

Differentiated Science Instruction Integrating Learning Style in Post-Modular Classes: An Experimental Study

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Abstract— The purpose of this study was to extrapolate the impact of incorporating students' learning styles into differentiated science instruction in Grade 10 at Limbaan National High School. To test the formulated hypotheses, a quasi-experimental research design was utilized where the 160 respondents were divided into two groups- the control group and the experimental group. The instruments used for data collection were a validated 50-item pre-test/post-test adopted-modified from the Grade 10 Teachers' Guide in the K to 12 science curricula used by the secondary schools. The obtained data were subjected to T-test statistical analysis. The outcomes demonstrated a statistically significant difference between the post-test scores of the experimental group and the controls group. The findings support the assertion that, as compared to the use of a conventional teaching approach, the use of differentiated instruction has a considerable impact on students' academic achievement.

Keywords— MAED- Teaching Science, differentiated instruction, learning style, conventional teaching approach, academic performance, Philippines.

I. INTRODUCTION

There are many tools for measuring learning style, some of which use sensory approaches like the VAK Inventory (visual, auditory, kinesthetic), while others classify learners psychologically, for example, as experiencers, conceptualizers, experimenters, and observers, as does The Kolb Learning Style Inventory. However, it is important to remember that while a learning style can be a useful construct, few people, if any, fall into only one category, and all minds can learn in a variety of ways. Teachers undoubtedly frequently use teaching techniques that are related to their own learning patterns. A change in teaching and learning practices known as differentiated instruction can be made to accommodate a variety of learners' readiness levels, interests, and learning preferences. It responds to the needs of various learners for more structure or independence, more practice or greater challenge, and more active or less active learning methods. An instrument that focuses on the characteristics of learning that will benefit modification of instructional practices the most must be chosen because the goal of this research is to promote change in the researcher's classroom, (Moser & Wilson, 2023).

Nevertheless, it is important to take into consideration the diversity of learners to ensure that learning could happen inside the classroom. The fact that students are people with distinct identities makes learner diversity a prevalent feature of many, if not all, classrooms, regardless of the subject, grade level, or kind of

instruction. It is therefore common to teach a class of diverse learners, each bringing their own particular set of differences, which can make responding effectively challenging, if not impossible. Before developing teaching methods to make them more challenging, it is conceivable that knowing learners' differences and adapting to them should come first in order to engage learners. Learner diversity, "learner factors" or "individual differences" offer a "key reason why many second language learners fail-while some learners do better with less effort". Herein lies the requirement for the teacher to consider students in the context of their learning, to comprehend their complicated individual differences, and to react with the necessary contextual and pedagogical realization. (Moallemi, 2023).

Meanwhile, it was underlined that the integration of students' learning styles into the execution of differentiated instruction was extremely beneficial to students' academic achievement. It was further described how this method was used to accommodate the varied learners in the classroom and offer tailored alternatives for individuals to learn as thoroughly and rapidly as possible without presuming that every student has the same path to learning. According to certain research, the proper implementation of the DI method improved students' academic performance for the primary and intermediate stages of school (De Neve et al., (2016); Van Casteren et al., 2017).

In addition, this strategy is defined as a collection of strategies, procedures, and methods that are applied in

an organized manner to meet deadline-sensitive goals while also making the most of available human and material resources. Many nations have begun implementing differentiated instruction (DI), which is regarded as one of the most cutting-edge and cutting-edge teaching strategies, to take into account the various needs, inclinations, and interests of students as well as the differences between their levels of understanding (Ziernwald, et al.,2022).

Similarly, in the Philippines, the Department of Education published DepEd Order No. 72 s. 2009 asserting the critical role of differentiated instruction in increasing the school participation rate of children. It specifically states, 'curriculum modifications shall be implemented in the forms of adaptations and accommodations to foster optimum learning based on individual's needs and potentials. Three years later, the Philippines adapted the K to 12 Basic Education Program from kindergarten to secondary. This policy judiciously considers DepEd Order No. 72 on differentiated instruction. As exemplified in its features and principles, the K to 12 programs gives utmost importance to learner-centered curriculum, inclusive education, and effective teaching, learning, and assessment processes.

