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Research Article

Differentiated Instruction as A Strategy in Teaching Introduction to the Philosophy of the Human Person (IPHP) for Grade 11 Students

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ABSTRACT

The research study aimed to investigate the effectiveness of differentiated instruction as a strategy in teaching Introduction to the Philosophy of the Human Person (IHLP) of one hundred sixty-nine (169) students. The researcher followed a prescribed lesson plan and focused on one objective to meet the expected competency using the students Multiple Intelligences in dividing each class into small groups best suited the study.

The study utilized a quantitative research method with a descriptive design to assess the effectiveness of differentiated instruction. To determine the performance of the respondents on the pre-test and post-test using the differentiated instruction, quasi-experimental design is utilized to establish a causal relationship between an independent variable, the differentiated instruction and the dependent variable which is the students' performance. T-Test and ANOVA is used to identify the significant differences between the pre-test, post-test, and demographic profile.

The findings of the study revealed that majority of student-respondents are female adolescents, belong to a middle-income class family, are body/kinestic, logic/math, and music styled-learners. The students performed very satisfactory during pre-test. Differentiated instruction as an intervention strategy was applied to tailor instruction to the learning needs of students based on the Pre-test scores and the students performed very satisfactory during post-test. The ANOVA computation revealed a significant difference between the performance of students during pre-test and post-test. However, no significant difference in the pre-test scores of students when grouped according to sex, age, family monthly income and learning style. A significant difference in the post-test scores of students when grouped according to sex was established. The proposed enhancement to intervention strategies aimed for a differentiated output.

Keywords: *Differentiated instruction, Multiple intelligences, Quasi-experimental*

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Introduction

The Philippines has been working hard to improve students' academic achievement in all major learning areas. Its academic achievement statement was seen in numerous national and international assessments, with the failure attributed to its blocked Basic Education Curriculum (BEC) with various capabilities to be learned in a limited time. The results of the Program for International Student Assessment (PISA) for the Philippines have been variable over the years. PISA is a worldwide study conducted every three years by the Organization for Economic Co-operation and Development (OECD).

Differentiated instruction is an instructional approach that recognizes and accommodates the diverse learning needs, interests, and readiness levels of students within a classroom. When teachers use differentiated instruction effectively, they can address students' varied learning styles, abilities, and interests. By providing personalized instruction, teachers can engage students more effectively, promote deeper understanding, and enhance their overall academic performance. However, it is important to note that differentiated instruction alone may not be sufficient to improve PISA scores or educational outcomes on its own. Several factors, including curriculum, quality teacher training and support, access to resources, and overall educational policies, contribute to student performance. Therefore, while differentiated instruction can be a valuable pedagogical approach, it should be implemented as part of a comprehensive strategy to enhance educational outcomes in the Philippines.

Thus, improving the academic achievement of the students is crucial since each student has a unique approach to learning and comprehending a specific instruction, circumstance, or the like (Reis & Renzulli, 2018). In this regard, using differentiated instruction may help them to increase their learning and may lead to increasing student's academic performance. As support to this, research conducted by Mavidou and Kakana (2019) discovered the effectiveness of differentiated instruction on the reading achievement of children. In the same manner, Ibia and Akpan (2019), also discovered positive effects of using multiple intelligence-based instructional approach in teaching social science.

Based on the scenarios described above, the researcher decided to investigate Differentiated Instruction (DI) as a strategy in IPHP for Grade 11 students. The reason for this circumstance is that Ibia & Akpan (2019) further found out in their study that, teachers should provide proper scaffolding support to students when and where it is needed, allowing them to develop their knowledge while utilizing their potential talents. As these supports can take the form of prompts, hints, suggestions, or performing tasks that the students are unable to complete. In this regard, using differentiated instruction in dealing with these needs may increase their academic performance further most especially when considering the multiple intelligences of the students. According to Dr. Howard Gardner, a proponent of the Multiple Intelligence Theory, each student is unique, with his or her own intelligence and learning styles.

The main purpose of this study is intended to determine the effectiveness of conducting differentiated instruction in teaching. Differentiated instruction is an instructional approach that acknowledges and values the diversity of students' needs, learning preferences, and abilities within a classroom. It aims to tailor teaching strategies, content, and assessment methods to accommodate individual students' unique learning profiles. While differentiated instruction has gained significant attention and implementation in elementary and junior high school settings, its application and effectiveness in the senior high schools have received comparatively less research attention. Therefore, conducting research on differentiated instruction among senior high school students is crucial to bridge this knowledge gap and enhance educational practices.

