

Differentiated Instructional Strategies Among Technology And Livelihood Education (TLE) And Music, Arts, Physical Education, And Health (MAPEH) Teachers And Students

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Abstract — This study examined the differentiated instructional strategies employed by Technology and Livelihood Education (TLE) and Music, Arts, Physical Education, and Health (MAPEH) teachers at Sumoroy Agro-Industrial School in Northern Samar. Using a descriptive-correlational research design, the study involved 103 teachers and 341 students selected through cluster random sampling. Data were collected using researcher-made survey questionnaires validated through pilot testing. The study assessed teacher and student profiles, the extent of utilization of differentiated instructional strategies in terms of instructional differentiation, active learning strategies, and assessment-driven instruction, and the outcomes regarding student engagement and teacher adaptability. Results showed that teachers perceived their utilization of differentiated strategies as excellent (median = 5.00), while students rated them as above average (median = 4.00). Significant relationships were found between teacher profiles and strategy utilization, particularly regarding sex, civil status, educational attainment, years of service, and subject handled. Major challenges identified included lack of resources, limited access to subject-specific materials, and insufficient planning time. Based on these findings, an enhancement program was proposed to address identified challenges and improve the implementation of differentiated instructional strategies in TLE and MAPEH education.

Keywords — *differentiated instruction, instructional strategies, TLE education, MAPEH education, teacher adaptability, student engagement, enhancement program*

I. Introduction

The landscape of contemporary education demands pedagogical approaches that recognize and accommodate the diverse learning needs of students. Differentiated instruction has emerged as a vital framework that enables teachers to adapt their instructional strategies to meet the unique strengths, interests, and challenges of individual learners (Tucker, 2024). This educational approach acknowledges that students enter classrooms with varying levels of academic preparedness, distinct learning styles, and diverse backgrounds, necessitating flexible teaching methods rather than a one-size-fits-all approach.

In the Philippine educational context, particularly in Technology and Livelihood Education (TLE) and Music, Arts, Physical Education, and Health (MAPEH), the implementation of

differentiated instruction becomes increasingly significant. These subjects, by their very nature, require hands-on activities, creative expression, and practical skill development that align well with differentiated teaching strategies (Ignacio, 2024). The MATATAG curriculum, grounded in Republic Act 10533, emphasizes differentiated instruction to meet diverse learner needs, particularly in TLE where teachers are encouraged to tailor lessons to individual learning styles while ensuring practical skills development (Academ-e Multi Media Solutions Inc., 2023).

Despite the recognized importance of differentiated instruction, teachers face numerous challenges in its implementation. According to recent research, barriers include lack of resources, limited professional development opportunities, large class sizes, and insufficient planning time (Shareefa et al., 2019). The study of Panela (2025d) highlighted similar challenges in the Philippine context, emphasizing the need for comprehensive support systems for teachers to effectively implement innovative instructional approaches.

Sumoroy Agro-Industrial School, located in the Palapag I District of Northern Samar, serves a diverse student population that would benefit significantly from differentiated instructional approaches. However, there remains a notable gap in empirical research examining the specific implementation of these strategies within the unique contexts of TLE and MAPEH education in this rural setting. This study aims to address this gap by providing comprehensive insights into current practices, challenges, and outcomes of differentiated instruction in these critical subject areas.

Literature Review

Theoretical Foundations of Differentiated Instruction

Differentiated instruction represents a fundamental shift from traditional teaching methods to student-centered approaches that recognize individual learning differences. Tomlinson's conceptualization of differentiated instruction emphasizes adapting content, process, or product to meet students' readiness, interest, and learning profile (Heick, 2021). This approach is grounded in two key theoretical frameworks that provide the foundation for understanding how differentiated instruction enhances learning outcomes.

