

Teachers' Digi-Based Differentiated Instruction in a Linguistically Diverse Environment and Students' Academic Performance in English

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ABSTRACT

This study examined teachers' use of digital-based differentiated instruction (DBDI) in a linguistically diverse environment across content, process, and product areas, and its relationship with students' academic performance in English. The respondents were 200 randomly selected Grade 9 students and their English teachers in the Division of Dumaguete City. A quantitative-correlational research design was employed, utilizing validated questionnaires. Descriptive statistics measured teachers' DBDI utilization and students' academic performance, while Spearman's rank correlation tested relationships among variables. Results showed that teachers utilized DBDI at high to very high levels, with students similarly perceiving high utilization. Significant positive relationships were observed between content and process differentiation and students' academic performance, leading to the rejection of the null hypotheses in these areas. This indicates emphasizing content and process differentiation in DBDI is crucial for supporting students' performance in English. In contrast, product differentiation did not show a significant relationship with academic performance, suggesting the need to explore innovative approaches to product differentiation to further enhance student engagement and performance. Teachers' demographic profiles (i.e., educational attainment and the number of DBDI trainings attended) were found to have no significant relationship with DBDI utilization. Overall, findings suggest that teachers strengthen content and process differentiation through digital integration, while exploring creative ways for students to demonstrate and assess learning.

Keywords: Differentiated Instruction, Linguistic Diversity, Academic Performance

INTRODUCTION

Digital-based differentiated instruction (DBDI) has been recognized as an effective approach for addressing diverse learner needs. However, the digital divide remains a significant challenge in education, particularly in contexts where access to digital tools and teacher training is limited (Vassilakopoulou & Hustad, 2021). Studies indicate that many teachers struggle to integrate digital tools into differentiated instruction due to limited resources and insufficient preparation (Oco, 2021; Jöhler & Krumsvik, 2022).

In the Philippines, inequalities in educational resources persist, especially between urban and rural schools. Rural schools often have limited access to digital infrastructure, internet connectivity, software, instructional materials, conducive classrooms, and professional development opportunities for teachers, and they frequently experience overcrowded classrooms (Zamora & Dorado, 2021; Bustillo & Aguilos,

2022; Blando, 2025). Linguistic diversity further compounds these challenges, as many students speak local dialects at home and face difficulties in English-medium instruction (Choi, 2024).

The researchers, drawing from their experiences within the public school system, have observed the challenges of English instruction in contexts with limited technological resources, instructional materials, internet connectivity, and learning support. Learning became even more challenging during the pandemic when classes shifted online, and access to digital resources was further restricted. These experiences motivated the researchers to explore this topic.

Several studies have already confirmed the positive impact of DBDI on student performance. Toledo (2023) reported improved Science performance among Grade 10 students through DBDI strategies. Similarly, DBDI significantly improved English performance among Grade 9 students (Pasubillo & Asio, 2023). Although these findings validate the effectiveness of DBDI, there is still limited research examining the extent of teachers' utilization of DBDI in linguistically diverse classrooms and its relationship with students' academic performance in English. Thus, the researchers considered this to address the research gap.

The present study was conducted to determine the extent of teachers' utilization of DBDI across content, process, and product, and its relationship with students' academic performance in English. There is a need to understand the extent of DBDI utilization, as this is crucial for identifying current practices, recognizing areas needing support, and informing context-based interventions that can strengthen instructional practices and help schools make informed decisions in supporting students' diverse learning needs. Additionally, the study considers how teacher demographic profiles may influence the utilization of DBDI. In alignment with Sustainable Development Goal 4 (SDG 4), the study contributes to advancing equitable quality education by highlighting the importance of teacher training, digital resources, and context-based instructional practices (Sadiki, 2024).

Research Questions

This study aimed to determine the extent of teachers' utilization of Digi-Based Differentiated Instruction (DBDI) in a linguistically diverse environment and its relationship to students' academic performance in English. Specifically, it sought to answer the following questions:

- To what extent do teachers utilize Digi-based differentiated instruction in a linguistically diverse environment as perceived by the teachers themselves and their students based on the following three key areas:
 - **content (what students learn);**
 - **process (how students learn); and**
 - **product (how students demonstrate learning)?**
- What is the students' academic performance in English?
- Is there a significant relationship between the extent of teachers' utilization of DBDI and the students' academic performance in English?
- Is there a significant relationship between the following demographic profiles of teachers and the extent of their utilization of DBDI in a linguistically diverse environment?
 - **4.1 highest educational attainment; and**
 - **4.2 number of trainings on DBDI?**

Statement of the Null Hypotheses

H₀₁. There is no significant relationship between the extent of teachers' utilization of DBDI and the students' academic performance in English.

H₀₂. There is no significant relationship between the following demographic profiles of teachers and the extent of utilization of DBDI in a linguistically diverse environment:

2.1 highest educational attainment; and

2.2 number of trainings on DBDI?