Moreover, numerous studies on the application of the DI approach in the educational field were conducted. Results from those studies demonstrated a positive boost in academic achievement for students who received their education using the DI strategy as opposed to the traditional method. The results also showed that the empirical group students' performance on the tests was assessed and evaluated favorably because it was determined that there is a statistically significant difference between their degrees and those of the control group students. It demonstrates that the DI technique has an important impact on students' academic progress Hassan (2016). However, there is no study conducted yet that focused on differentiated science instruction integrating learning style approach and the academic achievement of students especially in the locale of New Corella District, Davao del Norte Division, hence the research gap.

To fill this gap, the researcher conducted this quasi-experimental research to explore on the relationship between the aforementioned variables. Apparently, the present situation has led the researcher to determine the factors that can lead to help the students heighten their

preferred learning style and foster better engagement in the activities inside the classroom, which eventually, enhance students' performance outcomes. Consequently, the results of this study will be significant in the academe as it can provide bases in formulating more programs and activities that can cater to the needs of diverse students and teachers in enhancing academic achievement level.

II. METHOD

A. Research Design

This study used quasi-experimental research design (Design 10) called the Pre-test- Post-test of Campbell and Stanley (1963). According to Campbell and Stanley (1970), it is the most widespread design used in the educational researches which include the Experimental Group, the group receiving the treatment, and the Control Group, the group without treatment. Both groups were given the pre-test and post-test.

The treatment used in the study was the used of differentiated instruction integrating students learning style in teaching the Grade 10 Students of Limbaan National High School, which was afterwards correlated to their performance.

B. Research Locale

This study was conducted at Limbaan National High School; a public school located in Barangay Limbaan, Municipality of New Corella, Province of Davao del Norte, Figure 2 is the map of the Philippines highlighting the municipality of New Corella in the province of Davao del Norte. New Corella is the second-class municipality in the province of Davao del Norte, Philippines and it is politically subdivided into 20 barangays. According to the 2010 census, it has a population of 50,699 people and has a total area of 263.12 square kilometers. The municipality has 4 public and 2 private high schools. Limbaan National High School is under the supervision of Department of Education which implements the K to 12 Curriculum from grade 7 to grade 12. It has an area of almost 10,000 square meters with a current population of 680 students.

The school is headed by a head teacher III with 2 non-teaching personnel, 1 administrative assistant II and 1 administrative assistant III and more than 39 active teachers, in which 31 are teaching at Junior High School Department and an additional 8 Senior High School teachers. There are 6 science teachers teaching from grade 7 to grade 11. With the leadership of the school

head, the school aims to be the “Outstanding High School” that produces skillful and talented graduates in the academe. This school is one of performing and competitive school in both academic and extra-curricular activities in the Division of Davao del Norte.

The school has computer laboratory/ e-classroom with more than 40 functional computer units, 40 tablets and 2 projectors to cater for the specialization of the students in Information and Communication Technology (ICT) and Livelihood Education (TLE) and other subjects. Most of the classroom and offices has LED flat screen TV for education film viewing of the students. It has received donations (classroom and facilities) from the local government of New Corella, Provincial Government of Davao del Norte and Department of Education National Office. Facilities include computer units, senior high work station apparatuses/ equipment, science laboratory apparatuses and others.



Figure 2. Map of the Philippines highlighting the Barangay Limbaan, Municipality of New Corella Province of Davao del Norte

However, due to the heightened populations, the problems like limited numbers of computer units, lack of instructional materials and incomplete science laboratory apparatuses are experienced by the students.

All the teachers of the school are given an INSET (in service trainings) before the start of every school year and during semestral break or Mid-Year Performance Review and Evaluation (MYPRE). The teachers undergo various trainings such as local, division, regional and even national levels. They are also updated

with the learning competencies through the use of various teaching strategies and application of ICT (Information and Communication Technology). By the start of the national implementation of the K to 12 Curriculum, teachers in every grade level are required to attend trainings/ seminars to update themselves in the enhancement of learning strategies in order to improve and increase the academic achievement of students

C. Population and Sample

The participants of the study were the 160 Grade 10 students of Limbaan National High School SY 2022-2023. These students were grouped heterogeneously into 4 sections- Grade 10- Diamond, Grade 10-Pearl, Grade 10- Ruby and Grade 10- Sapphire. The heterogeneous grouping of students in these sections was the basis for choosing them as the experimental and the control group. The experimental group were Grade 10-Diamond and Grade 10-Pearl while the control group were Grade 10-Ruby and Grade 10-Sapphire which were composed of 40 students respectively.