Methodology

This study is anchored in Theory of Walter Burke Barbe named as Visual, Auditory and Kinesthetic Learners (VAK) model. According to the VAK model of which most people prefer one of three modes of learning: visual, auditory,

or kinesthetic. Although, in practice, we generally "mix and match" these three styles. Visual learners or visually dominant learners absorb and retain information better when it is presented in pictures, diagrams, and charts, for example. In contrast, auditory learners prefer to listen to what is presented. Howard Gardner's Theory of Multiple Intelligences and Vygotsky's Socio-cultural Theory are equally vital lenses in differentiated instruction. Differentiated Instruction (DI) has been promoted as a model to facilitate more inclusive classrooms by addressing individual learning needs and maximizing learning opportunities (Gheyssens et al., 2020c). DI aims to establish maximal learning opportunities by differentiating the instruction in terms of content, process, and product in accordance with students their readiness, interests and learning profiles (Tomlinson, 2017).

This study utilized a quantitative research method with descriptive design to assess the effectiveness of differentiated instruction in teaching Introduction to the Philosophy of the Human Person for Grade 11 students. The respondents of the study were the 169 Grade 11 students at the Regional Science High School III in the Division of Olongapo. Further, the researcher employed the purposive total population sampling technique of which all the students who participated in the pre-test were also the same students that participated in the post-test.

In the conduct of the study, the researcher utilized test questionnaires as the research instrument which were divided into two parts. For the pre-test questionnaires, the first part was survey questions with regards to the respondent's demographic profile. While the second part consisted of 50-item objective tests in relation to the researcher's chosen competencies in the subject Introduction to the Philosophy of the Human Person. The same instrument was used in the post-test questionnaires.

After making the final draft of the survey checklist, the researcher sought the permission/approval of the DepEd Schools Division Superintendent, Division of Olongapo, through letters signed by the Director of Graduate School and GS Faculty Advisers to administer the pre-test to the respondents. The researcher also secured the approval of the school head in the chosen public school in the Division of Olongapo in conducting the study. After gathering the data from the pre-test, the researcher began with a week execution of lessons targeting a week competency in the IPHP using the differentiated instruction as a teaching strategy in the experimental group, while executing the same lessons on the traditional strategy in the controlled group. After the lessons have been done in one full week, the researcher administered a post-test to both the experimental and controlled group to measure the effectiveness of differentiated instruction in teaching introduction to the Philosophy of the Human Person.

Results and Discussions

1. Demographic Profile of the Respondents

1.1 As shown in Table 1, the majority of the respondents were female. Ninety-seven (97) or 57.40% are females while seventy-two (72) or 42.60% are males. The findings indicate that female students outnumbered males which is a common observation in most programs of the institution.

Table 1. Frequency and Percentage Distribution on the Student-respondents' Profile Variables

Profile Variables		Frequency (f)	Percentage (%)
Sex	Male	72	42.60
	Female	97	57.40
	Total	169	100.00
Age (Years)	17	117	69.20
Mean = 16.91 or 17 years	16	34	20.10
old	**Total**	**169**	**100.00**

Profile Variables		Frequency (f)	Percentage (%)
Family Monthly Income (Php) **Mean = Php 47,452.66**	71,000 & Above 61,000 - 70,000 51,000 - 60,000 41,000 - 50,000 31,000 - 40,000 21,000 - 30,000 20,000 & Below **Total**	8 49 **169**	4.70 29.00 **100.00**
Learning Style	Body/Kinesthetic Language/Word Logic/Math Music Nature Self/Intrapersonal Social/Interpersonal Spatial	27 27 27 8	16.00 16.00 16.00 4.70
	Total	**169**	**100.00**

Research shows that women are more likely than men pursue education, perform better academically, and major in fields other than science, technology, engineering and mathematics are mostly attributable to factors affecting students. Beginning as early as kindergarten, girls have better average social and behavioral skills than boys, and that relates to girls' higher average grades at each stage of school and why girls are more likely to go in schooling. On average, middle school girls are more likely to say they like school and good grades are important, and are thus more likely to study more. Gender stereotypes are also at play. Boys have historically been trained to think that they needn't obey rules or work hard because men used to be able to drop out of high school and still earn wages comparable to better-educated women, in fields like manufacturing, construction and travel (Grasgreen, 2018).

1.2 In terms of age, most of the student-respondents are seventeen (17) years old, with one hundred seventeen (117) responses or 69.20% and the lowest recorded age of eighteen (18) years old. The computed mean age of students was 16.91 or 17 years old. This signifies that the student-respondents are adolescents occupying an important time for laying the foundations of mental learning and health. According to Stewart (2013) that young teens are at the prime age to engage in leadership roles and give them a voice in decision making. Under this principle, they are considered participants rather than recipients in the learning process. They want to feel ownership for projects and experimentations, involving them in the planning results and commitment from them. In school set-up, they find justice and equality to be important issues. They are developing skills in the use of logic and can solve problems that have more than one variable. They are in stage that is ready for an in-depth and long-term experiences. They want to explore the world beyond their own community.

1.3 The family monthly income of majority of the student-respondents ranges from Php 51,000- Php 60,000, with forty-nine (49) responses or 29.00% which is the highest and the lowest is eight (8) or 4.70% of the students belong to a family earning monthly income range of Php 71,000 and above.