Lev Vygotsky's Zone of Proximal Development (ZPD) theory serves as a crucial theoretical foundation for differentiated instruction. The ZPD describes the continuum of tasks that learners can accomplish with teacher support but cannot yet complete independently. This concept directly relates to differentiated instruction by recognizing that students operate at different developmental levels and require varying degrees of scaffolding to achieve success. In TLE and MAPEH contexts, teachers can utilize ZPD principles by offering appropriate challenges and support mechanisms tailored to each student's current capability level.

Howard Gardner's Theory of Multiple Intelligences provides another essential framework for understanding differentiated instruction. Gardner's theory suggests that individuals possess

different types of intelligence, including linguistic, logical-mathematical, spatial, musical, and interpersonal intelligences, among others. This theory aligns with differentiated instruction by encouraging educators to employ diverse teaching methods, evaluation tools, and activities that connect with students' individual strengths and preferences (Drew, 2024).

Contemporary Research on Differentiated Instruction

Recent empirical studies have demonstrated the effectiveness of differentiated instruction across various educational contexts. Iqbal et al. (2020) revealed that differentiated instruction significantly impacts student learning, with teachers using differentiated guidance to enhance students' skills while promoting positive classroom learning environments. Similarly, Magableh and Abdullah (2021) found that differentiated instruction significantly improved reading comprehension achievement for early secondary students, with experimental groups outperforming control groups.

The effectiveness of differentiated instruction extends beyond academic achievement to encompass broader educational outcomes. Pozas et al. (2021) demonstrated that students' ratings of their teachers' differentiated practices were positively associated with school well-being, social inclusion, and academic self-concept. This finding underscores the holistic benefits of implementing differentiated instructional strategies in educational settings.

Research specifically focused on practical subjects supports the implementation of differentiated instruction in TLE and MAPEH education. Castro (2024) emphasized that differentiated instruction is crucial in TLE for catering to diverse learners, enabling teachers to tailor assignments, group students effectively, and use varied materials to ensure every student can learn and succeed regardless of skill level.

Implementation Challenges and Barriers

Despite its proven benefits, teachers encounter significant challenges when implementing differentiated instruction. Yetnayet (2020) identified that most teachers lacked familiarity with differentiated instruction strategies, with practices being limited by factors including large class sizes, student diversity, lack of time, insufficient training, and inadequate materials. These findings align with research by Panela (2025c), which highlighted the importance of building teacher capacity through comprehensive professional development programs.

Shareefa et al. (2019) categorized teachers' definitions of differentiated instruction into three main aspects: using different strategies, addressing student diversity, and promoting student learning. However, the study also identified six major implementation challenges: time constraints, limited resources, lack of knowledge, large class sizes, inadequate support, and heavy workload.

Subject-Specific Applications

Research specific to MAPEH education has shown promising results for differentiated instruction implementation. Garcia (2019) highlighted the importance of active student engagement in the learning process, with teachers effectively gauging student understanding through questioning techniques and differentiated evaluation practices. The study emphasized that differentiated instruction emerged as a key factor in enhancing student performance in MAPEH subjects.

In TLE education, Rudio (2017) emphasized that effective teaching extends beyond traditional lectures, advocating for collaborative learning where students work together in groups, engage in discussions, solve real-world problems through service learning, and participate in demonstrations alongside teachers. This approach aligns with differentiated instruction principles by providing multiple pathways for student engagement and learning.

II. Methodology

Research Design

This study employed a descriptive-correlational research design to describe and determine relationships between testable variables. According to Creswell (2012), descriptive-correlational research measures the degree of relationship between two or more variables using statistical correlational procedures. This design was selected to comprehensively examine relationships between respondent profiles, extent of differentiated instructional strategy utilization, and implementation outcomes. The descriptive aspect provided detailed accounts of current practices and conditions within Sumoroy Agro-Industrial School, essential for identifying areas where differentiated instruction is effectively employed and where improvements are needed. The correlational component enabled analysis of patterns and relationships, such as how teacher characteristics relate to their utilization of differentiated strategies and corresponding student outcomes.

