

# The Effectiveness of Using Differentiated Instruction on Science Learning Achievement for Grade 5 Bhutanese Students

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**Abstract:** The purposes of the study were to examine the effectiveness of using Differentiated Instruction (DI) on Science learning achievement and learning satisfaction of grade 5 Bhutanese Students. This mixed- method research adopted a cluster random sampling method to select a sample group consisting of 30 students from one of the primary schools in Bhutan. The instruments used for the study were lesson plans, learning achievement tests and a semi-structured interview. The validity of the research instruments were validated by 3 experts with the result of the IOC index ranges from -1 to +1. The study used pre-test and post-test method to collect quantitative data and semi-structured interview to collect qualitative data. The pre-test and post-test were conducted before and after the treatment to find out the level of students' learning achievement. The semi-structured interview was administered after the post-test to find out the students' learning satisfaction in Science. The result of learning achievement was analyzed using a paired sample t-test. It was found that the post-test mean score (14.37) was higher than the pre-test mean score (8.58) with the mean difference of 5.79. Further, the significance (p) value was .01 which indicated using differentiated instruction on Science learning was effective. Additionally, the findings from semi-structured interview concluded that participants expressed high levels of learning satisfaction. Therefore, DI approach should be applied and implemented in schools as it creates new and diverse learning environments to accommodate students' diverse learning requirements, irrespective of their academic status or standing in society.

**Keywords:** Differentiated instruction, Learning achievement, Learning satisfaction, Science

## Introduction

Bhutan has placed much emphasis on education and it has played a central role in the social, economic, political, cultural, intellectual and environmental development of the country to give it a distinct identity as a small, peaceful, progressive and happy nation and thereby the Royal Government of Bhutan continues to accord high importance to education as an engine of growth in the nation building process (Ministry of Education [MoE], 2014). The modern education system in Bhutan was introduced with the initiation of economic development plans in 1961. The education system today has three main forms: General education, Monastic education, and Non-formal education. There exists now an extensive network of schools and other educational institutions spread throughout the country (National Statistical Bureau, 2023). Historically, Bhutanese science education started with a curriculum borrowed from India but it was later localized to suit the Bhutanese needs. The intended purpose for the localized Science curricula was to promote the art of scientific inquiry through Bhutan's social and environmental context.

The Bhutanese Science curriculum witnessed several rounds of reform to improve the quality of science education (Dorji et al., 2022). However, despite several rounds of curriculum reforms and revisions, several national and international studies from the past decade continue to point to the need to raise the quality of teaching and student learning in Science Education. There are numerous reports such as Education in Bhutan: findings from Bhutan's experience in PISA for Development (Bhutan Council of School Examination and Assessment (BCSEA, 2019), citing that Bhutan lagged significantly behind that of

Organization for Economic Co-operation and Development (OECD) countries and of the best education systems in Asia. In line to that, at the National School Curriculum conference 2016: Rethinking Curriculum Report by the Royal Education Council (REC, 2016) has also indicated that the education content structure in the STEM subjects is not inclusive. Similarly, as per the result of Bhutan Higher Secondary Education Certificate (BHSEC) examination 2023, Katel (2024) reported the stream-wise pass percentage with the pass percentage for the Science stream recorded at 82.71 %, which was lower in comparison to other streams like Commerce and Arts.

Additionally, going by the study findings of the REC (2019), it was ascertained that the Science and Mathematics curriculum were said to be prescriptive and rigid. Ultimately, the lower ability learners were overstretched while the high ability ones were under-utilized. Therefore, the need for developing a differentiated curriculum to cater to different abilities and interests of students were highly recommended by Royal Education Council (REC,2016). The erstwhile MoE (2014) had also identified teachers' ineffective teaching practice as a cause of students' low academic performances. In studies conducted by Utha et al. (2016), they have shown that teaching practices were mostly dominated, with teachers playing the conventional role of knowledge disseminator, teacher-centeredness and teacher's control are used as the main instruments for managing the learning process. To this end, Rabgay's (2018) findings reported that teacher talk (85.23%) dominated students' talk time (11.38 %) which indicated that the classroom interaction was dictated by science teachers and interactive teaching environments were hardly ever created or fostered.