The computed mean family monthly income of student-respondents was Php 47,452.66. This indicates that most

students come from middle-income families capable of meeting the educational expenses. Santos, & Vizmanos (2018) highlighted that middle-income class plays a crucial role in socio-economic development and in achieving long-term aspirations articulated in *Ambisyon* 2040, which envisages a predominantly "middle class" society where no one is poor. However, there is no standard definition for the middle-income class that can be used as a tool to monitor progress towards this long-term aspiration.

1.4 The learning style of majority of the students with twenty-seven (27) or 16.00% are body/kinesthetics, logic/math, and music, respectively, while eight (8) or 4.70% are social/interpersonal. Learning styles affect learning outcomes through learning motivation, this implies that students who have a body/kinesthetics, logic/math and music accompanied by learning motivation will have high learning outcomes, compared to students with different learning styles. A greater number of students being proficient in bodily kinesthetics, logic/ mathematics, and music brings numerous benefits, including a diverse skill set, holistic development, enhanced learning abilities, expanded career opportunities, and cultural enrichment. Therefore, it is desirable to encourage and support students in these areas of study. Moreover, in social studies, logical-mathematical intelligence can be utilized when analyzing statistical data, studying cause-and-effect relationships, interpreting maps or graphs, and understanding economic or political systems. In social studies, bodily-kinesthetic intelligence on the other hand can be applied through activities such as reenactments, simulations, or hands-on projects that allow students to experience historical events or cultural practices. While it may not have an explicit application in social studies, musical intelligence can be utilized to enhance learning and engagement. For example, incorporating historical songs or music from different time periods can help create an immersive learning experience.

Developed by Howard Gardner, the theory of multiple intelligences suggests that individuals have different strengths and preferences in how they learn and process information. The Multiple Intelligences Inventory helps identify these preferences across various domains, such as linguistic, logical-mathematical, spatial, musical, bodily-kinesthetics, interpersonal, intrapersonal, and naturalistic (Main, 2023). By recognizing and understanding these different intelligences, educators can design instructional approaches that cater to the diverse learning styles of their students. This may involve incorporating a variety of teaching methods, materials, and activities that align with each student's dominant intelligences, thereby enhancing their learning experience and outcomes.

Similarly, the study of Sotillo, & Beluso (2023) revealed that the extent of multiple intelligences of public-school students was “very good” in terms of bodily-kinesthetics, logical-mathematical, and literary-musical and “average” in verbal-linguistic intelligence. The degree of teaching strategies of public-school teachers in the district of Dumarao was “very good” in terms of bodily-kinesthetics teaching approach, logical-mathematical teaching approach, literary musical teaching approach, and verbal-linguistic teaching approach.

2. Students’ Performance during Pre-test

Table 2 shows the frequency and percentage distribution on students’ performance during pre-test.

2.1 During pre-test, majority of the student-respondents with one hundred twenty-three (123) or 72.80% garnered score range of 37-45 described as “Very Satisfactory”; while two (2) or 1.20% had score range of 1-18 and 19-27, with qualitative description of “Did Not Meet Expectations” and “Fairly Satisfactory”, respectively.

Table 2. Frequency and Percentage Distribution on Students' Performance during Pre-test

Descriptive Equivalent	Score Range	Pre-test Students' Performance	
		Frequency (f)	Percentage (%)
Outstanding	46 – 50	5	3.00
Very Satisfactory	37 – 45	123	72.80
Satisfactory	28 – 36	37	21.90
Fairly Satisfactory	19 – 27	2	1.20
Did Not Meet Expectations	1 – 18	2	1.20
Total		169	100.00
Mean		38.65 or 39 points	
Interpretation		Very Satisfactory	

The mean students' performance during pre-test was 38.65 or 39 points which belongs to score range of 37-45 interpreted as "Very Satisfactory". The very satisfactory academic performance normally achieved by the largest number of students during pre-test indicates a very satisfactory grasp of the topic on the subject matter. The measurement of academic performance has been a part of conventional teaching practices for so long that many people, educators and students alike, do not question its usefulness or validity. Using academic performance to mark proficiency, progress, and effort, to compare pedagogies and teaching methods among others, and to assess the success or failure of teachers and schools is commonplace and expected in the educational system (Brilleslyper, et.,al, as cited by Woods, 2022).

The results implies that students perform well in their test and that they are able to remember and apply things being taught to them and that the use of effective teaching methods that suit their learning styles impact student's performance.

3. Intervention Strategies Applied

The researcher applied differentiated instruction as an intervention strategy that tailors instruction to the learning needs of all students based on the Pre-test scores. Every student has the same learning objective. However, instruction varies according to students' interests, preferences, strengths, and challenges. In this regard, instead of teaching the entire group in one method (such as a lecture), a teacher employs a variety of strategies, activities and performance task.

Small group discussions and collaborative approach were utilized as an intervention strategy. These can stimulate learning by encouraging learners to share their thoughts, ask questions, and critically analyze information. Small group discussion may also increase engagement whereby learners are more likely to contribute when they feel safe and supported within the group. Additionally, small group discussion promotes personal growth as it nurtures emotional well-being and a sense of belonging.

