abu Al-Semeed, 2007) considered it as a teaching method or an education strategy. The current study views differentiated instruction as a philosophy of education on which education must be based. In spite of these differences, all definitions agreed that the main purpose behind differentiated instruction is to help all learners without exception to reach the same educational outcomes, taking into account their individual differences in abilities, interest, needs, orientations, intelligence and learning patterns.

The problem of the study

Official reports of international standardized tests that Qatar participates in like (TIMSS) (2015) and Progress In International Reading Literacy Study (PIRLS) (2016) in addition to the official reports from the Ministry of Education and Higher Education (MoEHE, 2018) have all shown a decrease in students' achievement. The MoEHE report for 2017-2018 identified aspects that need to be addressed in the educational process: low-achievement and poor thinking skills, the need to use challenging methods and strategies that lead to the development of students' higher thinking skills and meet their needs and adapt to their different abilities, and learning patterns and intelligence. The report also stressed on the importance of considering the individual differences among students, given that Qatar faces a significant challenge vis-à-vis the very high population growth rate that leads to differences and inconsistencies among learners related to the environments they originally came from. The need to deal with these differences has become an urgent requirement for educational institutions in Qatar (Lazar, 2013).

Therefore, the problem of the study centers around the inability of the educational institutions to deal with differences among learners in terms of their levels, abilities, needs, learning patterns and multiple cultural backgrounds, resulting in a decrease in attainment levels and poor thinking skills. The problem of the study represents itself through the efforts of the educational system that neither meet the needs of learners nor absorb the differences between them. These efforts do not adhere to the philosophy of Qatar's educational system, and therefore fall short of achieving the state's vision of keeping pace with international standards in terms of providing equal educational opportunities for all. Identifying the factors and the obstacles that affect the application of differentiated instruction becomes the driving power behind conducting this research.

Questions

The current study aimed to answer the following two questions:

1. To what degree do teachers in Qatar implement differentiated instruction?
2. Are there any statistically significant differences in the degree of application of differentiated instruction due to years of experience, qualification, grade, school subjects and training courses?
3. From teachers' perspective, what are the obstacles that impede the use of the differentiated instruction?

Significance of the study

The world is becoming a small village is now more true than ever; although this study reports on differentiated instruction based on data collected from the local area, the findings could be considered an addition to the world literature. Hence, this study is significant for being the first study, to the best of the researchers' knowledge, that examines the factors and the obstacles that affect the application of differentiated instruction in Qatar. The study comes in response to the modernization and development trend in the education system and in line with the objectives of

public education as represented in Qatar Vision 2030 (General Secretariat for Development Planning, 2008). The study is significant for considering the individual differences as a source of strength rather than deficiencies. This study is important as it highlights the most important barriers that hold back the application of differentiated instruction in the classroom. Accordingly, the results of the current study and recommendations will help education administrations in similar environments develop classroom settings that meet the aspirations of their societies and provide appropriate support to teachers to ensure the successful application of differentiated instruction in their classrooms. This study adds another piece to the international literature to get a better look at the big picture.

Methodology

Since the main goal for the study was to investigate the factors and the obstacles that affect the application of differentiated instruction, the study followed the mixed approach by using the questionnaire and the interview as the main tools for data collection. This should strengthen the design of the study and earn trust on the reported findings of the study (Abu Allam, 2013).

Research goals

In light of the questions of the study, the current study aimed to uncover the obstacles that teachers face when applying differentiated education. In addition, the paper aimed to detect the impact, if there is any, of years of experience, scientific qualification, grade, school materials, and training on the application of differentiated instruction.

Study population

The population of the study included early childhood teachers in all public primary schools in Qatar in the disciplines of Science, Literature, and English for the academic year 2019/2020, distributed to 99 primary schools. (See table 1).

Table 1. Distribution of the population according to different disciplines

	Number of schools	Number of teachers in different disciplines			Total
		Scientific path	Literature Path	English	
Teachers (male)	10	24	24	11	59
Teachers (female)	89	666	666	445	1777
Total	99	690	690	456	1836

Study sample

The sample of the study included 236 teachers randomly selected as respondents for the questionnaire. From the participating sample, 10 teachers were randomly selected for the interviews. The following is a description of the sample of the study according to the variables of the study:

Table 2. Sample distribution according to variables

Variables	Classification	Number	Percentage
Gender (Teacher)	Male	13	5.50%
	Female	223	94.50%
School type	Boys	84	35.60%
	Girls	152	64.40%
Grade	1 st grade	115	48.70%
	2 nd grade	121	51.30%
Subject	Scientific path	107	45.30%
	Literary Path	90	38.10%
	English	39	16.50%
Years of experience	1-5 years	36	15.30%
	6-10 years	77	32.60%
	11-15 years old	62	26.30%
Scientific qualification	16 years and older	61	25.80%
	Bachelor	203	86%
	Higher education	33	14%
Vocational training	Trained	115	48.70%
	No Training	121	51.30%

*Study tools**The questionnaire*

The questionnaire in its final form consisted of three components: biographical data, degree of application of differentiated instruction, and constraints that teachers might face while using differentiated instruction. The biographical data included years of experience, qualification, subject matter, teacher training, gender, school type (boys, girls), and the class being taught.