The number of students, who belongs to middle class families are very few, commonly are sons and daughters of businessmen and professionals. Most of the students are children of Indigenous People (IPs) and belong to families of farmers, drivers, laborers and others. Most of the families belong to Pantawid Pamilyang Pilipino Program (4Ps). This school is a non-sectarian institution. It is anticipated that the participants have different religious denomination such as Roman Catholic, Jehova’s Witnesses, Seventh Day Adventist, Iglesia ni Kristo and others.

The experimental group were taught daily from 7:30-8:30 and 10:00-11:00 with lessons using differentiated instruction strategy while the control group were taught daily from 11:00-12:00 and 1:00-2:00 with the conventional lecture method for the same topics from August to October of the same year.

D. Research Instrument

The instrument used in this study is the researcher-made 50-item multiple choice achievement test in First Quarter of SY 2022-2023. The test questionnaire was adopted-modified from the Pre-test/Post-test sections of the Teacher’s Guide being used by science teachers in the K to 12 science curricula because it was presumed that the items have already underwent item analysis by the experts.

The test items were developed based on the Table of Specification (TOS). The test items were evaluated and validated by internal and external experts. The developed achievement test included different levels of questions: 60% knowledge, 30% process/skills and 10% for evaluation/synthesis.

Prior to the conduct of the study, the test was administered to 30 grade 10 Students of the SY 2021-2022 last April 22,2022. Three weeks later, last May 16, 2022, the test was administered again to the same group of students. The test’s reliability was identified through Spearman’s rho computation.

The high correlation obtained between the two administered test made the researcher conclude that the test was reliable. During the thesis proposal period, the questionnaire was content-validated by the experts with a rating of 4.75 equivalent to very good.

E. Data Collection

After the approval of the proposed study by the thesis committee, the researcher developed the test questionnaire. The items were gathered from the Grade 10 teacher’s guide, a teaching manual from the Department of Education.

The topics included the contents of Unit 1, modules I and II. The researcher then submitted the prepared questionnaire to her thesis adviser for checking. After the checking, the questionnaire was finalized and was submitted to the panel of examinees for validation.

All suggestions from the panel were incorporated to the test questionnaire. Afterwards, the researcher sought the approval of the School Principal of Limbaan National High School and the Schools Division Superintendent of the Division of Davao del Norte to allow the researcher to conduct the said study.

After the approval, the pre-test was conducted to the control and experimental group last November 2022 – January 2023. Afterwards, the test papers were checked and the scores were recorded.

The used of two different media in the instruction started the day after. The chosen experimental group were the Grade 10-Diamond and Grade 10-Pearl while Grade 10-Ruby and Grade 10-Sapphire were belonged to the control group. In the experimental group, discussions and activities were applying differentiation by grouping the students according to their learning style. On the other hand, the control group were taught using conventional lecture method of teaching or commonly known as ‘teacher-centered classroom’.

F. Statistical Tools

The responses to the items in the researcher-made questionnaires were analyzed and interpreted using the appropriate statistical treatment as follows.

Mean. It was used to answer problem 1, the data is collected, coded, tabulated and analyzed based on their mean and standard deviation. The mean and the standard deviation are used to determine the achievement level of the students.

Analysis of covariance (ANCOVA). It was used to answer the problem number 2, analysis of covariance (ANCOVA) is used to determine the significant difference between the control and the experimental group.

III. RESULTS

Level of Pre – test of the Control Group and Experimental Group of Students in Selected Topics in Science

Table 1 shows the results of the pre – test conducted to both control and experimental groups among Grade 10 students.

The obtained mean score of the control group in the pre – test is 16.45 with a standard deviation of 4.76 and a descriptive equivalent of low.

Similarly, a low descriptive equivalent resulted by the experimental group obtained a mean score of 16.81 with a standard deviation of 5.66.

Indeed, the results show that the achievement of the Grade 10 students in both groups are poor.