Given the urgency for the need to foster better ways of teaching Science, the MoE placed a great emphasis on the quality of education. In order to fulfill the vision, the MoE spearheaded the development of a number of education-related documents, including Educating for Gross National Happiness (GNH), Draft National Education Policy 2019, Bhutan Professional Standards for Teachers (BPST) and Bhutan Baccalaureate (BB). The Draft National Education Policy 2019 and BPST firmly suggest offering various potential paths for learners. The BPST is guided by seven standards. The first standard is the diversity of learners, anticipating that teachers implement instructional strategies responsive to diverse learners in the classroom (Kado et al., 2021). Similarly, as per the mandates of Bhutan Baccalaureate (BB) developed in (2021), it places strong emphasis on the nine attributes of school excellence. The first attribute is the individualism, stating that the school should nurture the individualism of each student along with their individual talents, capabilities, and qualities.

Given the persistent need to raise the quality of teaching in Science Education, the Government continues to implement measures to support teachers to improve their teaching quality. To this end, the Government plans to strengthen the curriculum for STEM subjects. A recent move has been the development of a differentiated science curriculum to move away from the 'one-size-fits-all' curriculum to enable students to study subjects of their choice based on their aptitude and interest (REC, 2019). Owing to the endorsement of differentiated curriculum, thus, the need for using differentiated instruction (DI) also emerged. Based on the findings, the researcher carried out a study on the effectiveness of using differentiated instruction (DI) on Science learning achievement of grade 5 students in a Primary School in Western Bhutan. Science Education in Bhutanese schools is provided from upper primary to grade twelve through various subjects. Science Education is considered paramount in Bhutan to create a scientifically knowledgeable and skillful society to facilitate its socio-economic development (Rabgay, 2021).

Although a number of studies were conducted showing the positive results of using DI across the globe, however, no research has been conducted on Primary Science on the learning achievement and students' satisfaction towards the use of DI in the Bhutanese classroom context yet. As the classrooms are currently filled with students who have enormous differences in their readiness, interests, cultural backgrounds, prior knowledge, and learning profiles, the need for using DI is highly important. Also, teaching Science is characterized by the existence of many opportunities in implementing DI due to the variety of cognitive content and learning activities, in addition to the various learning environments, such as the classroom, the laboratory and outdoors garden (Abutayeh,2022). According to Tomlinson (2001), the founder of the concept DI, DI is a proactive approach whereby the teacher assumes different learners with differing needs and plans a variety of ways to “get at” and express learning. Differentiation typically includes pro-active and deliberate adaptations of the content, process, product, learning environment or learning time, based on the assessment of students' readiness or another relevant student characteristic such as learning preference or interest. To differentiate instruction is to acknowledge various students' backgrounds, readiness levels, languages, interests and learning profiles (Subban,2006).

A classroom is endowed with diversity of learner, thereby, keeping students in one basket, that too, through one stream is a false promise of equity. Each student comes to the class with differing interests, styles, abilities, and choices (REC, 2019). Tomlinson (2014), emphasized that in a differentiated classroom, teachers have to work daily to find ways to reach out to individual learners at their varied points of readiness, interest, and preferred approaches to learning. There is no single “right way” to create an effectively differentiated classroom; teachers craft responsive learning places in ways that match their own personality and approach to teaching. As DI classroom apply those inclusive instructional practices, therefore, it can be used to respond to the continuously increasing student diversity (Alt & Pozas, 2023). According to Toledo (2023) also opines that, instructions ought to be differentiated to benefit every individual student since students learn in more ways than one, which additionally affects student engagement and motivation.

DI has the power to benefit students' learning (Gheysens et al., 2023) since differentiation focuses on optimizing learning and learning conditions (including the learning environment) for all students; thereby making it an inclusive pedagogical approach (Loreman, 2017) whereby all students feel respected, safe and supported to participate and learn for maximum student achievement. When teachers use effective instructional approaches as part of their practice, they maximise the probability that students will be actively engaged in instruction. Student engagement is one of the most well-established predictors of achievement (Scarparolo & Subban, 2023). With DI, students are at the center of the teaching process, their needs and preferred ways of learning are met and their success is assured (Tulbure, 2011). Therefore, differentiated instruction (DI) was seen as a potential solution to meet diverse students' varied learning requirements.