The items of application and constraints were taken from Al-Bultan (2017), where the validity of the tool was checked by presenting it to a group of specialists in the curriculum and teaching methods, who agreed on its validity, accuracy and appropriateness. For the internal consistency, Pearson Coefficient came positive and statistically significant ($p=0.01$). For the reliability, Cronbach's alpha was calculated yielding a coefficient of (0.93) for application and (0.83) for the obstacles, which are considered highly reliable. The study used both components as in Al-Bultan (2017) without any changes or modifications. The application part consisted of (35) items, while the obstacles contained (21) items. The two parts followed the Likert-four scale.

The interview

This study used the interview to obtain a more accurate and more in-depth description for the phenomenon under investigation. The researchers used Spradley's (1979) model in conducting and analyzing the interview. The first question focused on the biographical data of the participants, while the remaining questions represented the main questions (Grand-Tour questions) and were built around the objectives of the study to ensure an overview of the context of the study. In addition to the grand tour questions, there were a number of follow-up questions that Spradley called "Mini-Tour" to help get further explanation, some of which were previously prepared, but many were spontaneous.

Data collection and analysis

In the first phase of data collection, the researchers designed the questionnaire electronically through Microsoft Forms and then sent it to teachers via e-mail. The second phase of data collection began by interviewing a randomly selected group of volunteer teachers using Spradley's (1979) interview form where key ideas, recurring topics and additional questions (mini-tour questions) were identified. All interviews were recorded using a digital audio recorder, and then copied for use in the data analysis phase.

Data analysis

In order to analyze data collected through the questionnaire, responses were introduced to the Statistical Analysis Program (SPSS, 26) where each response was assigned a sequential identification number, then audited and coded. The researchers personally processed the data, where the statistical significance for all tests was set at (0.05).

Assumptions of Normality: In small-sized samples, absolute z-value of Skewness and Kurtosis less than or equal 1.96 ($p = 0.05$) is accepted for normality (Kim, 2013). Table 3 shows the results of Skewness and Kurtosis values and its z-values of The reality of teachers applying differentiated instruction.

Table 3. Results of Skewness and Kurtosis values and its Z-values for The reality of teachers applying differentiated instruction

Group	Statistic	Statistic value	Std Error	Z-value
The reality of teachers applying differentiated instruction	Skewness	-1.241	.158	-7.85
	Kurtosis	1.948	.316	6.16

Normality assumption by teachers application for differentiated instruction: As it is seen in the Table 3, the absolute Skewness z-value (-7.85) and Kurtosis z-value (6.16) of teachers application for differentiated instruction were more than 1.96. According to the central limit theorem, if the sample data (> 30 or 40) is approximately normal, then the sampling distribution tends to be normal too regardless of the shape of the data. Thus, the violation of the normality assumption should not cause major problems, and can be ignored (Ghasemi & Zahediasl, 2012). It is worth noting that upon detecting the outliers, 11 items were found; therefore, all were deleted.

The statistical methods included frequency, percentages, means, standard deviation and One-Way ANOVA. T-test and Scheffé-test were used to illustrate the source and direction of differences in the participants' responses on the different components.

These tests serve the study purpose because, first, One-Way ANOVA is appropriate to answer the second question when investigating any statistically significant differences between the means of all independent (unrelated) groups. For grade, differences in the degree of application were spotted between the first and second grades. Therefore, the researchers conducted a t-test to find the difference between the two averages. Regarding the two variables, school subjects and years of experience, which have unequal group elements for unplanned comparison, the researchers used Scheffe-test because it is more appropriate for determining groups' differences. Concerning the outliers, there are none.

Table 4. Distribution of questionnaire categories

Description	Averages
Big.	3.26 – 4.00
Medium	2.51 – 3.25
A few.	1.76 – 2.50
None.	1.00 – 1.75

For the qualitative data analysis, the researchers used the 'domain-analysis' sheet for sorting and organizing data based on the emerging patterns such as differences, similarities, sequence, or causality (Spradley, 1979). The main themes are then identified. The researchers integrated the emerging themes within the results gleaned from the questionnaires to find explanations and answers to the research questions.