METHODOLOGY

Research Design

This study employed a descriptive-correlational research design, which is appropriate for examining the relationships between variables without manipulation.

Correlation analyses were used to determine the following: (a) whether there is a significant relationship between the extent of DBDI utilization and students' academic performance in English, and (b) whether teacher demographic profiles have an influence on the extent of DBDI utilization.

Research Locale

The study was conducted in seven public junior high schools in the Division of Dumaguete City, Negros Oriental, Philippines, namely: Dumaguete City National High School, Hermenegilda F. Gloria Memorial High School, Junob National High School, Piapi High School, Taclobo National High School, Ramon Teves Pastor Memorial – Dumaguete Science High School, and Camanjac National High School.

Research Respondents

This study involved two hundred (200) Grade 9 students and ten (10) Grade 9 English teachers from seven public junior high schools in the Division of Dumaguete City, Negros Oriental.

Both the teacher and student respondents were selected using simple random sampling from a class or section. This method ensured that the sample was representative of the total population and free from selection bias. The students rated their respective teachers' DBDI utilization in the classroom.

In addition to being rated by their students, the teachers also rated their own extent of DBDI utilization. This approach allowed the study to capture both the students' and teachers' perspectives.

Statistical Tools

The data collected in this study were analyzed using the following statistical tools:

Mean. The mean was used to summarize respondents' ratings for SOP 1, and SOP 2. Specifically, it measured the extent of teachers' utilization of DBDI across content, process, and product (SOP 1), and the students' academic performance in English (SOP 2). It was used to compute the average responses of both teachers and students based on the Likert-scale items.

Percent. This tool shows how a part is related to a whole. Thus, it was used in presenting the academic performance of the students in English.

Spearman's Rank-Order Correlation. Spearman's rho was used to determine the strength and direction of relationships between the study variables. For SOP 3, it tested whether a significant relationship exists between teachers' utilization of DBDI and students' academic performance in English. For SOP 4, it determined whether teachers' demographic profiles are significantly related to their utilization of DBDI. Values of r_s closer to +1 or -1 indicate stronger positive or negative relationships, while values near 0 suggest no significant correlation.

A five-point Likert scale was used to evaluate the extent of teachers' utilization of DBDI in terms of content, process, and product (SOP 1). This scale allows for a structured measurement of agreement or frequency, making the data easier to analyze and interpret.

Rating	Extent of Utilization	Description
5	Very High	DI is consistently and extensively implemented in all appropriate teaching and learning situations. Teachers regularly adjust content, teaching methods, learning activities, and classroom environments to address the diverse needs of students.
4	High	DI is often implemented. Teachers frequently make adjustments to address varied student readiness levels, interests, and learning profiles.
3	Moderate	DI is sometimes implemented. Teachers occasionally modify instructional approaches, but not consistently or across all areas.
2	Low	DI is rarely implemented. Only minimal or irregular efforts are made to tailor instruction based on student differences.
1	Very Low	DI is not implemented or is almost entirely absent. Teachers use a one-size-fits-all approach with little to no consideration for student diversity.

The proficiency level or academic performance at which the students were performing was based on the following criteria (DepEd Order No. 8, s 2015).

Rating	Verbal Equivalent	Explanations
90% and above	Outstanding	The student at this level exceeds the core requirements in terms of knowledge, skills and understanding, and can transfer them automatically and flexibly through authentic performance tasks.
85% - 89%	Very Satisfactory	The student at this level has developed the fundamental knowledge, skills, and core understanding and can transfer them independently through authentic performance tasks.
80% - 84%	Satisfactory	The student at this level has developed the fundamental knowledge and skills and core understanding, and with little guidance from the teacher and/or with some assistance from peers and can transfer these understandings through authentic performance tasks.
75% - 79%	Fairly Satisfactory	The student at this level possesses the minimum knowledge, skills, and core understanding but needs help throughout the performance of authentic tasks.
74% down	Did Not Meet Expectations	The student at this level struggles with his/her understanding; prerequisite and fundamental knowledge and/or skills have not been acquired or developed adequately to aid understanding.

**The explanation is based on DepEd Order No. 73, s. 2012*

Research Instruments

This study utilized two researcher-made questionnaires: one for teachers and one for Both instruments were carefully designed to align with the study's Statement Problem and to generate data relevant to the research objectives.

The teacher questionnaire was designed to collect demographic information such as the teachers' highest educational attainment and the number of DBDI trainings attended. It was also used to measure the extent of teachers' utilization of DBDI across its three key components.

The student questionnaire, on the other hand, was intended to gather data on students' academic performance in English. It was also used to measure the extent of teachers' utilization of DBDI.

Both instruments contain a disclosure statement ensuring voluntary participation, anonymity, and confidentiality. The purpose of the study was clearly explained to the respondents, who were also assured that all information collected would be used strictly for research purposes.