In this quasi-experimental study, the researcher used mixed methods research design to generate quality and consistent results from the study. The pre-test was done before the actual intervention, whereas the post-test and semi-structured interview was carried out only after the complete intervention of the approach. The quantitative data collected through the pre-test and post-test were analysed and interpreted using an inferential statistics t-test with (p) level of significance. Additionally, the qualitative data through the semi-structured interview was analysed using thematic analysis. In this study, the researcher included an independent and dependent variable. The use of differentiated instruction was independent

variable whereas Science learning achievement and satisfaction of the students were the dependent variables. Therefore, the researcher has decided to examine the effectiveness of using DI based on the research objectives: (1) to study the effectiveness of using differentiated instruction on Science learning achievement of grade 5 Bhutanese students. This objective was studied and evaluated through the comparison of pretest and posttest marks (Learning achievement test); (2) to investigate the learning satisfaction in Science after using differentiated instruction. Accordingly, the findings may provide teachers with an alternative and effective teaching approach to enhance learning achievement and satisfaction in learning the subjects among the students.

## Research methodology

In this study, the researcher adopted a mixed method design. A mixed methods study is one that includes a qualitative and quantitative dimension, where combination of these will enable a broader reach in empirical studies (Doyle et al., 2000). The mixed-method research (MMR) is a distinctive form of research method using both quantitative and qualitative research methods so that strong empirical evidence is obtained (Nair & Prem, 2020). The pre-test and the post-test were used to gather quantitative data to determine the Science learning achievement of students before and after the use of DI. The researcher conducted semi-structured interview to find out the learning satisfaction of students after the intervention phase.

*Research participants:* The study was conducted in one of the primary schools in western Bhutan. The population of the study was Grade Five students and the target participants of the research were comprised of 30 Grade Five students from one of the schools in the Paro district. The researcher used cluster random sampling method to select one sections out of two for the academic year 2024. The research participants were of mixed gender and mixed academic learning abilities within the age range of 10 to 13 years.

*Research Instruments:* The study was conducted with the aim of determining the effectiveness of using DI on Science learning achievement of Grade Five Bhutanese students and to produce reliable and valid results. In this study, researcher used three different research instruments to collect data. Four lesson plans to teach the lessons, learning achievement test paper to conduct pre-test and post-test to collect quantitative data and for the qualitative data, the researcher used semi-structured interview to investigate the learning satisfaction of students after the intervention.

*Lesson plans:* In this study, the researcher prepared four lesson plans of 90 minutes each to teach Grade Five research participants about ‘Nutrition and Healthy Habits’ from the Science subject. The four lesson plans were validated by three experts with the rating of +1. The lessons were taught over four weeks with two sessions each week consisting of 45 minutes each. The lessons were designed incorporating various DI methods (students’ readiness, students’ interest, flexible grouping & learning styles) in lesson activities. Throughout the sessions, participants participated and learned the lesson through various DI learning modalities as per their preferences.

*Learning Achievement Tests:* The learning achievement test comprised of pre-test and post-test to collect the quantitative data for the study. The test consisted of 20 marks developed according to the Bloom’s Taxonomy and standard guidelines of Bhutan Council for School Examination and Assessment (BCSEA). The learning achievement tests questions were validated by three experts with the overall rating of 0.93, which was within

the range of 0.67 to 1. The value of the test item between 0.67 and 1.00 was considered accurate and acceptable. The pre-test was conducted before the actual intervention of lesson using DI. The questions comprised of 5 marks each for multiple choice questions, true or false questions, fill in the blank questions and short questions. The post-test was conducted after the intervention and both pre-test and post-test marks were compiled and analysed. The total time frame to complete the test was 45 minutes.

*Semi-Structured Interview:* According to Dovetail (2023), a semi-structured interview is a qualitative research method used to gain an in-depth understanding of the respondent's feelings and beliefs on specific topics and (George, 2023) also stated that, it relies on asking questions within a predetermined thematic framework. In this study, the researcher used a semi-structured interview to collect qualitative data on the use of DI approach after the intervention. The semi-structured interview questions were validated by three experts with the rating of +1. During the interview, six questions were asked individually face-to-face for around 4-5 minutes. The language used for the interview was optional and the participants had the choice of speaking either in English or Dzongkha (National language of Bhutan). Each participant's response was recorded in audio during the interview and later translated and transcribed into English. The researcher analysed the data using different themes.

*Validity:* Validity refers to how accurately a method measures what it is intended to measure (Middleton, 2023). In this study, the research instruments were validated by three experts. The lesson plans, learning achievement test questions, and semi-structured interview questions were validated by a Professor from Rangsit University, Thailand and two experienced Science teachers with a Doctoral degree and Master degree from the Royal University Bhutan (RUB). The validity of the instruments was carried out using the Item Objective Congruence (IOC) index ranging from -1 to +1 to check alignment of the items with the learning objectives. The rating +1 on Item Objective Congruence index signified that the items clearly matched the objectives set. The rating 0, indicates that the items set as per the objectives are neutral or uncertain whether the items meet the objectives or not. The rating -1 indicates items do not meet objectives. The accuracy and acceptability of the test item value were between 0.67 and 1.00. All the instruments for this study were validated and rated with the score between 0.67 to +1 by the validators, which indicated that all the items were congruent and valid for the study.