To evaluate learners understanding and application of concepts, skills, and knowledge related to social studies. The researcher incorporates a variety of performance tasks and activities that cater to different intelligences as to problem solving, guided questions, role play, jingle, creative speech, infographics and gameshow. By completing this performance task, learners can showcase their understanding of social studies concepts such as civic responsibility, community development, and problem-solving, while also applying research and presentation skills.

When learners engage in tasks that cater to multiple intelligences, they can experience the so-called holistic development by providing opportunities for learners to develop and utilize a range of intelligences, including linguistic, logical-mathematical, spatial, bodily-kinesthetic, musical, interpersonal, intrapersonal, and naturalistic intelligences. By engaging in tasks that target these different areas, learners can develop a more well-rounded set of skills and abilities. However, it is important to note that while multi-intelligence tasks offer many

benefits, they should be implemented alongside other instructional strategies and assessments to provide a comprehensive learning experience.

To effectively implement DI in the classroom, educators may offer students option to choose from in assignments or lesson plans; provide multiple texts and types of learning materials; utilize a variety of personalized learning methods and student assessments; and customize teaching to suit multiple forms of intelligence.

4. Students' Performance during Post-test

Table 3 presents the frequency and percentage distribution on students' performance during post-test.

Table 3. Frequency and Percentage Distribution on Students' Performance during Post-test

Descriptive Equivalent	Score Range	Post-test Students' Performance	
		Frequency (f)	Percentage (%)
Outstanding	46 – 50	68	40.20
Very Satisfactory	37 – 45	91	53.80
Satisfactory	28 – 36	9	5.30
Fairly Satisfactory	19 – 27	1	0.60
Did Not Meet Expectations	1 – 18	0	0.00
Total		169	100.00
Mean		43.23 or 43 points	
Interpretation		Very Satisfactory	

It can be noted that the highest number of student-respondents with ninety-one (91) or 53.80% recorded score range of 37-45 with qualitative equivalent of "Very Satisfactory"; sixty-eight (68) or 40.20% had score range of 46-50 interpreted as "Outstanding" while least number of students was noted with only one (1) or 0.60% had score range of 19-27 described as "Fairly Satisfactory". The mean sudents' performance during post-test was 43.23 or 43 points described as "Very Satisfactory". The very satisfactory assessment of learning with the differentiated instruction as an intervention strategies applied mirrored on the very satisfactory result of their post-test performance implies effectiveness of the strategy. The findings of Basco (2020) elucidated that the respondents performed significantly better in their post-test. The results implied that infographics were significant in terms of improving academic performance in Science among learners. Additionally, findings revealed that critical thinking skills, recall information, understanding complex information, and organizing information into logical groups may be improved through infographics.

Further, infographics were found to improve learners'ability to communicate to others what they have learned, improve presentation skills, acquire teamwork, increase motivation to learn, improve the ability to give and receive feedback, and gain self-confidence to learn and succeed. An infographics paradigm was developed based on the study results to understand further the infographics'potentials in the teaching and learning process.

5. Test of Difference between the Performance of Students during Pre-test and Post-test

The t-test to test difference between the performance of students during pre-test and post-test is presented in Table 4.

It can be noted that the students' performance during pre-test with a mean of 3.75 was significantly lower compared with their score in post-test with a mean of 4.34. The computed sig (0.000) was less (<) 0.01 Alpha Level of Significance. Therefore, the null hypothesis is rejected and that there was significant difference between the performance of students during pre-test and post-test. Significant difference was found in the mean scores of pre-test and post-test where differentiated instruction as an

intervention strategies was employed, this indicates that students learned better by in employing differentiated instruction as intervention strategies.

Table 4. T-test to Test Difference between the Performance of Students during Pre-test and Post-test

	Group	N	Mean	Std. Deviation	Std. Error Mean
Students' Performance	Pre-test	169	3.75	0.585	0.045
	Post-test	169	4.34	0.606	0.047

t-test for Equality of Means						
t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
					Lower	Upper
-12.058	336	0.000	-0.586	0.049	-0.682	-0.490
Decision: Reject Ho (Significant)						

Copper and Coople, 2001 as cited by Magalhães, Ferreira, Cunha, & Rosário (2020) also found similar results and concluded that differentiated instruction is effective as much as 40% faster than those receiving traditional and teacher directed instruction, retention of content is superior to traditional instruction alone. The result of the present study indicate that students were benefited from the individualization, self-pacing and interactive nature of differentiated instruction and this can among one of the strategies to enhance learning. Each segment was followed by questions and immediate feedback in instructional process that had a better impact on student learning. Learners' active participation in instructional process has a better student learning. Differentiated instruction is a powerful, useful and interesting mode of instruction. Differentiated instruction is found to be feasible and applicable for teaching subject.