Participants

The study involved two groups of respondents: teachers and students from Sumoroy Agro-Industrial School in the Division of Northern Samar. The teacher population consisted of 103 TLE and MAPEH educators, representing the total population of eligible participants. This included 48 Technology and Livelihood Education teachers (46.60%), 30 MAPEH teachers (29.13%), and 25 TVL Track teachers (24.27%). For student participants, 341 students were selected from a total population of 3,051 using cluster random sampling technique to ensure equal representation across grade levels and programs. The Raosoft sample size calculator was utilized to determine the required sample size. Student distribution included 57 students each from grades 7-11 (16.72% each) and 56 students from grade 12 (16.42%).

Instrumentation

A researcher-made survey questionnaire served as the primary data collection instrument. The questionnaire comprised three main sections: (1) demographic profiles of teacher and student respondents, (2) extent of utilization of differentiated instructional strategies, and (3) outcomes of differentiated instructional strategy implementation. The second section assessed three key areas: instructional differentiation, active learning strategies, and assessment-driven instruction. The third section evaluated outcomes in terms of student engagement and motivation, and teacher adaptability and implementation. All items utilized a five-point Likert scale ranging from strongly disagree (1) to strongly agree (5).

Validity and Reliability

Face and content validation was conducted by experts including panel members and advisers. Pilot testing was performed at Cabatuan National High School with 30 teachers and 30 students who were not subjects of the main study. Cronbach's alpha analysis was employed to evaluate instrument reliability. Initial reliability testing revealed some items required removal to achieve acceptable internal consistency. For teacher perceptions, final alpha values were: Instructional Differentiation ($\alpha = 0.761$), Active Learning Strategies ($\alpha = 0.753$), and Assessment-Driven Instruction ($\alpha = 0.715$). For student perceptions, all variables demonstrated good internal consistency with alpha values exceeding 0.8.

Data Collection and Analysis

Formal permission was obtained from the Schools Division Superintendent of Northern Samar and school administrators before data collection. Questionnaires were administered to teachers and students with proper explanation of study purposes and assurance of confidentiality. Given non-normal data distribution, median values were used as measures of central tendency. Frequency and percentage distributions described respondent profiles. Spearman's rank correlation coefficient and chi-square tests analyzed relationships between variables. Multiple response analysis was employed to rank teacher-identified challenges.

Ethical Considerations

The study adhered to ethical standards by ensuring informed consent, confidentiality, and voluntary participation. Respondents were fully informed about study purposes and assured of anonymity. All responses were treated confidentially and used solely for research purposes.

III. Results and Discussion

Respondent Profiles

The teacher respondent profile revealed a mature and well-educated workforce, with the majority aged 32-45 years (59.23%), predominantly female (58.25%), and married (65.05%). Most teachers possessed master's units (61.17%), indicating commitment to professional development. Years of service showed a balanced distribution, with 33.01% having 6-10 years and 26.21% having 1-5 years of experience. Technology and Livelihood Education teachers represented the largest group (46.60%), followed by MAPEH teachers (29.13%).

Student respondents were predominantly 13-17 years old, with slight female majority (53.08%) and all single status as expected for secondary students. Economically, 59.24% came from families with monthly income below Php 10,957.00, highlighting potential resource constraints. Regarding intelligence inclinations, spatial intelligence was most common (26.39%), followed by logical-mathematical and naturalistic intelligences (13.49% each).

These demographic characteristics align with findings from Panela (2025c), which emphasized the importance of understanding teacher and student profiles when implementing educational innovations. The economic status of students particularly suggests the need for differentiated approaches that do not rely heavily on expensive materials or resources.

Extent of Differentiated Instructional Strategy Utilization

Teacher Perceptions. Teachers demonstrated strong confidence in their utilization of differentiated instructional strategies, with all three measured areas receiving excellent ratings (median = 5.00). For instructional differentiation, teachers strongly agreed with statements about modifying content for diverse student needs, using varied teaching methods for different learning styles, designing activities considering varying readiness levels, providing additional support for struggling students, and adjusting instructional pace according to learning needs.