To ensure validity and reliability, the questionnaires underwent a rigorous face-validation process by at least three experts in education and inclusive instruction, including English teachers with Master's degrees and who were actively engaged in research. Following validation, a pilot test (dry-run) was conducted with a small sample that was demographically similar to the study population. The participants involved in the pilot test were strictly excluded from the actual group of respondents to prevent data contamination and uphold the integrity and accuracy of the study's findings.

The internal consistency and reliability of the instruments were assessed using Cronbach's alpha, which is considered the most appropriate statistical test for survey research involving multi-item scales. The results showed the following Cronbach's Alpha Coefficients: Content = 0.843, Process = 0.839, and Product = 0.874. These values indicate consistency across all components, demonstrating that the items in the instrument were reliable measures of DBDI.

Data Gathering Procedures and Analysis

Following the design hearing, the researchers incorporated all suggestions and recommendations provided by the panel members. A formal request to conduct the study was then submitted to the Dean of the Foundation University Graduate School for recommendation to the Schools Division Superintendent of the Division of Dumaguete City. Once the request had been signed and approved, it was forwarded to the Division Office. After approval was granted by the Schools Division Superintendent, the letter was distributed to the school principals and the advisers of the students who participated in the study.

Before the main data collection, a pilot test was conducted to validate the researcher-made questionnaires with 30 Grade 9 students from Piapi High School, who were not included in the actual distribution. Reliability was assessed using Cronbach's alpha to ensure internal consistency, and the results showed that all items were reliable.

After establishing reliability, the researchers proceeded with the actual distribution of the questionnaires in the participating schools. During the data collection, the researchers explained the purpose and significance of the study to the students. The questionnaires were retrieved immediately after the students completed them.

The responses were encoded in Microsoft Excel and the dataset was statistically processed and interpreted using appropriate statistical tools. The mean was used to determine the average responses of teachers' utilization of DBDI in terms of content, process, and product, as well as students' academic

performance in English. Percentages were used to illustrate the relationship of a part to a whole. Additionally, the Spearman Rank-Order Coefficient (Spearman’s rho) was employed to determine the strength and direction of the relationship between the variables in the study. Specifically, it was used to identify whether a significant relationship exists between teachers’ utilization of DBDI and students’ academic performance in English. It was also utilized to determine whether teachers’ demographic profiles are significantly related to their extent of utilization of DBDI. Throughout the analysis, the researchers applied specific interpretations to describe the teachers’ utilization of DBDI and the students’ academic performance in English.

Scope and Limitations of the Study

This study focused on exploring the relationship between the extent of public junior high school English teachers’ utilization of DBDI and students’ academic performance in the English subject. It specifically considers three areas of DBDI utilization: a) content, b) process, and c) product.

The study also looked into the teacher demographic profiles, including the highest educational attainment, and the number of DBDI-related trainings to determine their relationship with the extent of teachers’ DBDI utilization.

This study is limited to Grade 9 English teachers and students in public junior high schools within Dumaguete City Division, where digital infrastructure and access may vary. Findings may not apply to all school areas or other grade levels and locations.

Data were collected through teachers’ self-assessments of their DBDI utilization and students’ academic records, which could be subject to bias or variations in grading standards. External factors, such as socioeconomic status and parental involvement, were not examined in this study.

Lastly, this investigation is constrained by the given time frame and sample size, which may limit the broader applicability of the results.

RESULTS

Table 1. Teachers’ Extent of Utilization of Digi-Based Differentiated Instruction in the Content Dimension in a Linguistically Diverse Environment (n=200)

Indicators	Students		Teachers	
	\bar{x}	EoU	\bar{x}	EoU
1. My teacher gave lessons at a level that suited my ability.	4.19	H	4.90	VH
2. My teacher shared real-life examples through digital materials to make learning meaningful.	4.15	H	4.30	VH
3. My teacher provided digital lessons (e.g., videos, apps, modules) that helped me understand English lessons better.	4.14	H	4.50	VH
4. My teacher presented lessons step by step using digital tools to make them easier to follow.	4.09	H	4.70	VH
5. My teacher explained clearly what I needed to learn in English using digital tools.	4.06	H	4.50	VH
6. My teacher related English lessons to real-world uses with the help of digital resources.	4.05	H	4.70	VH

7. My teacher used online resources that explained English topics in simple and clear ways.	3.99	H	4.80	VH
8. My teacher included topics or digital materials connected to my culture, language, or background.	3.89	H	3.90	H
9. My teacher used translation tools, subtitles, or multilingual apps when lessons were hard to understand.	3.67	H	4.30	VH
10. My teacher gave online word support (e.g., glossaries, dictionaries, translation apps) to help me learn vocabulary.	3.62	H	3.80	H
Composite	3.98	H	4.34	VH
Standard Deviation	0.95		0.64	

Note: Extent of Utilization (EoU); 4.21–5.00, Very High (VH); 3.41–4.20, High (H); 2.61–3.40, Moderate; 1.81–2.60, Low (L); 1.00–1.80, Very Low (VL)

Table 1 presents the extent to which teachers utilize DBDI in the *content dimension*, as perceived by both teachers and their students. The data indicate that teachers consistently incorporate digital tools into their instruction to tailor content to the needs of their learners, which is reflected in a composite mean score of 4.34 (Very High). On the other hand, students rated their teachers with a composite mean score of 3.98 (High), suggesting that they have a positive experience with these differentiated practices.