The results are similar to the findings of previous studies that differentiated instruction has a significant impact on the students' academic achievement (Kaye & Ehren, 2021).

Similarly, the study of Dap-og (2022) claims that students exposed to differentiated instruction obtained "fairly satisfactory" results in the post-test, while those exposed to non- differentiated instruction showed "needs improvements" both in the pretest and post-test. Moreover, for students' engagement in science, the differentiated instruction group had a high engagement level for affective, cognitive, and behavioral domains. In contrast, the non- differentiated instruction group had moderate engagement before and after the intervention.

The students' academic performance in social science exposed to differentiated instruction is significantly higher than those exposed to non- differentiated instruction. Also, there is a significant difference in students' engagement level for a cognitive domain in favor of differentiated instruction. It is concluded that differentiated instruction as a social science learning tool enhances the students' cognitive engagement.

6. Test of Difference in Pre-test Scores when Grouped According to Profile Variables

Table 5 shows the analysis of variance to test difference in pre-test scores when respondents are grouped according to profile variables.

The computed P-value for sex (0.577), age (0.175), family monthly income (0.081), and learning style (0.887) were greater than (>) 0.05 Alpha Level of Significance, hence the Null Hypothesis is accepted. Therefore, there is no significant difference in pre-test scores when students are grouped according to sex, age, family monthly income, and learning style. The result signify that no substantial statistically detected difference on the pre-test scores of students when they are grouped according to sex, age, family monthly income and learning style.

Table 5. Analysis of Variance to test Difference in Pre-test Scores when Respondents are Grouped According to Profile Variables

Sources of Variations		SS	df	MS	F	Sig.	Decision / Interpretation
Sex	Between Groups	0.107	1	0.107	0.312	0.577	Do Not Reject Ho (Not Significant)
	Within Groups	57.455	167	0.344			
	Total	57.562	168				
Age	Between Groups	1.198	2	0.599	1.764	0.175	Do Not Reject Ho (Not Significant)
	Within Groups	56.364	166	0.340			
	Total	57.562	168				
Family Monthly Income	Between Groups	3.811	6	0.635	1.914	0.081	Do Not Reject Ho (Not Significant)
	Within Groups	53.752	162	0.332			
	Total	57.562	168				
Learning Style	Between Groups	1.039	7	0.148	0.423	0.887	Do Not Reject Ho (Not Significant)
	Within Groups	56.523	161	0.351			
	Total	57.562	168				

7. Test of Difference in Post-test Scores when Grouped According to Profile Variables

The analysis of variance to test difference in post-test scores when respondents are grouped according to profile variables is shown in Table 6.

The computed P-value for age (0.905), family monthly income (0.516), and learning style (0.541) were greater than (>) 0.05 Alpha Level of Significance, hence the Null Hypothesis is accepted. Therefore, there is no significant difference in post-test scores when students are grouped according to age, family monthly income, and learning style.

On the other hand, the P-value for sex (0.033) was lower than (<) 0.05 Alpha Level of Significance, therefore the Null Hypothesis is rejected and that there is a significant difference in post-test scores when students are grouped according to sex. This means that sex influences the learning outcomes of the of students. It can be noted that male and female students have differemt study habits. And that females are focused on their studies as compared to male students. Studies have shown that male and female performs differently in school. Females could achieve higher learning outcomes than males because they were more persistent and committed than males and females had stronger self-regulation than males, which also led to their significantly more positive online learning outcomes than males (Alghamdi et al., 2020).

Table 6. Analysis of Variance to test Difference in Post-test Scores when Respondents are Grouped According to Profile Variables

Sources of Variations		SS	df	MS	F	Sig.	Decision / Interpretation
Sex	Between Groups	1.661	1	1.661	4.613	0.033	**Ho is Rejected (Significant)**
	Within Groups	60.115	167	0.360			
	Total	61.775	168				
Age	Between Groups	0.075	2	0.037	0.100	0.905	Do Not Reject Ho (Not Significant)
	Within Groups	61.701	166	0.372			
	Total	61.775	168				
Family Monthly Income	Between Groups	1.936	6	0.323	0.874	0.516	Do Not Reject Ho (Not Significant)
	Within Groups	59.839	162	0.369			
	Total	61.775	168				

Sources of Variations		SS	df	MS	F	Sig.	Decision / Interpretation
Learning Style	Between Groups	2.222	7	0.317	0.858	0.541	Do Not Reject Ho (Not Significant)
	Within Groups	59.553	161	0.370			
	Total	61.775	168				

The result signify that the post-test scores of students differs as to their sex; while no substantial statistically detected difference when grouped according to their age, family monthly income and learning style.