Results

This study had three questions: the first one tried to investigate the degree to which teachers implement differentiated instruction; the second question tried to investigate any statistically significant differences in the application of differentiated instruction due to the variables of years of experience, qualification, grade, school subjects and training courses. In the third question, the study investigated the obstacles that inhibit the application of differentiated instruction.

Question 1:

To what degree do teachers in Qatar implement differentiated instruction?

To answer this question, the researchers analyzed data collected through the survey, observations and interviews. Upon running the descriptive analysis (table 5), the means responses ranged between ($M= 3.84, SD= .42$) to ($M= 2.74, SD=1.04$), while the overall mean average was ($M= 3.52$). It is worth noting that the researchers categorized the level of application into four to facilitate data interpretation (high= 4.00-3.26, intermediate= 3.25-2.51, low= 2.50-1.76, none= 1.75-1). Said so, the findings clearly indicate that teachers apply differentiated instruction at a large scale in their classrooms.

Table 5: The reality of teachers applying differentiated instruction.

Number	Order	Items	Average arithmetic	Standard deviation
Top 5 phrases with a large application				
25	1	I work to instill the student's self-confidence and allow him to express his opinion and discuss what the teacher is asking	3.84	.42
7	2	I set educational goals for the lesson implemented through a range of activities and strategies.	3.82	.47
26	3	I provide explanations and examples for (ordinary) students who need them according to their degree of information on the subject	3.78	.46
23	4	Make sure students understand the subject and don't focus on memorizing it	3.77	.46
33	5	Types of evaluation methods (individual, group, teacher evaluation, self-assessment, evaluation of colleagues,) taking into account the differentiation and difference between students	3.76	.52
Two least applicable terms				
3	27	I categorize students into groups in light of the results of the pre-test and according to each set of common characteristics	3.44	.69
1	28	A pre-evaluation was conducted to identify students' preparations, abilities, different needs, inclinations and learning patterns before starting teaching.	3.42	.71

Table 5: Continued

Number	Order	Items	Average arithmetic	Standard deviation
Top 5 phrases with a large application				
Phrases that were the degree of applicable application				
9	29	Make sure to diversify the learning environment (classroom, laboratory, library, ...) depending on the teaching method used and to achieve the effectiveness of learning	3.25	.82
19	30	I dedicate a notebook to each student's notes while working in the classroom.	3.08	.88
12	31	Students have the opportunity to participate in planning processes and select activities and tasks.	3.06	.91
27	32	I sometimes condense the content of the lesson for the distinguished students, content with what is new and allow them to complete the subject by themselves.	3.02	.86
2	33	Give students an idea of a differentiated (diverse) education that makes them feel like they are involved in learning.	2.96	.90
28	34	I use multiple assignment options according to students' abilities. (opposite to the traditional; one assignment for every student)	2.86	.98
18	35	I use files for the work that every student does in the class.	2.74	1.04
9	29	Make sure to diversify the learning environment (classroom, laboratory, library, ...) depending on the teaching method used and to achieve the effectiveness of learning	3.25	.82
Overall arithmetic mean axis			3.52	

On the other hand, the interviews and observations yielded controversial findings; discrepancy and weakness emerge as two major themes. For discrepancy, it appears in the application of differentiated instruction; this is evident in the pedagogy teachers follow to differentiate the content material, the teaching methods and strategies while considering the different needs and learning patterns of the students. The second theme depicts weakness in teachers' practices for differentiated instruction; this is evident when teachers try to classify learners according to their common characteristics in light of the results of the pre-assessment, as well as when teachers try to recognize individual differences through varying the learning objectives. (See table 6).

Table 6: Teachers' response on the real application of differentiated education

Style	Domain	Examples of answers
Contrast	Interviews	
	Degree to which teachers apply differentiated instruction	<ul style="list-style-type: none"> • One teacher confirmed that he was applying highly differentiated instruction, • One teacher replied: "I don't know if we were applying differentiated education in our classes or • "We hear from the coordinator that we include it in our day-to-day plans, but I don't know what that means."
	The time that teachers believe they have begun to apply differentiated instruction	<ul style="list-style-type: none"> • Ranged from (1-12) years
	Teachers' evaluating their experience in applying differentiated instruction	<ul style="list-style-type: none"> • One teacher assessed his experience as successful and useful and did not have the challenges and constraints that might make it difficult to apply differentiated instruction. • The majority expressed the difficulty and the inability to apply differentiated instruction. • Some of them acknowledged that differentiated instruction prevents them from achieving their goals of completing the curriculum according to the quarter plan.