Table 1: Level of the Pre – test Results of Grade 10 Students in Selected Topics in Science as to:

Pre-test	Mean Score	SD	Description
Control Group (Conventional)	16.45	4.76	Low
Experimental Group (Differentiated)	16.81	5.66	Low

Level of Post – test of the Control Group and Experimental Group of Students in Selected Topics in Science

Table 2 shows the results of the post – test of the control group and the experimental groups among Grade 10 students in Science. The control group obtained a mean score of 26.73 with a standard deviation of 6.86 which

means that their achievement is moderate. On the other hand, the mean score obtained by the experimental group is 39.15 with a standard deviation of 9.76 which can be described as high. The results show that the experimental group had higher level of achievement compared to control group.

Table 2: Level of the Post – test Results of Grade 10 Students in Selected Topics in Science as to:

Post - test	Mean Score	SD	Description
Control Group (Conventional)	26.73	6.86	Moderate
Experimental Group (Differentiated)	39.15	9.76	High

Significance on the Difference Between the Pre – test And Post – test Scores of the Controlled Group

Table 3 shows the difference between the pre – test and post – test scores of Grade 10 students in Science of the control group. The group obtained a mean score of 16.45 with a standard deviation of 4.76 in the pre – test. A

mean score of 26.73 and a standard deviation of 6.86 is posted in the post – test. Using the t – test, a t – value of 12.468 was obtained. The obtained probability level is 0.001 which is lesser than 0.05. This means that there is a significant difference between the pre – test and post – test scores of the control group.

Table 3: Significance on the Difference Between the Pre – test and the Post – test Scores in Selected Topics in Science of the Controlled Group

Control Group	Mean Score	SD t – value	p – value Decision
Pre - test	16.45	4.76	Reject H ₀
Post - test	26.73	12.468* 0.001 6.86	

*significant at 0.05 significance level

Significance on the Difference Between the Pre – test and Post – test Scores of the Experimental Group

Table 4 shows the difference between the pre – test and post – test scores of Grade 10 students in Science of the experimental group. The group posted a mean score of 16.81 with a standard deviation of 5.66 in the conducted

test prior to the treatment given. The group’s mean score in the post – test is 39.15 with a standard deviation of 9.76. These results obtained a t – value of 21.657. Tested at 0.05 significance level, the 0.001 probability level signifies that the null hypothesis is rejected.

Table 4: Significance on the Difference Between the Pre – test and the Post – test Scores in Selected Topics in Science of the Experimental Group

Experimental Group	Mean Score	SD t – value	p – value Decision
Pre - test	16.81	5.66	Reject Ho
Post - test	39.15	21.657* 0.001 9.76	

*significant at 0.05 significance level

Significance on the Difference on the Post– test Scores of Students in Science of the Control Group and the Experimental Group

Table 5 shows the difference between the post – test scores of Grade 10 students in Science of the control group and experimental group. The control group (taught in conventional approach) posted a mean score of 26.73 with a standard deviation of 6.86. Meanwhile,

the experimental group (taught in differentiated instruction) obtained a mean score of 39.15 with a standard deviation of 9.76. The computed t- value for these results is 10.41. With a probability level of 0.001, the null hypothesis that there is no significant difference between the post – test scores of the control group and the experimental group is rejected.

Table 5: Significance on the Difference Between the Post – test Results of Control Group and Experimental Group in Selected Topics in Science

Group	Mean Score	SD	t – value	p – value	Decision
Control	26.73	6.86	10.41*	0.001	Reject Ho
Experimental	39.15	9.76			

*significant at 0.05 significance level

IV. DISCUSSION

Level of Pre – test of the Control Group and Experimental Group of Students in Selected Topics in Science

On the process of experimentation, a pre – test to the controlled and experimental group was conducted. The result revealed that the two groups obtained low scores. This implies that the respondents found the test difficult because of some factors affecting its performances. When COVID-19 emerged, the students had been using the modular learning modality for approximately two years. Modular classes were changed into blended learning as the restriction was eased, and then into face-to-face classes. In terms of how students behaved in relation to their ability to learn and comprehend test questions as it developed during the pre-test, there was a clear learning gap. Some students still modifying their learning habits to deal with the return of in-person instruction brought on by the pandemic. Students were affected by the abrupt change, and as a result, they had difficulty comprehending the scientific terms and ideas that were part of the test questions for a few topics in Science 10.