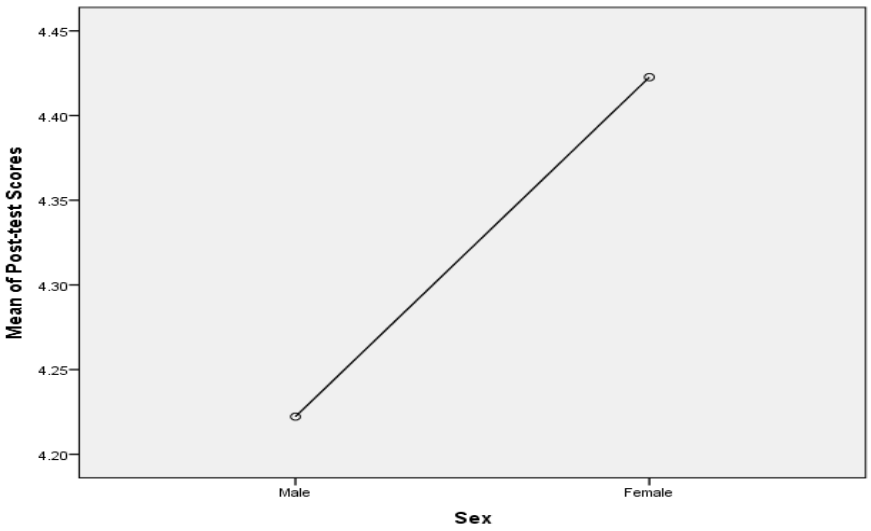

Figure 1. Post hoc using Scheffe Test and Means Plot in determining where the Difference lies in the Post-test Scores of Students when they are Grouped According to Sex

Figure 1 illustrates the post hoc using scheffe test and means plot in determining where the difference lies in the post-test scores of students when they are grouped according to sex.

The figure clearly illustrates the means plot that the difference on the post-test scores lies between female and male respondents, as manifested on the highest and lowest mean values of sex profile variable.

The post-test scores of female respondents are significantly higher compared to male counterpart.

Conclusions

Based on the foregoing results of the study, the researcher concluded that majority of student respondents are female; adolescents; belong to a middle-income class family; who are body/kinesthetic, logic/math, and music styled learners. The students performed very satisfactory during pre-test. Differentiated instruction as an intervention strategy was applied to tailor instruction to the learning needs of students based on the Pre-test scores. The students performed very satisfactory during post-test. There was a significant difference between the performance of students during pre-test and post-test. There was no significant difference in the pre-test scores of students when grouped according to sex, age, family monthly income and learning style. There was significant difference in the post-test scores of students when grouped according to sex. The researcher proposed enhancement to intervention strategies aimed for a differentiated output based on students' interests and potentials.

In essence, the use of DI in teaching could help students develop their potentials in a way that educators gives students choice and flexi-

bility in how they learn, and helps teachers personalize learning by tailoring lessons to meet each student's individual interests, needs, and strengths. This method also requires instructional clarity and clearly defined goals for learning, better enabling students to meet those goals. Teachers complicate differentiation by not allowing themselves to be provisional with how they apply the foundational pieces of differentiated instruction. Instead, if they address these four questions in their instructional planning, differentiation will always be the result: What do my students need? How do I know? What will I do to meet their needs? How do I know if what I'm doing is working?" (Westman, 2021).

In a differentiated learning space, teachers and students learn together. Students focus on learning the course content, while teachers tailor their instructional strategies to student learning styles." (Epitropoulous, 2020).

Recommendations

In view of the conclusion of the study, the following recommendations are advanced. Teachers at the Regional Science High School III in the Division of Olongapo should continually utilize differentiated instruction inside the classroom to nurture students with diverse learning needs, enhance the overall learning experience and improve student performances and/or outcomes. School heads, Principals, Head Teachers & Master Teachers should provide ongoing support, resources, and a collaborative environment that encourages teachers to explore, experiment, and refine their differentiated instruction practices, strategies and techniques.

Collaborate with fellow educators to share successful Strategic Intervention Materials. Discuss and exchange ideas during SLACS, MPRE, INSET & Educational Week on how to effectively implement SIMs in different subject areas or grade levels in promoting continuous improvement and innovation. Uplift teachers to develop individualized learning plans (ILPs) for students with diverse needs. ILPs outline specific goals, strategies, and accommodations tailored to each student's strengths, weaknesses, and learning preferences and styles. Teachers may incorporate a variety of activities and tasks that tap into different intelligences to foster a more inclusive and effective classroom experience. For the next cycle of research, the gaps and problems identified in the application of the strategy may be given attention and proper action. Since this study was limited to the students of Regional Science High School, future studies might consider the conduct of similar study with wider in scope with consideration of the sample size, context, utilization of other approaches to enhance DI, and separate locale to further validate the findings obtained from this study.

References

Amelia, A. & Ibrahim, J. (2020). On the Effectiveness of Differentiated Instruction in the Enhancement of Jordanian Students' Overall Achievement. https://eric.ed.gov/?id=EJ1249110

Ankrum, J. W. & Bean (2017). Differentiated Reading instruction: What and how. ScholarWorksWMU. https://scholarworks.wmich.edu/reading_horizons/vol48/iss2/

Basco, R. O. (2020). Effectiveness of science infographics in improving academic performance among sixth grade pupils of one laboratory school in the Philippines. Research in Pedagogy, 10(2), 313-323.