Table 6: Continued

Style	Domain	Examples of answers
Contrast	Observation	
	Degree of differentiating educational content, teaching methods according to learners' needs, abilities and learning patterns	<ul style="list-style-type: none"> • Learning patterns were limited to the use of visual and audio style, mostly book images or listening texts • Few teachers used external images as a supporting source to communicate a concept in a variety of ways. • Three teachers used video in their classes, with the aim of diversifying lesson entries and teaching methods. • One of the teachers used the audio style distinctly from the others by repeating the instructions for individual and group work with her students (motivational shouts, soft and encouraging music).
	Application for some strategies that vary in the type and form of teaching	<ul style="list-style-type: none"> • Two teachers used flexible grouping. • Others used cooperative learning and strategy (Think-pair-share) • The rest of the classes were limited to the use of teachers for group activities in which activities and tasks are presented to everyone at the same time in the same way without any differentiation.
	Diversifying activities and tasks	<ul style="list-style-type: none"> • A number of teachers use the same activities in the same way all the time and with all students. • Learners in any of the classes were not given the opportunity to choose the activity or task they preferred
	The space that teachers provide to students to discuss, exchange ideas and express their opinions	<ul style="list-style-type: none"> • Few teachers gave their students the opportunity to express their opinions and to exchange ideas • One teacher gave his students the teacher role (young teachers) to explain the idea in their own language. • Most teachers have adhered to the content and examples of the curriculum, limiting students' questions and ideas
	Teacher practices: focusing on understanding and building knowledge, focusing on the memorizing and storing information	<ul style="list-style-type: none"> • Four of the teachers focused clearly on comprehension. • The majority of teachers focused on repetition of information and vocabulary
Weak	Observation	
	Classifying learners according to their common characteristics	<ul style="list-style-type: none"> • Learners were not classified during the classes attended, and student groups were not changed during activities and exercises, except in one class. • In the rest of the classes, and to choose learners at different levels to do the same task or activity, or to answer the same question in the same format and method, teachers used iced and colored sticks.
	Teachers' practices concerning the learners' pace due to their readiness and abilities.	<ul style="list-style-type: none"> • In most classes, learners were given the same time to accomplish the same tasks; therefore, quick learners end up doing nothing while waiting for the slow learners to finish the task.
	Diversifying learning goals	<ul style="list-style-type: none"> • The objectives of the lessons are not set by the teachers themselves according to the level of their classes but are prepared by group of teachers of the same specialization and for the same stage, and are unified for all classes, and are not allowed to change it, as most of it became fixed in the manual or the textbook.

Question 2:

Are there any statistically significant differences in the degree of application of differentiated instruction due to years of experience, qualification, grade, school subjects and training courses?

The researchers used one-way ANOVA to answer this question and to determine whether there are any statistically significant differences between the means of all independent (unrelated) groups. results are presented in the following table.

Table 7. Differences in teachers' responses due to different variables

Variable		Sum of Squares	df	Mean Square	F	Sig.	η^2	Post hoc
Grade	Between groups	0.502	1	0.502	4.500	0.035	0.02	
	Within groups	24.885	223	0.112				
	Total	25.387	224					
School subject	Between groups	0.649	2	0.324	2.912	0.054	0.025	* E > S > L
	Within groups	24.738	222	0.111				
	Total	25.387	224					
Years of experience	Between groups	1.056	4	0.264	2.387	0.052	0.042	**4 > 3 > 2 > 1
	Within groups	24.332	220	0.111				
	Total	25.387	224					
Scientific qualification	Between groups	0.165	2	0.082	0.725	0.485		
	Within groups	25.223	222	0.114				
	Total	25.387	224					
Have you received any training?	Between groups	0.281	1	0.281	2.497	0.115		
	Within groups	25.106	223	0.113				
	Total	25.387	224					

Note: * the letters shown in post hoc result for school subject variable refer to (E: English, S: Scientific path, L: Literary path).

** The numbers shown in post hoc result for years of experience variable refer to the numbers used in illustrating statistically significant differences. (1: 1-5 years, 2: 6-10 years, 3: 11-15 years, 4: > 16 years)

As it shows in the table above, there are no statistically significant differences ($p > 0.05$) in the participants' responses relevant to the use of differentiated instruction due Scientific qualification, and vocational training.