*Reliability:* According to Middleton (2023), reliability refers to how consistently a method measures something. In this study, Kuder-Richardson formula (KR-20) from Statistical Package for Social Sciences (SPSS) software was used to check the reliability coefficient of the learning outcome of the test. The KR-20 coefficient for the instruments should be equal to or greater than 0.70 if the instruments are to be reliable. To determine the reliability of learning achievement tests, the researcher conducted a reliability test consisting of 5 marks each for multiple choice questions, true or false questions, fill in the blank questions, and short questions with 34 Grade Six students studying in the same school. The reliability test was conducted prior to the actual intervention. The coefficient obtained for the reliability test using KR-20 was 0.80, which was greater than 0.70. Thus, the results indicated that the test was reliable to be used in the study.

*Data Collection:* To conduct the study, firstly, the researcher obtained an approval letter from concerned stakeholders to carry out the research. Secondly, for ethical considerations, all the students in the class were informed about research procedures and asked their parent/guardian to sign a consent letter. Since, the research participants were below the legal age, the researcher requested the parents/guardian to read and understand the

content of the consent letter before signing it. This was done to avoid violation of the rights of the participants during the study. The consent letters were collected and kept by the researcher throughout the study. The details of the participants and study records were kept confidential and anonymous. The researcher used a coding system in the place of their names as an alternative measure in ensuring confidentiality (Example: B501, B502, and B503). Thirdly, the researcher administered a pretest to study and analyse the Science learning achievement before teaching. After that, four weeks of teaching using differentiated instruction approach was conducted following the lesson plans. During the teaching, four DI methods were implemented in Science classroom. The four DI methods were: differentiated instruction based on students' readiness, differentiated instruction based on students' interest, differentiated instruction based on flexible grouping, and differentiated instruction based on learning style. A post-test was then administered after the teaching and finally, a semi-structured interview was conducted to investigate the students' Science learning satisfaction with the use of DI.

*Data Analysis:* A pre-test was conducted before the actual intervention and post-test after teaching using DI. The scores of the participants from the pre-test and post-test were analyzed by the researcher using a paired sample t-test based on mean ( $\bar{x}$ ), standard deviation (SD), and significance (p) value. Similarly, the learning satisfaction of the participants were analyzed using thematic analysis.

## Research results

The study was conducted with Grade Five students in Science on the topic 'Nutrition and Healthy Habits' using the DI approach. The lesson was taught over a period of a month comprising of two sessions per week. All the lessons consisted of different DI methods in the learning activities.

The DI methods applied were differentiated based on student's readiness, student's interest, flexible grouping and learning style. The quantitative and qualitative data was obtained through learning achievement tests and semi-structured interview. The pre-test and the post-test comprised of 20 marks and were administered with 30 students before and after the intervention. The data analysis and comparison of the learning achievement test (pre-test and post-test) were done using paired sample t-test based on mean standard deviation and significance (p) value.

The semi-structured interview was conducted with the participants after the intervention to investigate the learning satisfaction after using differentiated instruction Science lessons. The results were collected and analyzed based on the following classifications: (1) data analysis of the learning achievement tests of the research participants before and after the intervention of DI in Science; and (2) thematic analysis of semi-structured interview after the intervention to investigate the learning satisfaction of research participants on the use of DI in Science. Individual student's learning achievement score by 30 research participants in the pre-test and post-test. The blue line represents the marks obtained by individual students from the pre-test and an orange line for the post-test, consecutively. The post-test scores of an individual student drawn in orange line evidently proved that every participant had significantly improved in their scores compared to the pre-test scores indicated by the blue line. Therefore, using differentiated instruction on Science learning was effective. Table 1 below shows the learning achievement data analysed using paired sample t-test.