Regarding active learning strategies, teachers expressed strong agreement with encouraging hands-on activities, using interactive methods such as role-playing and simulations, assigning research tasks beyond textbooks, allowing student reflection and sharing, and adjusting teaching approaches based on student feedback.

For assessment-driven instruction, teachers strongly agreed with modifying activities based on assessment performance, using varied assessment tools, allowing student self-assessment, regularly reviewing assessment data, and adjusting instructional pacing based on student mastery.

These findings suggest that teachers at Sumoroy Agro-Industrial School possess positive attitudes toward differentiated instruction and perceive themselves as effective implementers. This aligns with research by Dema et al. (2022), which found that most teachers had positive attitudes toward differentiated instruction.

Student Perceptions. Students provided more moderate assessments of their teachers' differentiated instruction implementation, rating all areas as above average (median = 4.00). While students agreed that teachers implemented various differentiated strategies, their ratings were consistently one point lower than teacher self-assessments across all measured areas.

This discrepancy between teacher and student perceptions suggests a gap between intended implementation and student experience. Similar findings were reported by Article et al. (2022), who found that while teachers expressed positive perceptions of differentiated instruction benefits, actual implementation often fell short of intentions.

For instructional differentiation, students agreed that teachers modified content, used different methods for various learning styles, created activities based on readiness levels, provided extra support, and adjusted lesson pace. However, the moderate ratings suggest room for improvement in implementation visibility from the student perspective.

Outcomes of Differentiated Instructional Strategies

Student Engagement and Motivation. Both teachers and students recognized positive outcomes from differentiated instruction implementation, though with different intensity levels. Teachers reported excellent outcomes (median = 5.00) for student engagement and motivation, strongly agreeing that differentiated instruction increased student enthusiasm, participation, focus, motivation for assignment completion, confidence in sharing ideas, independence in learning, positive attitudes toward learning, willingness to attempt challenging tasks, collaborative skills, and overall engagement.

Students provided above-average ratings (median = 4.00) for the same outcomes, indicating that while they experienced benefits from differentiated instruction, the impact was less pronounced than teachers perceived. This pattern aligns with research by Pozas et al. (2021), which found positive associations between differentiated practices and student well-being and engagement.

Teacher Adaptability and Implementation. Teachers demonstrated high confidence in their adaptability and implementation capabilities (median = 5.00), strongly agreeing with statements about feeling confident in adapting teaching methods, regularly modifying lesson plans, improving flexibility in responding to learning challenges, using wide ranges of instructional tools, strengthening classroom management skills, seeking new approaches, and finding differentiated activities easy to integrate.

Students rated teacher adaptability and implementation as above average (median = 4.00), agreeing that teachers adjusted methods for different needs, demonstrated flexibility in changing activities, modified lessons when students struggled, used varied teaching methods, adapted lessons to match interests, used student feedback for improvement, changed approaches based on student responses, and showed confidence in trying new methods.

The consistent pattern of teacher ratings exceeding student ratings by one point across all measures suggests either teacher overestimation of implementation effectiveness or student underappreciation of differentiated instruction efforts. This finding emphasizes the importance of incorporating student perspectives in evaluating instructional effectiveness, as suggested by Panella (2025a) in examining educational impact assessments.

Relationships Between Variables

Teacher Profile Relationships. Significant relationships emerged between teacher profiles and differentiated instruction utilization. Teacher sex showed highly significant correlations with instructional differentiation ($p = 0.004$), while civil status significantly correlated with instructional differentiation ($p = 0.011$). Highest educational attainment demonstrated highly significant correlations with both active learning strategies ($p = 0.004$) and assessment-driven instruction ($p < 0.001$).

Years of service significantly correlated with instructional differentiation ($p = 0.012$), while subject handled showed significant relationships with all three strategy areas: instructional differentiation ($p = 0.022$), active learning strategies ($p = 0.019$), and assessment-driven instruction ($p = 0.010$).