Concerning grade, school subjects and years of experience, the results came statistically significant. That promoted the researchers to find the effect size for these variables on implementing differentiated instruction. According to Cohen's (1988) guidelines, the results of effect size measurements in the table above would be deemed small for the variables of grade, school subjects and years of experience); 2 % of the implantation of differentiated instruction was caused by grade of students and 2.5 % of the implantation of differentiated instruction was caused by school subjects, but years of experience was responsible by 4.2 % of the implantation of differentiated instruction, greater than the other two.

For grade, differences in the degree of application were spotted between the first and second grades. Therefore, the researchers conducted a t-test to find the difference between the two averages; the results showed that the degree of application of teachers to differentiated instruction varies in favor of the second grade.

Regarding the two variables, school subjects and years of experience, which have unequal group elements for unplanned comparison, the researchers used Scheffe-tast because it is more appropriate for determining groups' differences. Results are presented in tables (7).

Post hoc results show statistically significant differences between the responses of the participants on the degree of application of differentiated instruction in favor of the teachers of the literary track. It also shows statistically significant differences in favor of teachers with greater experience compared to novice teachers or those who do not have any prior experience in education.

Question 2:

From teachers' perspective, what are the obstacles that impede the use of the differentiated instruction?

The descriptive statistics below provide the answer to this question.

Table 8. Obstacles teachers face when applying differentiated instruction.

Number	Order	Phrase	Mean	Standard deviation
Phrases with a high degree of disability				
14	1	The teacher's burden and classes are too high.	3.61	0.733
9	2	Length of course content	3.5	0.78
4	3	Large number of students per class	3.45	0.871
15	4	The use of differentiated education requires effort and time to plan and implement	3.34	0.786
20	5	The time allocated for lessons is not enough to use	3.29	0.863
Top 5 phrases in the ranking with a moderate disability				
10	6	Inappropriate content of the decision to use such methods	3.09	0.848
11	7	There are no incentives for teachers who use these methods and strategies	3.03	0.958
3	8	Small classroom space	2.90	0.965
13	9	Poor in-service teacher training in modern learning strategies	2.83	0.966
17	10	Students' interaction with the methods and activities required by the use of differentiated education	2.81	0.927
Low-obstruction phrases				
16	19	Poor classroom management skills for teachers	2.47	1.033
8	20	Lack of modern school equipment	2.46	1.045
5	21	Teacher's unwillingness to use modern learning strategies	2.45	1.032
Overall arithmetic mean axis			2.89	

Table (8) shows the means ranging between (M=3.61) to (M=2.45), while the overall average means for this part of the questionnaire is (M=2.89). Clearly, there are five items that were considered as obstacles from the point of view of the participants, namely items (4, 9, 14, 15, and 20) with means ranging between (M=3.61-M=3.29). Teachers considered the most obstacle facing them is item (14) "too heavy class load and assignments" (M= 3.61, SD=0.73) while item (20) as the least "The time allocated for lessons is not enough" (M=3.29, SD=0.86). On the other hand, table (8) clearly reports thirteen items as obstacles of a medium effect. Item ten "Methods are not appropriate with such content" ranks first (M=3.09, SD=0.85), while item seven "teacher's disbelief in the importance of differentiated instruction in the teaching various school subjects" ranks last (M=2.55, SD=1.02). However, items (5, 8, and 16) represented obstacles with least effect. Respectively, item (16) "Teachers low skills in classroom management" (M=2.47, SD=1.03), item (8) "Lack of modern school equipment" (M=2.46, SD=1.05), and item (5) "Teachers are unwilling to use modern learning strategies" (M=2.45, SD=1.03). These results concord well with the results gleaned from the interviews where the emerging themes support the identified obstacles.

Based on the data collected from the interviews, teachers showed a strong belief in the importance of differentiated instruction and its impact on students' achievement and the need to apply differentiated instruction in their education. The most emerging themes relevant to obstacles facing the application of the differentiated instruction were teachers' overload, overcrowded classes, shortage in time and the need for extra effort in preparation and planning due to the disproportionality between content and time.

Upon running factor analysis test to identify the factors and the obstacles relevant to the implementation of differentiated instruction (Table 9), the researchers classified the obstacles that teachers face during their application of differentiated education into four groups: (1) Teacher-related obstacles, (2) Classroom-related obstacles, (3) Curriculum-related obstacles, and (4) School administration -related obstacles. Keeping in mind the results of the analysis of teachers' responses to the obstacles part of the questionnaire, the phrases of great obstacles were mostly from the third group, namely Curriculum-related obstacles. The results also showed that teacher-related obstacles were mostly in the last six terms, low to medium level.

Table 9. Result from a factor analysis of the obstacles relevant to the implementation of DI.