Table 2. Teachers’ Extent of Utilization of Digi-Based Differentiated Instruction in the Process Dimension in a Linguistically Diverse Environment (n=200)

Indicators	Students		Teachers	
	\bar{x}	EoU	\bar{x}	EoU
1. My teacher used different digital teaching methods (e.g., viewing of online videos, modeling, scaffolding) to help me understand better.	4.00	H	3.80	H
2. My teacher provided step-by-step guides online to help me with difficult tasks or topics.	3.96	H	3.30	M
3. My teacher managed classroom activities using digital tools (e.g., online schedule, class announcements).	3.96	H	3.30	M
4. My teacher used visuals, translations, or prompts to support students who struggled with lessons.	3.91	H	4.40	VH
5. My teacher set up the classroom and digital equipment (e.g., projector, computer, internet) so lessons were clear and accessible.	3.88	H	4.20	H
6. My teacher used online discussions, quizzes, and other apps to keep me engaged in my English class.	3.70	H	3.50	H
7. My teacher connected lessons to my experiences, culture, and language background using digital content.	3.66	H	4.60	VH
8. My teacher allowed me to work in digital groups or in pairs based on my needs.	3.64	H	3.60	H
9. My teacher allowed me to ask questions and get answers using digital	3.53	H	3.10	M

platforms.				
10. My teacher allowed me to use both English and my home language (e.g., Cebuano) when discussing or completing digital tasks.	3.52	H	3.60	H
Composite	3.77	H	3.74	H
Standard Deviation	1.05		0.98	

Note: Extent of Utilization (EoU); 4.21–5.00, Very High (VH); 3.41–4.20, High (H); 2.61–3.40, Moderate; 1.81–2.60, Low (L); 1.00–1.80, Very Low (VL)

Table 2 shows the extent of utilization of DBDI in the *process dimension* within linguistically diverse classrooms, as perceived by both teachers and their students. The composite mean scores illustrate alignment: students rated utilization as High (mean = 3.77), and teachers also rated it as High (mean = 3.74). Both groups gave a high rating overall.

Table 3. Teachers’ Extent of Utilization of Digi-Based Differentiated Instruction in the Product Dimension in a Linguistically Diverse Environment (n=200)

Indicators	Students		Teachers	
	\bar{x}	EoU	\bar{x}	EoU
1. My teacher valued projects where I could connect English learning with my traditions, experiences, or local practices.	3.87	H	4.60	VH
2. My teacher gave me opportunities to work with classmates through digital platforms to show learning in English.	3.84	H	3.90	H
3. My teacher gave me feedback on my digital work so I can improve my English performance.	3.84	H	4.60	VH
4. My teacher asked me to create projects (e.g., blogs, e-portfolios, videos) using digital platforms.	3.71	H	3.90	H
5. My teacher encouraged me to create projects that reflect my culture and language background, using digital tools to show my learning in English.	3.65	H	4.00	H
6. My teacher asked me to record or present oral tasks (e.g., speech, storytelling) using digital tools.	3.57	H	4.10	H
7. My teacher encouraged me to use translation tools or multilingual resources when creating outputs.	3.46	H	3.60	H
8. My teacher encouraged me to share my ideas through digital discussion boards, chats, or forums to demonstrate my learning in English.	3.41	H	4.40	VH
9. My teacher required me to submit assignments through digital platforms (e.g., google classroom, email)	3.36	H	4.20	H
10. My teacher allowed me to take online quizzes or tests to show my learning progress in English.	3.24	H	4.20	H
Composite	3.59	H	4.15	H
Standard Deviation	1.09		1.00	

Note: Extent of Utilization (EoU); 4.21–5.00, Very High (VH); 3.41–4.20, High (H); 2.61–3.40, Moder-

ate; 1.81–2.60, Low (L); 1.00–1.80, Very Low (VL)

Table 3 illustrates the extent of utilization of DBDI in the *product dimension* as perceived by both teachers and students. Teachers gave a composite mean score of 4.15 (Very High), indicating that they consistently provide opportunities for students to demonstrate learning through digital outputs such as multimedia presentations, video reports, or collaborative tasks online. Students rated the utilization of these practices as high (mean = 3.59), confirming their presence in the classroom, although at a slightly lower level than teachers perceive.

Table 4. Students’ Academic Performance in English

Rating	Verbal Description	Frequency	Percent	Mean	SD
90% - 100%	Outstanding	78	39.00		
85% - 89%	Very Satisfactory	41	20.50		
80% - 84%	Satisfactory	44	22.00	85.77	6.50
75% - 79%	Fairly Satisfactory	27	13.50		
≤ 74%	Did Not Meet Exp.	10	5.00		
Total		200	100		

Table 4 shows the students’ academic performance during the 2nd quarter in their English class. The results reveal that students generally demonstrate a very satisfactory academic performance in English, with a mean score of 85.77 (SD = 6.50). It also indicates that 39% of the learners achieved an outstanding performance, while only 5% fall under the Did Not Meet Expectations category.