This is similar to the idea of Kamarulzaman, et.al. (2017) which described that teachers' support workers, and experts work together to create the best learning environment for children within the learning environment made possible by the individualized instruction approach. Also, in this setting, every kid is appreciated for their individual talents and given chances to exhibit those talents through a number of assessment methods.

Similarly, this is in accordance with the study of Vygotsky, (2016) that the social interactive link between instructor and student is the central principle of Vygotsky's socio-cultural theory, which is reflected in this working definition of differentiated teaching. It emphasizes that the teacher is the professional in the classroom, a person who has undergone the necessary training to guide and mentor her charges, employing the proper methods, and helping each one of them realize

their full potential within the context of learning Objectives. Also, to align with Vygotsky's zone of proximal development, the difficulty of the skills taught should be only a little bit higher than the child's current level of proficiency. Teachers have a moral and legal obligation to guide students toward their full development.

Conforming to the concept of Emini (2020) that individual rights and ambitions are highlighted by students whose learning is mostly dependent on their particular learning styles. These students are driven by their own perks and incentives. People establish own objectives and goals based on their own interests. People frequently feel highly at ease carrying out independent tasks. A student's academic performance and attitude toward learning may improve if education is tailored to that student's learning style. A teacher can build on a student's strengths and get familiar with concepts they might find problematic by being aware of the student's preferred methods of learning.

Level of Post – test of the Control Group and Experimental Group of Students in Selected Topics in Science

The post – test conducted in the control group and the experimental group resulted different outcomes. The control group obtained in moderate level of achievement. This signifies that respondent used to have conventional approach in the lesson delivery yet teachers need to strategized the lesson delivery to increase participation and achievements of Grade 10 students in Science 10. Learners want more strategies to respond their needs with the kind of learning styles they fit in. Teachers must address such and improve teaching to attain best results. In addition, heterogenous grouping among learners lead to the premise that there were several high achieving students with developed skills strived harder to compete for their grades, so they excel academically.

On the other hand, the post – test scores of experimental groups obtained a high level of achievement. Indeed, the

intervention found to be effective in addressing learners' interests and needs in a heterogeneously group of students with the use of differentiated instruction. The result showed that despite the adversities, the Grade 10 students of Limbaan National High School had the urge to work harder to achieve their goals upon the aid of effective strategy. In addition to, students were motivated to learn since they were involved in the teaching-learning process.

This is in consonance with the idea of Suprayogi, et.al., (2017) that there are three student characteristics—readiness, interest, and learning profiles—must be addressed by a teacher in order to differentiate instruction in the classroom. The level of a student's background knowledge regarding a subject is known as student ready. Students are motivated to learn when they are interested in the subjects they are studying. Last but not least, learning profiles of students include learning styles. A teacher can differentiate their instruction effectively by taking into account certain aspects of the students.

Moreover, this is in accord with the idea of VanTassel-Baska et.al. (2021) that differentiated teaching, learning is a social and collaborative process, and both the instructor and the learner share responsibility for what transpires in the classroom. Furthermore, it was clear in the majority of typical classroom scenarios that flexible grouping strategies were not consistently used to promote instructional goals. Findings also suggested that some teachers were successful in putting best practice strategies into practice. They also expanded the description by stating that differentiated instruction first emerged in the context of student populations that were diversifying and that teachers who were using differentiated practices were using them at least somewhat effectively.

Significance on the Difference Between the Pre – test and Post – test Scores of the Controlled Group

The increase in the mean scores posted implies that the achievement of students had improved. The obtained probability level is 0.001 which is lesser than 0.05. This means that there is a significant difference between the pre – test and post – test scores of the control group which signifies that the null hypothesis is rejected. This implies that the increase of level of achievement best described because of the eagerness of the students to learn. Teachers and students were comfortable to conduct the conventional approach in teaching in the

resumption of face-to-face classes. Thus, students had active participation in the lesson delivery. This also means that whatever the difficulties encountered and with all the inconvenience of adjusting, teaching-learning process continued their efforts to achieve the goals that they set for themselves by being open to accept suggestions and always making room for improvement.