Table 1
Relationships Between the Profile of Teachers and the Level of Outcomes to Differentiated Instructional Strategies as Utilized or Implemented to Students in Terms of Years of Service, Subject Handled, Designation/Position, and Relevant Seminars and Trainings Attended

Variables	Years of Service		Subject Handled		Designation/ Position		Relevant Seminars and Trainings Attended	
	r_s	p-value	X ²	p-value	r_s	P-value	X ²	p-value
Student Engagement and Motivation	0.015	0.880	3.539	0.739	-0.034	0.734	-0.008	0.937
Teacher Adaptability and Implementation	-0.136	0.0172	15.616*	0.016	-0.235*	0.017	-0.108	0.277

** Correlation is highly significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed)

These findings suggest that more educated teachers and those with specific subject specializations are more likely to implement differentiated strategies effectively. This aligns with research by Ramli and Yusoff (2020), which found significant positive correlations between teacher self-efficacy and differentiated instruction practice.

Student Profile Relationships. Student profiles also showed significant relationships with strategy utilization perceptions. Student age was highly significantly correlated with both instructional differentiation ($p = 0.002$) and active learning strategies ($p = 0.002$). Student sex

showed highly significant correlations with active learning strategies ($p < 0.001$) and assessment-driven instruction ($p = 0.008$).

Grade level demonstrated highly significant correlations with instructional differentiation ($p = 0.006$) and active learning strategies ($p = 0.002$), while economic status significantly correlated with instructional differentiation ($p = 0.013$). Intelligence inclination showed highly significant correlation with active learning strategies ($p = 0.004$) and significant correlation with assessment-driven instruction ($p = 0.023$).

Table 2
Relationships Between the Profile of Students and the Level of Outcomes to Differentiated Instructional Strategies as Utilized or Implemented to Students in Terms of Grade Level, Economic Status, and Intelligence Inclination

Variables	Grade Level		Economic Status		Intelligence Inclination	
	r_s	p-value	r_s	p-value	X^2	p-value
Student Engagement and Motivation	-0.160**	0.003	0.011	0.835	83.590**	<0.001
Teacher Adaptability and Implementation	-0.207**	<0.001	-0.019	0.722	23.712	0.697

** Correlation is highly significant at the 0.01 level (2-tailed) * Correlation is significant at the 0.05 level (2-tailed)

These relationships suggest that differentiated instruction implementation effectiveness varies based on student characteristics, highlighting the need for teachers to consider individual student profiles when designing and implementing instructional strategies.

Implementation Challenges

Multiple response analysis revealed the most significant challenges teachers face in implementing differentiated instructional strategies. The top three challenges were: (1) lack of resources such as materials and technology limiting ability to offer varied instructional methods (90.29%), (2) limited access to relevant instructional resources for specific subjects like TLE and MAPEH hampering differentiation (81.55%), and (3) limited time for lesson planning and preparation making it difficult to implement differentiated instruction effectively (76.70%).

Additional challenges included difficulty adapting activities for students with special needs (71.84%), classroom disruptions and behavior management issues (68.93%), large class sizes making individual attention challenging (67.96%), and time-consuming assessment of individual learning styles (65.05%).

Table 31
Challenges of the Teachers Utilizing Differentiated Instructional Strategies