Table 5. Relationship between the Extent of Teachers’ Utilization of the Digi-Based DI and the Students’ Academic Performance in English (n=200)

Variables	r_s	p	Decision	Remark
Content and Aca. Performance	0.313	<.001	Reject H_{o1}	Significant
Process and Aca. Performance	0.182	0.010	Reject H_{o1}	Significant
Product and Aca. Performance	0.021	0.767	Fail to reject H_{o1}	Not significant
Overall and Aca. Performance	0.167	0.018	Reject H_{o1}	Significant

Spearman’s Rank-Order Correlation (r_s) at 0.05 Level of Significance

Table 5 presents the relationship between the extent of teachers’ utilization of DBDI and students’ academic performance in English. Overall, the results show a significant positive relationship between DBDI utilization and English academic performance ($r_s = 0.167$, $p = 0.018$), indicating that classrooms where DBDI is utilized to a greater extent tend to have students with higher academic performance.

Table 6. Relationship between the Demographic Profiles of Teachers and the Extent of Utilization of Digi-Based Differentiated Instruction (n=200)

Teachers’ Digi-Based DI and...	r_s	p	Decision	Remark
Highest Educ. Attainment	0.082	0.248	Fail to reject H_{o2}	Not significant
Number Of Trainings	0.049	0.496	Fail to reject H_{o2}	Not significant

Table 6 depicts the relationship between the demographic profiles of teachers and the extent of utilization of DBDI. The results reveal that teachers’ highest educational attainment and the number of

DBDI training courses attended do not significantly relate to the extent of DBDI utilization ($p > .05$). This finding signifies that the null hypothesis is not rejected.

DISCUSSIONS

Teachers' Extent of Utilization of Digi-Based Differentiated Instruction in the Content Dimension in a Linguistically Diverse Environment

The results in Table 1 indicate that the use of digital-based differentiated instruction in content dimension is evident in classroom practice, as reflected in the aligned perceptions of teachers and students. This finding is supported by Mustofa (2023), who reported that teachers integrate technology to differentiate lesson content, and students recognize its effectiveness in building knowledge. Similarly, Johler and Krumsvik (2022) posited that in technology-rich classrooms, teachers view digital tools as central to adapting instructional content, and students affirm their value in strengthening learning, aligning with the findings of this study.

The difference in standard deviation values—0.64 for teachers and 0.95 for students—indicates that teachers' self-ratings are more consistent compared to those of students, whose ratings show more variability. This suggests that teachers generally have a consensus regarding their use of DBDI, while students exhibit greater discrepancies in their experiences across different classrooms. This pattern is supported by Frolovičeva and Daniela (2025), whose statistical analyses revealed notable differences between teachers' perceptions and students' experiences in technology-enriched classrooms, reflecting the same pattern of consistency among teachers and variability among students observed in this study.

Based on the indicators, teachers rated nearly all items as “Very High,” with the exception of culturally connected materials (mean = 3.90) and vocabulary support tools (mean = 3.80), which they rated as “High.” In contrast, students rated all indicators as “High,” with the lowest scores also found in culturally connected materials (mean = 3.89) and vocabulary support tools (mean = 3.62). This suggests that both groups perceive these two areas as being less emphasized compared to others. This pattern indicates that additional planning may be necessary to better align digital content with students' linguistic and cultural needs.

As Eutsler and Pérez (2022) observed, teachers tend to emphasize efficiency in digital integration, leaving culturally relevant and vocabulary supports less consistently applied. Correspondingly, Blair et al. (2024) found that teachers struggle to anticipate multilingual learners' vocabulary needs, resulting in uneven scaffolding despite overall strong digital utilization. Similarly, Quirao et al. (2025) found that while teachers express confidence in their technology integration, students highlight unevenness in access, which explains the wider spread in student ratings.

Moreover, the largest gaps between teacher and student ratings are found in the use of online resources (teachers' mean = 4.80, students' mean = 3.99) and step-by-step digital presentations (teachers' mean = 4.70, students' mean = 4.09). In these areas, teachers rated their utilization as “Very High,” while students rated them only as “High.” These findings can be supported by the literature: Sim and Ismail (2023) reported that English teachers frequently utilize digital tools and online resources for content delivery, which corresponds with teachers' “Very High” self-rating in using step-by-step presentations and online materials.