Obstacles items	Factor loading			
	1	2	3	4
Teacher's unwillingness to use modern learning strategies	.793	.194		.184
Teacher's lack of belief in the importance of differentiated instruction in the education of various detectives	.784	.219	.120	.182
Teachers are accustomed to using traditional teaching methods	.752	.140	.148	.179
Poor classroom management skills for teachers	.729	.203	.131	.111
Poor pre-service teacher preparation in modern strategies in education	.693	.169	.284	.100
The teacher's belief that the use of differentiated instruction results in losing control and quietness within the classroom	.684	.182	.315	.114
Students' interaction is not enough according to what is required by differentiated instruction	.561		.358	.219
The teacher's poor knowledge of what is differentiated instruction, its objectives and mechanisms	.557	.279		.257
Small classroom space	.157	.793	.157	.181
Large number of students per class	.166	.752	.233	
Lack of appropriate classroom environment for the use of differentiated instruction	.297	.705	.127	.207
Lack of modern school equipment	.340	.564	.143	.264
The use of differentiated instruction requires effort and time to plan and implement	.163		.750	
The teacher's burden and classes are too high.		.303	.660	.265
The time allocated for lessons is not enough to use	.207	.351	.606	
Length of course content	.124	.475	.570	.175
Difficulty evaluating students when using differentiated instruction	.404		.510	.146
Inappropriate content of the curriculum to use such methods	.227	.199	.503	.331
Poor encouragement of the school principal and the teacher's educational supervisor to use differentiated instruction	.281		.136	.827
There are no incentives for teachers who use these methods and strategies	.196	.189	.336	.751
Poor in-service teacher training in modern learning strategies	.325	.303	.135	.735

Note: Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization.

a. Rotation converged in 7 iterations.

Discussion

At the outset, this study tried to investigate the degree to which teachers in Qatar implement differentiated instruction. According to the results, there was a discrepancy in the findings between the quantitative and the qualitative data. While the survey findings indicated that early childhood teachers do apply differentiated instruction; the results obtained from the interviews and the observations indicated otherwise. One possible explanation might rest in the phrases themselves; for example, items like 25, 7, and 13 might be misleading. These items ranked on top of the list of the phrases that measure the degree of application for differentiated instruction; however, a second reading for these phrases may suggest that these items could be shared with other types of education, not necessarily the differentiated instruction. For the same reason, we find phrases like (26, 20, 10) that refer to procedures and practices directly linked to differentiated instruction, yet ranked low on the list. For example, item one says, "I conduct a pre-assessment to identify the students' readiness, abilities, needs, attitudes, and their learning patterns before starting teaching." Such an item is basic for differentiated instruction, yet it ranked (28) in terms of the degree of application. Other items that strongly relate to differentiated instruction ranked low like phrase 2, "I give students an idea of differentiated instruction that makes them feel that they are major participants in their learning" ranked 33, and the phrase "I group students in light of the pre assessment and in light of their shared characteristics" ranked 27.

Similar inconsistency emerged from teachers' interviews. For example, two teachers confirmed that they apply differentiated instruction while both of them failed to give a correct definition for differentiated instruction or to distinguish between differentiated instruction and individual differences. Others admitted that they never implemented differentiated instruction: "I don't know if we've been applying differentiated education in our classrooms or not; we hear from the coordinator that we include it in our day-to-day plans, but I don't know what that means," one teacher said. One way to look at this discrepancy could be through considering the teachers' awareness of differentiated instruction, which in turn might justify the recent professional development that the Ministry of Education and Higher Education has launched to raise teachers' awareness about differentiated instruction. The researchers also believe that teachers' responses might reflect teachers' beliefs about what should be done not what is done on the ground. Hence, the results might reflect teachers' strong belief in the importance of differentiated instruction and their strong desire to develop the required skills to make it a real practice regardless of the level of the real practice. In this regard, the findings of this study are consistent with other studies (Burns, 2004; Hobson, 2008; Ismjli, 2018) which reported variance in teachers' application for differentiated instruction, and that teachers

instruction is still predominated by the traditional style in spite of the preliminary attempts to apply differentiated instruction in their classrooms (Kelly, 2004).

The second question in this study investigated the differences in the application of differentiated instruction in terms of years of experience, qualification, grade, school subjects and training courses. As reported earlier in the results, this study did not find any differences in the participants' responses relevant to the use of differentiated instruction due to qualification and training courses. This finding is different from Al-Bultan (2017) where the researcher reported differences in teachers' responses due to training in favor of teachers who have enrolled in more than one workshop compared to those who enrolled only in one or have never received any training. Al-Saray and Fares (2015) emphasized the significant impact of the training program on the way teachers implement differentiated instruction practically in changing their attitudes positively towards their profession and increasing their competence.