Bergland, C. (2022). What is the Theory of Multiple Intelligences? Retrieved from https://www.verywellhealth.com/multiple-intelligences-5323411

Bibon, J. M. a. B. M. B. (2021). Coping mechanism of Island School students on the problems encountered in modular distance learning. isroset.org. Retrieved from https://www.isroset.org/journal/IJSRMS/full_paper_view.php?paper_id=2652#parentHorizontalTab2

Bickford, D. & Wright, D. (2019). Community the Hidden Context of Learning. EDUCASE. learning spaces. (n.d.). EDUCAUSE. https://www.educause.edu/research-and-publications/books/learning-spaces

Brilleslyper, M., Ghrist, M., Holcomb, T., Schaubroeck, B., Warner, B., & Williams, S. (2012): What's The Point? The Benefits of Grading Without Points, PRIMUS: Prob-

lems, Resources, and Issues in Mathematics
Undergraduate Studies, 22:5, 411-427

Broadbent, K. (2021). 4 Different Learning Styles: The VARK Theory. Retrieved from https://www.melioeducation.com/blog/vark-different-learning-styles/

Brown, J. (2020). What is Differentiated Instruction by Caril Tomlinson? https://knowledgeburrow.com/what-is-differentiated-instruction-by-carol-ann tomlinson/

Cherry, K. (2023). Gardner's Theory of Multiple Intelligences. https://www.verywellmind.com/gardners-theory-of-multiple-intelligences 2795161

Cherry, K. (2023). Overview of VARK Learning Style. https://www.verywellmind.com/vark-learning-styles-2795156

Cote, A. (2022). 5 Free Noise Cancelling Apps for Windows in 2022 (For Any Use Case). https://krisp.ai/blog/noise-cancelling-apps-windows/

Dap-og, E. (2022). Computer-Assisted instruction on students' academic achievement and engagement in science.www.academia.edu.https://www.academia.edu/82436600/Computer_Assisted_Instruction_on_____Students_Academic_Achievement_and_Engagement_in_Science?f_ri=2731

Epitropoulous, A. (2020). *The Innovator's Mindset.* The Conference for Learning, Teaching, and Leading Together. ASCD. Los Angeles

Gay, L. R., Mills, G. E., & Airasian, P. (2020). Educational research: Competencies for analysis and applications (12th ed.). Pearson.

Grande, V. (2019). Audio Materials. https://www.slideshare.net/VeeAeGrande/audio-materials 127382688 Audio materials. (2019, January 6). [Slide show]. PPT. https://www.slideshare.net/VeeAeGrande/audio-materials-127382688

Grasgreen, A. (2018). 'The Rise of Women'. Retrieved: https://www.insidehighered.com/news/2013/02/21/new-book-explains-why-women-outpace-men-education

Gheyssens, E., Griful-Freixenet, J., and Struyven, K. (2023). Differentiated Instruction as an Approach to Establish Effective Teaching in Inclusive Classrooms. ResearchGate. https://www.researchgate.net/publication/371930872_Differentiated_Instruction_as_an_Approach_to_Establish_Effective_Teaching_in_Inclusive_Classrooms

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2020). Multivariate data analysis (8th ed.). Cengage Learning. Homepage | Cengage EMEA. (n.d.). https://au.cengage.com/c/multivariate-data-analysis-8e-hair-babin-anderson-black/9781473756540/

Herdon, E. (2018). What are the Multiple Intelligences and How do they Affect Learning? https://www.cornerstone.edu/blog-post/what-are-multiple-intelligences-and-how-do-they-affect-learning/

Ibia, I. E. & Akpan, N. U. (2019). Multiple Intelligence-based Instructional Approach and Students' Cognitive Achievement in Social Studies Education, knowledge Review.

IGI Global. (2023). What is Instructional Materials. https://www.igiglobal.com/dictionary/relevance-of-the-use-of-instructional-materials-in-teaching-and-pedagogical-delivery/48956

Johnston (2020). 9-Effectiveness of Instructional Materials in Selected Public Secondary Schools in the Division of City Schools in Quezon City.

*Kaye, T., & Ehren, M. (2021). Computer-assisted instruction tools: a model to guide use in low-and middle-income countries. International Journal of Education and Development using Information and Communication Technology, 17(1), 82-99

Kishore, K. (2021, February 19). Multiple intelligence theory. Harappa. https://harappa.education/harappa-diaries/multiple-intelligence-theory/

Levy, H. M. (2008). Meeting the Needs of All Students through Differentiated Instruction: Helping Every Child Reach and Exceed Standards. The Clearing House: A Journal of Educational Strategies, Issues and Ideas, 81(4), 161–164. https://doi.org/10.3200/tchs.81.4.161-164