This is aligned with the findings of Lawrence-Brown (2020), that in response to the teacher's prompts, the student aspires to be autonomous and self-sufficient, working toward better awareness of their knowledge, skills, and capacities, and taking on more responsibility for their lives and their education. It is apparent that the teacher-student connection is mutual, and that both parties share responsibility for the student's development.

Furthermore, conforming to the abstraction of Hughes, et al., (2021) that teachers should be able to identify students' skills by getting to know them well, which will help those pupils advance. By actively involving students in the learning process and the subject, teachers may help them identify patterns, identify areas of overlap between disciplines, and view learning as a cumulative process.

In addition, this is in line with the findings of Marshall, (2016) that when teachers adapt their instruction to each student's level of readiness, they can accommodate a student who has mastered the material from the session and is ready for a challenge. In this situation, a more challenging text or project might be given. In order for all pupils to succeed in learning, the teacher responds to a need by identifying a strategy or solution to address the need. In these instances, the instructor can use differentiated instruction to fulfill the educational needs of their students.

Significance on the Difference Between the Pre – test and Post – test Scores of the Experimental Group

The higher increase in the mean score obtained by the experimental group suggests that learning with the intervention is much evident. These results obtained a t – value of 21. 657. Tested at 0.05 significance level, the 0.001 probability level signifies that the null hypothesis is rejected. This implies that the use of differentiated instruction in Grade 10 science integrating students learning style contributed to the increased performance of Grade 10 students in science. The teacher indeed

used an effective strategy in the lesson delivery to enhance learning. In order for children to learn effectively, the intervention presented many ways for them to access knowledge, process ideas, create meaningful comprehension, and achieve results. Teachers may concentrate on their pupils and make sure they are given the finest opportunity and support systems to fulfill their unique learning needs by being able to provide a platform for differentiation.

This is in support with the findings of Suprayogi, et.al (2017), when one-room schoolhouses were the norm in the past, teachers had one classroom full of kids with a range of grade levels and academic ability. To account for the diverse grade levels and learning demands of each student, the teacher had to differentiate their instruction. As a result, presenting a lesson to eighth-graders looked and sounded different than presenting the same lesson material to second-graders. Similarly, teachers now confront comparable difficulties when they try to teach children of various abilities in a single grade. In order to help students of various abilities have good learning experiences, teachers might employ the same tactics for differentiating instruction as were later outlined.

Conforming to the findings of Scarparolo, 2020, that the goal of differentiation is to offer some background information and useful advice for how to accommodate diversity in scientific classrooms. By using a menu, teachers may prepare lessons that will accommodate diversity and give students options within the science curriculum. By letting students choose from a board with nine possibilities for activities, teachers may give their kids freedom and flexibility. The majority of teachers, especially new ones, tend to teach to the middle despite the diversity in every classroom. In light of the teacher's understanding of their students' readiness, interests, and learning profiles, Carol Ann Tomlinson advises that changes to the content, process, product, and learning environment should be taken into consideration. Instructors can learn more about their students'. Differentiated instruction fosters a sense of community inside the classroom by embracing both similarities and differences. It enables the construction of a setting where all pupils can flourish and gain advantage.

Moreover, as stated in the abstraction of Shabbir & Raza, 2022, which describe that in a differentiated classroom, students differ in three crucial ways:

preparation, interests, and learning profiles. The instructor is required to take these variations into consideration in order to optimize each student's learning potential in that setting. There are a variety of student interests, and these interests can be useful resources for supporting learning in the diversified classroom. In this endeavor, it is believed that student interests are a strong motivator, which savvy teachers could use in the differentiated classroom. Instructors should develop ways to engage students by identifying their areas of interest and including them in the day-to-day operations of the classroom.

Significance on the Difference on the Post-test Scores of Students in Science of the Control Group and the Experimental Group

Compared to the controlled group, the classes conducted in the experimental group were lively and more active. Students were more engaged and active during discussions. It was then observed that there was a maximum participation. Diverse output can be also observed with amazing performances at all times. More activities were also offered and got excellent results as evident that they really understand and want to explore more the topic. On the other hand, such observation was not noted in the controlled group because most of the respondents were hesitant to express their ideas. They were cases when students whispered their answers to their seatmates but they fell silent whenever called in the class. More so, it implies that the respondents have a difficulty understanding the topics. Science concept has broad and confusing areas that can affect the learners' ability to acquire knowledge.