Similarly, Moorhouse (2023) found that teachers continued to rely on digital presentations and instructional technology even after online learning, further validating the high teacher perception. Meanwhile, Panyasi et al. (2025) emphasized that although teachers believe they integrate the use of

online resources effectively, students sometimes perceive utilization differently, which explains the lower yet still “High” rating from students. Hence, this finding implies that digital resources are widely implemented by teachers, but students’ ratings reflect a more grounded experience inside the classroom. Overall, the findings confirm that DBDI in content delivery is well-implemented, particularly through the use of online resources and step-by-step digital presentations. Although both teachers and students perceive utilization positively, culturally connected materials and vocabulary support remain less emphasized. This indicates a strong digital foundation among Grade 9 English teachers in Dumaguete with opportunities to strengthen cultural relevance and vocabulary scaffolding.

Teachers’ Extent of Utilization of Digi-Based Differentiated Instruction in the Process Dimension in a Linguistically Diverse Environment

The findings in Table 2 suggest that that digital strategies like online videos, group work, and language support are being used regularly, though not at the highest level. Similarly, Alshareef et al. (2022) noted that technology is used to differentiate instruction in various ways for instructional purposes, but challenges in application still exist, leading to variation in utilization levels among teachers. The standard deviation scores 0.98 for teachers and 1.05 for students suggest that students have more varied experiences with process differentiation. Some reported frequent and high use, while others experienced less exposure, whereas teachers showed more consistent self-ratings. This aligns with the findings of Kisworo and Oktaviani (2021) that although teachers generally perceive digital learning positively, students’ experiences are more mixed and varied across engagement and instructional interaction.

Looking at specific indicators, students gave the highest ratings to digital teaching methods (mean = 4.00) and step-by-step guides (mean = 3.96), while teachers rated these at 3.80 (High) and 3.30 (Moderate), suggesting that students value structured digital supports more than teachers do. This difference may reflect students’ reliance on clear, organized guidance to understand lessons, especially in digital learning environments. Empirical research supports this idea. For instance, Zuo et al. (2023) found that integrating scaffolding strategies in online learning significantly enhances students’ learning performance, indicating that structured instructional supports, such as step-by-step guides and organized digital materials, help students stay engaged and complete tasks more confidently. Students’ higher ratings, therefore, likely reflect their direct experience of how structured digital supports make learning tasks easier to follow and understand, even when teachers perceive their use as only moderate.

Other indicators, such as classroom management using digital tools (students mean = 3.96, High; teachers mean = 3.30, Moderate) and opportunities to ask questions via digital platforms (students mean = 3.53, High; teachers mean = 3.10, Moderate), reveal differences in perception. Teachers see these areas as needing improvement, while students still recognize them as supportive. The difference in ratings may be attributed to practical challenges teachers face in utilizing digital classroom management and facilitating online question opportunities. According to Salifu and Abonyi (2022) and Adsız and Dinçer (2025), large class sizes make it hard for teachers to monitor all students, and unstable internet can disrupt communication and delay responses to students’ questions. Correspondingly, Johler et al. (2022) found that teachers often report challenges in managing classroom activities with digital tools and facilitating interaction, even as students benefit from the engagement opportunities these platforms provide.

Overall, both teachers and students view DBDI in the process dimension positively. Teachers are confident in using digital strategies during the learning process, and students perceive these strategies as helpful for their learning.

Teachers' Extent of Utilization of Digi-Based Differentiated Instruction in the Product Dimension in a Linguistically Diverse Environment

The findings in Table 3 reflect that teachers actively provide opportunities for students to demonstrate learning through digital outputs, although students' experiences of these activities are slightly lower than teachers' perceptions. This difference may reflect factors found in prior research, such as device access, internet connectivity, and tight deadlines for completing digital outputs, which can influence students' experiences with digital activities (Enciso-Huamani et al., 2025). Similarly, Guan and Despi (2023) postulated that teachers use multimedia projects, collaborative platforms, and educational apps to enhance engagement and provide diverse avenues for students to showcase learning. However, they caution that such tools may also lead to distractions if not managed effectively.

Moreover, indicators with the highest teacher ratings include providing feedback on digital work (mean = 4.60) and encouraging idea-sharing through discussion boards and forums (mean = 4.40). Students also rated these practices positively (both means = 3.84), confirming their consistent presence in the classroom. This finding coincides with Vygotsky's (1978) sociocultural theory, which emphasizes that meaningful learning emerges through collaboration and shared dialogue, and is further supported by Hamadi et al. (2023), who found that structured digital feedback and innovative use of discussion boards significantly enhance student engagement and idea generation.

Students rated online quizzes and tests with an average score of 3.24, and digital submission activities received a mean score of 3.36, both falling within the high range. However, these scores are significantly lower than the teachers' ratings, which have a mean score of 4.20. This discrepancy suggests that students may perceive or interpret digital assessment activities differently from what teachers anticipate. Prior research shows that students face challenges with online assessments, such as unstable internet connections and unexpected logouts (Enciso-Huamani et al., 2025). Such studies provide context for understanding why differences in perception between students and teachers may occur.