Magableh, I. S. I. (2020). Effectiveness of differentiated instruction on primary school studentsâ€TM English reading comprehension achievement. Magableh | International Journal of Learning, Teaching and Educational Research. https://www.ijlter.org/index.php/ijlter/article/view/1983

Magalhães, P., Ferreira, D., Cunha, J., & Rosário, P. (2020). Online vs traditional homework: A systematic review on the benefits to students' performance. Computers & Education, 152, 103869. https://doi.org/10.1016/j.compedu.2020.10386

Main, P. (2023). Multiple intelligences. Structural Learning. https://www.structural-learning.com/post/multiple-intelligences-howardgardner

Malvick, C. (2020). 4 Types of Learning Styles: How to Accommodate a Diverse Group of Students. https://www.rasmussen.edu/degrees/education/blog/types-of-learning-styles/

Marenus, M. (2023). Howard Gardner's Theory of Multiple Intelligences. https://www.simplypsychology.org/multiple-intelligences.html

Marinelli, A. (2021). The 4 Types of Learning Styles. https://www.mentor.edu.au/student-life/articles/the-4-types-of-learning-styles

Mathers, C. (2021). Naturalist Intelligence: Definition, Characteristics & 5 Examples. https://www.developgoodhabits.com/naturalist-intelligence/

Mavidou, F. & Kakana, L. (2019). Effectiveness of differentiated instruction on the reading achievement of children. Researchgate. DOI:34523225-2/2568

Mettetal. S. (2020). Effects of multiple intelligences in both Parents and Teachers. Researchgate. DOI: 32565/256/222.

Northern Illinois University Center for Innovative Teaching and Learning. (2020). Howard Gardner's theory of multiple intelligences. In Instructional guide for university faculty and teaching assistants. https://www.niu.edu/citl/resources/guides/instructional-guide

Nuzzi, R. J. (2023, December 14). Multiple intelligences | Psychological Benefits & Applications. Encyclopedia Britannica. https://www.britannica.com/science/multiple-intelligences

Pitler, H. (2022). Supporting Technology Integration for School Leaders. Edtech Books. https://edtechbooks.org/integrating_technology

Quillao, J., Despojo, G., Piñero, B., & Comighud, S. M. (2020). The use of multimodal instructional materials in teaching science. ResearchGate. https://www.researchgate.net/publication/345773706_The_Use_of_Multimodal_Instructional_Materials_in_Teaching_Science

Reis, S. & Renszulli, J. (2018). The Five Dimension of Differentiation. Eric.gov. https://files.eric.ed.gov/fulltext/EJ1296874.pdf

Santos, A. G. F., & Vizmanos, J. F. V. (2018). Profile and determinants of the middle-income class in the Philippines (No. 2018-20). PIDS Discussion Paper Series.

Santos & Vizmanos (2018) About AmBisyon natin 2040 – AmBisyon natin 2040. (n.d.). https://2040.neda.gov.ph/about-ambisyon-natin-2040/

Saunders, M. N., Lewis, P., & Thornhill, A. (2020). Research methods for business students (8th ed.). Pearson.

Sphermo, T. (2020). 4 Types of Learning Styles: Explaining the VARK Model. https://sphero.com/blogs/news/learning-styles-for-kids

Stewart, J (2013). 12- to 14-year-olds: Ages and stages of youth development. Retrieved: https://www.canr.msu.edu/news/12_to_14_year_olds_ages_and_stages_of_youth_development

Sotillo, C. R., & Beluso, N. A. (2023). Selected categories of students'multiple intelligence and teaching strategies of public-

school teachers in the district of dumarao. Cpc vmgo.

Thomas, L. (2023). *Quasi-Experimental Design | Definition, Types & Examples*. Scribbr. https://www.scribbr.com/methodology/quasi-experimental-design/

Tomlinson, C. A. (2017). Differentiated Instruction. In C. M. Callahan, & H. L. Hertberg-Davis (Eds.), Fundamentals of Gifted Education (pp. 279-292). Routledge.

Tucker, G. (2020). What is Differentiated Instruction? https://www.understood.org/en/articles/differentiated-instruction-what-you-needto-know

Tudor, A. (2023). Existentialist Intelligence: A Key to Finding Meaning and Purpose in Life. https://blog.mindvalley.com/existential-intelligence/

Weselby, C. (2022). What is Differentiated Instruction? Examples of How to Differentiate Instruction in the Classroom. https://resilienteducator.com/classroom-resources/examples-of-differentiated-instruction/

Westman, L. (2021). Teaching with Empathy: How to Transform Your Practice by Understanding Your Learners. *ASCD. 1703 North Beauregard Street, Alexandria, VA 22311-171*

Whitehead, M. (2019a). Definition of Physical Literacy: Developments and Issues. In M. Whitehead (Ed.), Physical Literacy across the World (1st ed., pp. 8-18). Routledge. https://doi.org/10.4324/9780203702697-2

Wood, S. (2022). What is differentiated instruction? US News & World Report. https://www.usnews.com/education/k12/articles/what-is-differentiated-instruction