Table 1 Paired t-test analysis of pre-test and post-test

Group	Pretest		Posttest		Mean Difference	t	p-value
	M	SD	M	SD			
Sample Group	8.58	2.50	14.37	2.88	5.79	12.41	.01

As reflected above, the mean score obtained by the research participants for the pre-test was 8.58, with a standard deviation of 2.50, and the mean score of post-tests was 14.37 with the standard deviation of 2.88, respectively. A paired sample t-test also proved that the post-test mean score was comparatively higher than the pre-test mean score with the mean difference of 5.79. Upon thorough analysis of the test scores, it was found that the significant p-value was .01 which indicated the significance of the test. As a result, the use of DI was effective and successful as evidenced by the higher mean scores in post-test than the pre-test.

*Data Analysis of Semi-Structured Interview:* The researcher used semi-structured interview to collect qualitative data from the participants at the end of the four weeks of intervention. To investigate the in-depth quality and opinions of the students and achieve the second objective of the research, six open-ended interview questions were used. The interview questions were as follows: (1) Did you enjoy the Science lessons? Why?; (2) Have you ever experienced a learning approach like this in the past? When and why?; (3) What are your feelings about learning Science through this differentiated instruction approach?; (4) What did you enjoy the most while participating in the classroom activities?; (5) Do you think the use of Differentiated Instruction approach helped you to learn science better? Why or why not?; (6) Would you prefer to learn other subjects through the differentiated instruction approach? Why? These were the questions asked during the interview. The responses from the research participants were audio-recorded and later translated and transcribed, and the data were further analyzed using thematic analysis under two broad themes: Part I: interest and motivation, Part II: efficacy of differentiated instruction on student’s learning which were further divided into four sub themes: 1) Past Experiences, 2) Fun Learning and Satisfaction, 3) Convenience and Flexibility, 4) Preferred mode of Learning. Based on the responses and the data collected, the use of DI had significantly increased the satisfaction of Grade Five Bhutanese students in learning Science.

#### I: Interest and Motivation

*Past Experiences:* Hundred percent of the students shared that it was their first-time learning science this way. Nobody had experienced the DI learning approach in the past. In most classes, the variation in learning and teaching method was limited. This as a result hindered students learning and interest towards learning. The intervention introduced a more interactive and engaging approach towards learning Science. The students were decisive, responsible and cooperative enough towards choosing their own mode of learning. It has helped them learn and understand the content taught to their own learning capacity. This way it fostered students critical thinking skills and independent learning, as shared by the students:

*“No, I have not experienced this type of learning and teaching strategy.” (B502).*

*“In the past, most activities are to do individually which hampered me by not getting to discuss with friends and could not do well in Science.” (B515).*

*Fun learning and Satisfaction:* Learning Science became fun with various learning modalities in place. Students had shared that learning Science by engaging in different activities, learning materials and working modalities has made their learning interesting and easier. By adopting a student-centered class, students had the flexibility to choose their way of learning. Students enjoyed the lessons as it was based on their readiness, interest/preferences, flexible grouping and preferred learning styles.

*“The learning was interesting and happy; I am satisfied with my own learning.” (B509).*

*“I felt that I have learned well in science class. It was easier to learn faster as there was flexibility to choose how to learn. It was interesting and fun and I am satisfied.” (B523).*

## II: Efficacy of differentiated instruction on student’s learning

*Convenience and Flexibility:* A collective analysis of participants’ interview on efficacy of DI on student’s learning has displayed a high level of satisfaction. Most of the participants revealed that DI on Science learning was convenient and flexible. Participants expressed that this way of learning has not only made them learn the content taught but also honed their skills like decision making and taking responsibilities of their learning. The main reason for this response was, it allowed them to choose their preferred way of learning or adopt and adapt to the learning styles that best suited their personalities. It has provided them with the avenue to choose their personalized mode of learning.

*“I got opportunity to choose my partner to work since I am more comfortable working with my own gender and best friend rather than to work with another gender.” (B518).*

*“Working as per our learning style was interesting since I could choose my way of learning. I have chosen to work in visual group since I like to learn visually and I am good in drawing and interpreting diagrams and illustrations.” (B519).*

*Preferred mode of Learning:* According to the responses shared through the interview, the participants enjoyed the Science lessons and they were satisfied with what they did and learnt. Therefore, learning Science through DI was meaningful as it focused on a student-centered classroom. To find out more on their future preferences or desire to learn through DI, the question was asked: Would you prefer to learn other subjects through the differentiated instruction approach? Why? All the participants gave positive response and some of the common statements are quoted below.