Indeed, the computed t- value for these results is 10.41. With a probability level of 0.001, the null hypothesis that there is no significant difference between the post-test scores of the control group and experimental group thus rejected. This result also concludes that there is a significant difference between the achievement of Grade 10 students in science when they were taught using differentiated instruction compared to a conventional way of the lesson delivery.

This is supported with findings from Tomlinson, (2021), which describe that by focusing on students' issues and life experiences in activities and conversations, the curriculum can be made more relevant to students. Even excluded students will find a place in the learning community if student preferences are accommodated. Giving struggling children the chance to explore and

express their interests in the classroom lessens the sense of failure they previously felt. Most students, including those who struggle in school, have talents and hobbies. Additionally, the ideas of differentiation of content, process, product, and learning environment are particularly important because they show how teachers can make decisions that will maximize the potential of advanced learners who differ from their classroom peers in terms of readiness to learn, interests, and learning profiles as well as from identified gifted students in suburban or urban environments. In order to ensure that students are given time to learn in their "zones of proximal development" and with engaging content appropriate to their rural environments, curriculum and instructional strategies can be adjusted across domains such as concrete to abstract, simple to complex, and less independent to more independent.

Moreover, this is in consonance with Jang et.al., (2018) revealed that diversifying instruction was described as "a tailored way of satisfying all of the kids' academic needs at their level".

Differentiating instruction allows teachers to better meet the individual learning needs of each student, which is one advantage. Yet, while designing differentiated teaching, a teacher can design learning activities that particularly target what students would like to learn and how they learn best by being aware of their interests and dominant learning styles, or profiles.

Further, this is also similar with the findings of Smale-Jacobse, et.al., (2019), where recognizing varied student histories, preparation levels, languages, interests, and learning profiles is part of differentiated education.

Differentiation is a current educational hot topic. Teachers are urged by policymakers and researchers to value diversity and to modify their lessons to meet the varied learning needs of the pupils they teach.

Differentiation is a teaching philosophy founded on a great regard for students, an understanding of their individual differences, and a desire to support the success of every student. In order to better meet students' learning needs, such concepts indicate that teachers should proactively adjust curricula, teaching strategies, resources, learning activities, and product requirements.

Differentiated instruction refers to the deliberate planning and implementation of such changes by teachers to support students' learning.

V. CONCLUSION

With considerations on the findings of the study, conclusions are drawn in this section.

The results discussed in the previous section made the researcher conclude that usual method of teaching wherein the teacher does the talk-and-chalk presentation of the lesson while the students are just mere passive listeners in the classroom does not signify a great impact in the achievement of students. Considering students' learning styles, it is noted as an effective strategy that best used to encourage full participation among learners. The use of differentiated instruction was later discovered to be an effective strategy for addressing interrupted learning and teaching new content that is most appropriate for each student. In light of evolving methodologies appropriate for a new generation of learners, the teaching and learning process takes on a different form.

Statistically, there was a significant difference between the use of conventional approach and the use of differentiated instruction among Grade 10 students in learning Science. In general, kids perform better when differentiated instruction is used. It suggests that teachers intentionally adapt their practice to meet the needs of each individual student (or groups of students with comparable needs), and that doing so in a way that takes into account each student's abilities, needs, and interests is a bit of a balancing act.

VI. RECOMMENDATION

Based on the results of the study, the researcher came up with the following recommendations:

Since the study was able to prove the effectiveness of using differentiated instruction in learning Science among Grade 10 students. It is recommended that science teachers will consider the technical difficulties the students might experience and assess if they prefer this kind of teaching approach. The level of participation among students may be raised to a very high through the use of differentiated instruction. Also, in the implementation with this strategy, application of varied and effective teaching techniques and instructional materials can be realized. Having a consistent monitoring of Science teachers by the head and administrator upon providing adequate materials needed in the implementation of instruction.

In addition, the school should sustain the high level of the consistent use of differentiated instruction in teaching Science and introduced it in different learning areas. This could be achieved by constant feedbacking that were given to assist the learners' needs towards their lesson delivery and during the conduct of Learning Action cell sessions. The school administrators must require Science teachers to attend enrichment seminars and trainings particularly differentiated instruction in teaching Science to continue to offer quality learning.

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