A similar pattern was reported by Valdez and Maderal (2021), who found that students generally recognized online assessments as useful and motivating, yet their perceptions varied depending on factors such as ease of use, personal preference, technical considerations, and the way assessments are integrated into instruction. Their study emphasized that although students appreciate online assessment as a modern and convenient alternative to traditional tasks, issues related to functionality and technical demands can influence the level of acceptance (Valdez & Maderal, 2021). This supports the present result wherein students acknowledge digital quizzes and digital submissions positively, but to a relatively lower extent than teachers, likely due to differences in user experience and assessment interaction.

In addition, students rated culturally reflective outputs at a mean of 3.65, which is considered high but still lower than the teachers' rating of 4.00. Similarly, tasks that involve students recording or presenting oral work using digital tools, such as speeches and storytelling, received a high rating from students (mean = 3.57) but were rated even higher by teachers (mean = 4.10). These findings reinforce the argument made by Zhang and Chen (2023) that digital activities, such as storytelling, assist culturally diverse learners in expressing their cultural identities and enhancing their language proficiency. However, students also face challenges, including technical difficulties and language barriers. This supports the current results, indicating that while students value culturally reflective digital tasks, practical constraints can impact their level of engagement and perception.

Overall, the findings indicate that DBDI in the product dimension is strongly utilized. The slightly lower student ratings suggest not limited use, but possible classroom realities such as time constraints, technical challenges, and language demand that may influence how students experience digital outputs, even when teachers perceive utilization as very high.

Students' Academic Performance in English

The results in Table 4 reveal that students generally demonstrate a very satisfactory academic performance in English. This finding demonstrates that most students have developed strong foundational skills in English. Similarly, Othman (2025) asserted that technology-rich learning environments enhance performance, increase learner engagement, and provide interactive opportunities in the subject, explaining the high achievement levels observed in this study.

Relationship between the Extent of Teachers' Utilization of the Digi-Based Differentiated Instruction and the Students' Academic Performance in English

The results show a significant positive relationship between DBDI utilization and English academic performance, indicating that classrooms where DBDI is utilized to a greater extent tend to have students with higher academic performance.

For content differentiation ($r_s = 0.313$, $p < .001$), the findings suggest that when teachers adjust what students learn, learners are better able to access and comprehend instructional materials. This outcome aligns with Tomlinson's DI framework (2001), which emphasizes that modifying content is essential in addressing students' readiness levels, especially in heterogeneous and linguistically diverse classrooms. Prior studies support this connection, showing that adapting content through digital tools such as levelled texts, multimedia resources, and adaptive assessments can enhance learners' understanding and engagement (Estateyeh & DeCoito, 2024; Carhill-Poza et al., 2020).

Further evidence comes from Lei and Phongsatha (2023), who reported that integrating digital tools and fostering technology-rich classroom environments not only enhanced English performance but also supported higher-order thinking skills.

Meanwhile, the significant and positive relationship between process differentiation and English performance ($r_s = 0.182$, $p = .010$) is consistent with Vygotsky's Social Constructivist Theory (1978), which posits that learning is mediated through guided scaffolding, peer interactions, and meaningful tasks within the Zone of Proximal Development (ZPD). In this study, process differentiation is reflected in collaborative digital activities, such as peer feedback and scaffolded online exercises, which allow learners to co-construct knowledge while receiving timely guidance.

Philippine studies support the findings. Tenedero et al. (2022) observed that collaborative digital tasks enhanced comprehension and outputs, while Del Pilar and Santos (2024) demonstrated that scaffolded digital materials improved mastery and achievement in English 9. Resuello et al. (2025) confirmed that process differentiation strategies were significantly related to performance under the MATATAG curriculum, while international evidence from Carhill-Poza et al. (2020) further confirms that scaffolded peer interactions in multilingual classrooms improve academic achievement. Collectively, these studies affirm that process differentiation, especially when digitally mediated, is a significant determinant of English performance.

In contrast, product differentiation shows no significant relationship with students' English academic outcomes ($r_s = 0.021$, $p = 0.767$). This finding may be explained by a misalignment between the differentiated products students typically produce and the academic performance measures used, which are often standardized or written in nature. According to Chenyang (2023), although product

differentiation promotes creativity and engagement, these strengths may not directly improve performance on tests that focus on linguistic accuracy and content recall. This implies that even when teachers successfully use creative and engaging product-based tasks, students' test scores may not improve unless these tasks are closely aligned with what is assessed in exams.

Furthermore, contextual barriers, such as limited instructional time, heavy workload, and scarce materials, also restrict teachers' ability to design and assess differentiated products effectively, which may weaken their impact on measurable achievement (Woodfork, 2024; Suryati et al., 2023). Further supporting this result, Maming (2022) found that Senior High School English teachers frequently used product differentiation such as posters, role plays, and multimedia outputs, yet these did not consistently raise English exam scores because assessments remained standardized.

Nonetheless, product differentiation has demonstrated potential under optimal conditions. Peralta et al. (2025) found in their study that when teachers used clear rubrics to assess outputs, students' performance improved. Similarly, Pasubillo and Asio (2023) reported that product differentiation in digital classes enhanced both proficiency and engagement.