*“Yes, I would prefer learning other subjects too through DI since with this strategy learning becomes fun and engaging. It helped learn better as I got the choice to choose my learning modalities.” (B506).*

*“Yes, because learning other subjects like I did in this science class will help me improve my learning status in other subjects too.” (B512).*

Thereby, the analysis of the achievement tests and the semi-structured interview showed a significant result towards using DI approach as an applicable way of learning Science.

## **Discussion**

The study concluded with strong findings based on the two research objectives: to study the effectiveness of using differentiated instruction on Science learning achievement of grade 5 Bhutanese students and to investigate the learning satisfaction in Science after using differentiated instruction. The study revealed that the use of DI on Science learning achievement for grade 5 Bhutanese students was effective and they had exhibited positive learning satisfaction towards the approach used, as follows:

The study on the effectiveness of using DI on Science learning achievement was proven effective and reliable after the data collection through the learning achievement test. The pre-test and post-test were conducted before and after the intervention. It was apparent that students improved and performed better in the post-test. The post-test mean score was (14.37) clearly indicating higher scores than the pre-test mean score (8.58) with a mean difference of (5.79). The significance (p) value from the learning achievement test was .01 which clearly indicated that the use of DI improved the learning achievement of the students as all the students performed better after the using DI approach. This is in relation to the study carried out by Loreman (2017) stating that differentiation focuses on optimizing learning and learning conditions. Similarly, the study results by Magableh & Abdullah, (2020) reported that implementing differentiated teaching in a mixed-ability classroom reduced students’ diversity to being more homogenous in nature.

The semi-structured interview was used to investigate the extent of student learning satisfaction after using DI in Science. The data was collected with face-to-face interview with students in the language that they were most comfortable with. The findings were then translated, transcribed and analyzed further using thematic analysis. As per the findings from the interview, most of the students responded that they enjoyed the lesson as it was a flexible and a convenient way of learning. They also disclosed that learning through discussion, learning by doing, and the opportunity to share their learning during and after the lesson was more meaningful for them. The findings of study are in line with Tomlinson (2001), stating that effective differentiated classrooms include purposeful student movement and some purposeful student talking. While it is true that DI offers several avenues to learning, it does not assume a separate level for each learner. This finding is further supported by the study conducted by Tulbure (2011), validating that with DI, students are at the center of the teaching process, their needs and preferred ways of learning are met and their success is assured. Consequently, these findings from the research participants and the previous research concluded that improvement in students’ learning achievement attributed to the use of DI in their learning. The approach used has made their learning more convenient,

understandable and meaningful. Likewise, Alsalhi et al. (2021) posited that in DI classroom all students are involved in substantial and meaningful work or tasks. Therefore, the study has further proven that use of DI improved the learning achievement of Grade Five Bhutanese students in Science.

The aim of the study was to evaluate the effectiveness of using DI on Science learning achievement of Grade Five Bhutanese students. Based on the findings, this study demonstrated that DI approach customized to students' readiness, interest, and learning style improved their Science learning achievement and enhanced satisfactions towards the approach used. In line with the findings, the researcher recommended teachers to use DI as alternative teaching approach as DI has been beneficial on students' learning achievement. Since there have been limited studies in Bhutan examining the use of DI in classroom teaching, the researcher suggests that another study with this specific focus should be undertaken. The study was constrained by a small sample size (30 students) and a brief implementation period (1 month) for the approach. Therefore, the researcher suggests employing the DI approach over extended durations and with larger participant groups. Due to the prescribed curriculum and limited time, the study was carried out using DI only in process and the product (learning activity and at lesson closure) avenues. For further study, the future researcher could differentiate lessons based on whole DI elements that include content, process and product areas too. Lastly, this study suggests that the Ministry of Education and Skill Development (MoESD) and school administrators to prioritize the use of DI and offer professional development (PD) sessions to teachers. Furthermore, the curriculum should be thinned down, made more precise and relevant and there should be a separate specific differentiated curriculum designed if feasible.

## **Conclusion**

In conclusion, contemporary student populations are becoming increasingly academically diverse and differentiation is a hot-topic in education circles nowadays (Subban, 2006; Jacobs et al., 2019). According to the findings, using DI has proven to be an effective and engaging approach to teach diverse students in today's classroom scenario, especially in the field of teaching and learning Science. Through the analysis of students' learning achievement test and responses from the semi-structured interviews, using DI in learning Science was found to be inclusive, engaging, and a meaningful way of learning. Therefore, the DI approach should be one of the important approaches to be further studied and investigated for the overall improvement of instructional strategies in schools to have a better impact on students' overall learning.

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