This result might help in explaining the insignificant differences in this study between teachers who received training, accounting for 48.7% of the total member of the sample, and the rest of the participants who did not receive any training. According to the majority of the participants, this might be because of the theoretical nature of the training they receive. This raises concern, in fact, about the quality of such training workshops and the possible outcomes; being theoretical would weaken teachers' opportunities to transform these workshops into real practices. Filiz and Durnali (2019) supported the hands-on training in schools and believed it would be more useful for acquiring skills, abilities and educational strategies to apply in the future. There is no benefit from theoretical training if there is no practical application on the ground. It is worth noting that Embedding chances for real practices would allow teachers to gain more control on the components of differentiated instruction and to link that to differentiated strategies during planning and implementation. Concerning grade, school subjects and years of experience, the results were significant. In reference to Cohen's (1988) guidelines, the result depicted a small size effect for years of experience, students' grade level, and school subjects respectively.

Differences in the degree of application concerning grade level were identified between the first and second grades, yielding higher distinction in favor of the second grade. This finding is different from Al-Bultan (2017) who found no effect for grade level on teachers' application for differentiated instruction. This difference could be reasoned in light of the fact that adoption of some distinct education strategies depends on mastering the skills of reading, writing and self-reliance; second graders are more capable to read, write, understand and implement instructions than first graders. First graders often need more time to read and write and need more teacher support and guidance.

With regard to the two variables, school subjects and years of experience, the study reported noticeable differences between the responses of the participants on the degree of application of differentiated instruction in favor of the teachers of the literary track. The researchers attribute these differences to the lack of time allocated to English classes, which amounts to five classes per week, while considering the huge content that teachers need to cover. On the other hand, the number of classes in the literary track reaches 13 divided between Arabic (nine classes for the second grade - ten classes for the first grade) and Islamic Education (three classes), allowing them to lessen the pressure of the strategies on first graders. This finding is different from Al-Bultan (2017) and Al-Harbi (2017) where both researchers reported no differences relevant to school subjects.

The results also reported important differences in favor of teachers with greater experience compared to novice teachers or those who do not have any prior experience in education. This is consistent with the Affholder (2003) who confirmed the application of differentiated instruction by teachers with more experience. It is also consistent with Hobson (2008) who indicated that years of experience had a significant impact on the frequency of using differentiated instruction. However, Al-Harbi (2017), Al-Bultan (2017), Siam and Al-Natour (2016) and Tomlinson (1995) did not support this stance; their studies did not report any differences in the degree of teachers' application for differentiated instruction relevant to years of experience. The researchers of the current study may attribute the differences to the fact that teachers with greater experiences are more familiar with classroom and time management. However, the researchers believe that if teachers were better trained on how to apply differentiated instruction and were provided with continuous professional development along with classroom support, these differences would fade out. It is also logical to think that less experienced or newly appointed teachers might apply differentiated instruction more than peers with longer experience; this is under the assumption that novice teachers might be more motivated to put the most up-to-date techniques and strategies into practice.

Based on the point of view of the participants, the study uncovered five obstacles that hinder the use of differentiated instruction. Teachers considered "too heavy class load and assignments" as the most obstacle facing them while "the time allocated for lessons is not enough" as the least. On the other hand, the results reported thirteen items as obstacles of a medium effect, with the item "Methods are not appropriate with such content" ranking first, while the "teacher's disbelief in the importance of differentiated instruction in the teaching various school subjects" ranking last. However, the items that represented obstacles with the least effect were "teachers' low skills in classroom management", "lack of modern school equipment" and "teachers are unwilling to use modern learning strategies". These results concord well with the results gleaned from the interviews where the emerging themes supported these identified obstacles. In

addition, the results of this study align with those of Al-Bultan (2017) and Aldossari (2018) who reported similar obstacles, especially reporting full agreement with items (4, 14, and 20) within the high-level category.

The results gleaned from the interviews reported four major obstacles facing the application of the differentiated instruction: the overload assigned to teachers, the overcrowded classes, the shortage in time and the need for extra effort in preparation and planning. Such barriers, in the absence of required knowledge and practical training for the application of differentiated instruction may be the reason behind teachers low-level or deficiency in applying differentiated instruction. One of the interviewed teachers confirmed this when reporting his successful personal experience in applying the differentiated instruction. This teacher had nine students in his class; a situation that enabled him to accomplish his duties and give more space for his students for participation, interaction and expressing their opinions. On the other hand, one of the teachers pointed out saying "overcrowded classes makes the process of applying differentiated education an impossible task; in my class I do not know where to be since there are 32 students and there is no assistant and students at this stage need more support." The time and effort the teachers needed to pursue his duties in a class of nine are not comparable to another class containing thirty students or more. In a class of 30 students, the teacher attends to focus more on covering the content, managing the classroom, rather than on building the student's personality and sharpening his higher-thinking skills. Another teacher said, "the many burdens assigned to us do not leave us the space and time to be able to develop our skills and acquire new knowledge and skills, especially since the application of anything new takes a lot of time." And a third teacher said "the time and effort needed for differentiated education in planning and processing is very enormous; preparing various means and resources according to the needs of students needs a lot of time especially when having a large number of students different in their characteristics."