Relationship between the Demographic Profiles of Teachers and the Extent of Utilization of Digi-Based Differentiated Instruction

The results depicts that teachers' highest educational attainment and the number of DBDI training courses attended do not significantly relate to the extent of DBDI utilization. This may indicate that the extent of utilization of DBDI does not depend on teachers' highest educational attainment or the number of DBDI trainings attended. This further suggests that teachers, despite differences in background, are generally able to utilize DBDI at a level sufficient to support students' learning outcomes.

Several studies support the idea that teachers consistently use familiar digital tools even in the absence of extensive formal training. Abareta and Prudente (2025) found that Filipino science teachers most frequently used platforms such as PowerPoint, Messenger, and Google Classroom in both online and face-to-face settings, suggesting adaptability and sustained use of accessible tools despite connectivity challenges. Similarly, Moorhouse (2023) noted that language teachers often incorporate commonly used digital platforms for organizing instructional materials and communicating with students, making these tools part of their routine classroom practice.

Moreover, Huang et al. (2022) reported that many educators develop digital integration strategies primarily through their own experience and exploration rather than formal training, with ideas often originating from self-directed learning or collaboration with colleagues. Although prior studies have suggested that advanced academic preparation may enhance pedagogical decision-making by equipping teachers with a broader repertoire of instructional methods (Shareefa, 2023; Alshaikhi & Khasawneh, 2025), the present findings indicate that higher degree attainment or training exposure alone does not necessarily translate into higher levels of DBDI utilization in practice.

Conclusions

DBDI is perceived by both teachers and students as being actively utilized in classroom practices that emphasize flexible learning outputs, structured digital management, and varied opportunities for student participation. These practices help create learning environments that enhance students' academic performance in English. The use of these practices seems to be consistent among teachers, regardless of their educational background or training experience. This indicates that effective digital utilization occurs uniformly across different demographic factors.

A greater extent of DBDI utilization is associated with improved English academic performance, implying that deliberate and sustained application of digital differentiation can facilitate greater student engagement, comprehension, and mastery of content. The observed variability in student experiences, however, reflects differences in how learners engage with and perceive DBDI. These findings stress the importance of providing continued support for instructional planning, practical strategies, and resource accessibility to ensure that all students benefit equitably from DBDI in linguistically diverse classrooms.

Recommendations

In light of the results and conclusions obtained, the following recommendations are hereby advanced:

Students:

1. Develop digital literacy by actively using tools like online collaboration platforms, multimedia presentations, and educational apps to participate more effectively in digital tasks.
2. Communicate difficulties in digital tasks to teachers, for example through emails, chat boards, or class discussions, to support instructional adjustments and continuous learning.

School Administrators:

3. Monitor classroom digital practices by encouraging reflection and self-assessment to maintain consistent utilization across teachers
4. Develop assessment-aligned rubrics for digital products so that teachers can evaluate creative outputs based on measurable English learning outcomes. For example, a rubric for a digital poster can assess vocabulary, grammar, content relevance, and creativity, ensuring that digital tasks contribute meaningfully to student performance.

Teachers:

5. Incorporate culturally relevant and vocabulary-supportive digital materials consistently to reduce variation in student learning experiences.
6. Provide multiple opportunities for students to submit digital outputs, ask questions, and receive timely feedback.
7. Explore innovative approaches to product differentiation to further engage students and optimize academic performance.

Future researchers:

8. Conduct qualitative studies, such as interviews or focus groups, to capture students' detailed experiences with digital content, process, and product differentiation.

Compliance with Ethical Standards

Ethical protocols were carefully observed throughout the study to ensure the safety and dignity of the participants. Prior to data gathering, approval was secured from the Foundation University Graduate School Dean, the Schools Division Superintendent of Dumaguete City, and the respective authorities of the participating schools. Informed consent was also secured from both students and teachers. It clearly explained the study's purpose, procedures, and the respondents' right to withdraw at any point without penalty. Participation was, therefore, completely voluntary and free from coercion.

Moreover, confidentiality and anonymity of participants were rigorously maintained in this study. Personal data were securely stored and used solely for research purposes. All results were presented in aggregate form to ensure that no individual participant could be identified. All data will be properly disposed of after the required retention period. Throughout the research process, cultural and social sensitivity were upheld, ensuring that the diverse backgrounds of participants were respected.

In preparing the manuscript and conducting the literature review, the researchers analyzed and synthesized scholarly articles, empirical studies, and educational resources to ensure accuracy, relevance, and academic depth. AI-powered language tools such as QuillBot and GPT-based platforms were also utilized, but only to improve clarity, coherence, and academic tone. These tools were not used to generate original research content. All AI-assisted outputs were thoroughly reviewed, fact-checked, and edited by the researcher, who maintains full authorship and responsibility for the final manuscript. A formal declaration of AI tool usage is included to ensure transparency and uphold academic integrity.

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