Challenges of Teachers ^a	Responses		% of Cases
	f	%	
Lack of resources (e.g., materials, technology) limits my ability to offer varied instructional methods.	93	9.46	90.29
Limited access to relevant instructional resources for specific subjects, like TLE and MAPEH, hampers differentiation.	84	8.55	81.55
Limited time for lesson planning and preparation makes it difficult to implement differentiated instruction effectively.	79	8.04	76.70
I find it challenging to adapt differentiated activities for students with special needs.	74	7.53	71.84
Classroom disruptions and behavior management make it harder to implement differentiation.	71	7.22	68.93
Large class sizes make it challenging to address each student's individual needs.	70	7.12	67.96
Assessing and understanding each student's unique learning style is time-consuming.	67	6.82	65.05
Limited professional development opportunities prevent me from fully understanding differentiated instructional strategies.	67	6.82	65.05
I struggle to provide adequate support for students who need extra assistance.	66	6.71	64.08
I find it challenging to balance curriculum requirements with the need for differentiated instruction.	63	6.41	61.17
Managing diverse learning activities simultaneously is overwhelming during lessons.	61	6.21	59.22
I lack confidence in using some differentiated instruction techniques effectively.	53	5.39	51.46
Tracking and assessing individual progress for each student is difficult and time-intensive.	50	5.09	48.54
Student resistance or lack of engagement in differentiated activities can be discouraging.	49	4.98	47.57
It is difficult to measure the effectiveness of differentiated instructional strategies on student learning outcomes.	36	3.66	34.95
Total	983	100.00	954.37

a. Dichotomy group tabulated at value 1.

These findings align with previous research identifying similar barriers to differentiated instruction implementation. Yetnayet (2020) reported comparable challenges including large class sizes, lack of time, insufficient training, and inadequate materials. The resource-related challenges are particularly significant in the Philippine context, where educational institutions often face budget constraints and limited access to specialized materials.

The prominence of resource-related challenges suggests that successful differentiated instruction implementation requires institutional support beyond individual teacher efforts. This finding supports the recommendations of Panela (2025d) regarding the need for comprehensive support systems to enable effective implementation of innovative educational approaches.

Implications for Practice

The study findings have several important implications for educational practice in TLE and MAPEH education. The gap between teacher and student perceptions suggests the need for improved communication and feedback mechanisms to ensure that differentiated instruction efforts are effectively reaching students. Teachers may benefit from strategies to make their differentiated approaches more visible and meaningful to students.

The significant relationships between teacher characteristics and strategy utilization indicate that professional development programs should be tailored to address specific needs based on teacher profiles. For example, newer teachers or those with lower educational attainment may require more intensive support in implementing differentiated strategies.

The resource-related challenges identified by teachers point to the need for systematic institutional support, including provision of appropriate materials, technology, and planning time. Schools and educational systems must prioritize resource allocation to support differentiated instruction implementation effectively.

The positive outcomes reported for student engagement and teacher adaptability suggest that continued investment in differentiated instruction development is warranted. However, the moderate student ratings indicate that implementation quality could be enhanced through more systematic approaches to strategy selection and implementation.

IV. Conclusion

This study provides comprehensive insights into the current state of differentiated instructional strategy implementation among TLE and MAPEH teachers at Sumoroy Agro-Industrial School. The findings reveal that while teachers demonstrate positive attitudes and confidence in their differentiated instruction capabilities, there remains a gap between teacher perceptions and student experiences that warrants attention.

The research confirms that differentiated instruction implementation is influenced by various teacher and student characteristics, suggesting the need for individualized approaches to professional development and strategy selection. The significant challenges identified, particularly resource limitations and time constraints, highlight the importance of institutional support for effective implementation.

The positive outcomes observed for student engagement and teacher adaptability demonstrate the potential benefits of differentiated instruction in TLE and MAPEH education. However, the consistent pattern of student ratings being lower than teacher ratings suggests that implementation effectiveness could be enhanced through improved strategies for making differentiated approaches more visible and meaningful to students.

The study contributes to the limited research on differentiated instruction in Philippine educational contexts, particularly in practical and creative subject areas. The findings provide a foundation for developing targeted interventions to improve differentiated instruction implementation and ultimately enhance learning outcomes for diverse student populations.

The proposed enhancement program, based on study findings, offers a systematic approach to addressing identified challenges while building on existing strengths. Implementation of such

programs could significantly improve the quality and effectiveness of differentiated instruction in TLE and MAPEH education, benefiting both teachers and students in achieving educational goals.

Future research should focus on longitudinal studies examining the implementation and outcomes of enhancement programs, as well as comparative studies across different educational contexts to further understand the factors that contribute to successful differentiated instruction implementation.

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