Recalling the results from factor analysis per teachers' responses on the obstacles, the phrases labeled as large obstacles fall mostly under the third group, which includes constraints related to the curriculum and differentiation. This may indicate the importance of developing better curriculum to be more appropriate for differentiation and adjustment in terms of the length of the content or the time allocated for it. Novice teachers might find help what Al-Ghamdi (2018) called for when suggesting providing teachers with pre-prepared models and materials to refer to while differentiating their education, especially in the early stages of their instruction. The justification would be to provide teachers with rich and varied reservoir to be used with their students according to their individual differences. This would give them the opportunity to gradually practice differentiated instruction and develop their skills over time until it becomes natural for them (Netterville, 2002).

The result of this question is consistent with that of Good (2006) who reported time as one of the biggest constraints facing teachers when using differentiated instruction. The findings of this study align with Al-Bultan (2017), Burns (2004) and Siam and Al-Natour (2016) who emphasized the need for time and effort in planning for differentiated instruction. The results also showed imbalance between the content and the time allocated to lessons; this disproportion significantly hampered the use of differentiated instruction. While Netterville (2002) added teachers' load as one of the significant impediments, Tomlinson (1995) added classroom management and lesson preparation as the most important difficulties that cause concern to teachers during the implementation of differentiated instruction.

Conclusion

The differences between learners pose a major challenge for those in charge of the educational process, as one of its main tasks is to provide equal educational opportunities for all learners in order to ensure better growth, meet learners' needs, and raise the efficiency and quality of the educational system. Achieving this requires adopting a philosophy and an orientation similar to differentiated instruction that places the learner at the center of the educational process, making him the focal point for planning, preparation and implementation. Educational systems that ignore meeting the learners' needs, interests, abilities and learning patterns will fall short from achieving its objectives (Al-Shafi'i, 2013).

This study targeted the status quo of differentiated instruction vis-à-vis the level of practice, the factors affecting the degree of application of differentiated instruction, and the constraints that teachers face during implementation. Despite the significant obstacles that teachers face while applying differentiated instruction, it remains a worthwhile endeavor. It requires concerted efforts from people in power manifest in the technical, professional and administrative support to teachers in order to enable them to successfully put differentiated instruction into practice.

Finally, teachers must remember very well that they all have the opportunity to change and develop themselves and their teaching methods in order to become a force capable of bringing the desired changes around by creating a well-prepared generation for a future that does not consider other than excellence.

Recommendations

In light of the findings of the current study, the researchers encourage the colleges of education to adopt and adapt differentiated instruction through its courses that offer hands-on experience and field training on differentiated instruction. The researchers also recommend providing professional development courses to the supervisors and the

administrators in schools along with teachers of course. The study also supports designing diverse and progressive activities, providing a variety of supportive and physical learning resources for teachers, visual, audio and physical, to save teachers' time and effort in preparation and processing. The goal behind the prepared models of lessons and rich resources is to provide teachers with rich and varied reservoir for all what they might need; teachers should adopt and adapt what works best for their students guided by their students' individual differences. Finally, the study recommends further research targeting the extent to which the teaching-learning process across all the grades' levels incorporate the principles of differentiated instruction.

Limitations

Similar to research studies that share the same methodology, the data collection tools may be one source for limitations. This study used surveys to reach to its participants, and it is well known that these surveys ask the participants to choose an answer according to a ready-made scale. Therefore, there is no guarantee that the participants' responses will remain the same if asked to respond to the same tool at a different time or place. Their feelings and their state of mind might get affected due to such change resulting in different responses.

In addition, data collection was carried out through online survey; the researchers designed electronically their survey through Microsoft Forms and then sent it to teachers via e-mail. Having this in mind, the researchers would like to refer to a possible bias relevant to respondent visibility. The second tool was the interview; here the researchers would like to remark a possible research bias due to qualitative data analysis. Based on the aforementioned, we suggest broadening this kind of study where other instruments of data collection could be used in order to account for possible biases as much as possible.

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