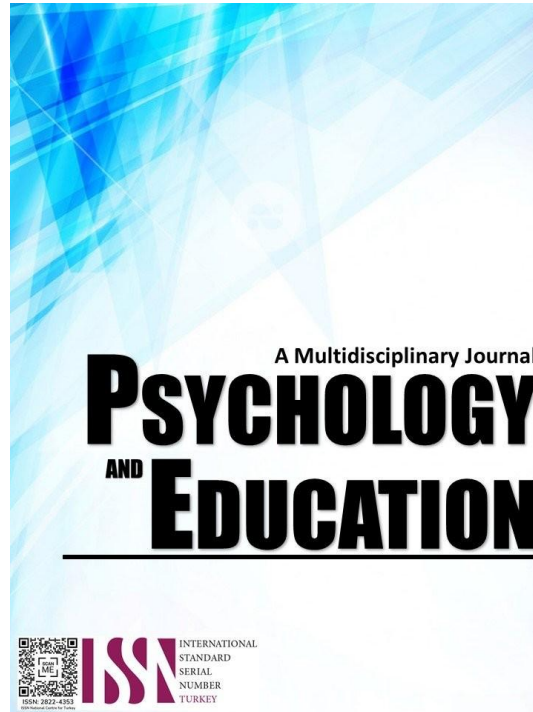


**EXPLORING UNIVERSAL DESIGN FOR LEARNING IN AN INCLUSIVE
EDUCATIONAL LANDSCAPE: A MULTIPLE LINEAR
REGRESSION ANALYSIS**



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Exploring Universal Design for Learning in an Inclusive Educational Landscape: A Multiple Linear Regression Analysis

Ruth Llorando Pepito-Orilla*

For affiliations and correspondence, see the last page.

Abstract

Low learning competence of students in an inclusive classroom is a problem in the field of education. This research aimed to determine the significance of the combined degree of influence of multiple means of representation, engagement, action, and expression on learning competence. Employing Multiple Linear Regression Analysis involving 300 samples selected via a non-probability sampling technique, the researcher found that the predictor variables had a 37% significant combined degree of influence on the criterion variable. However, of the three predictors, only one was found to have a significant impact. Hence, the UDL theory was partially affirmed. Consequently, prioritizing programs that capacitate teachers and parents to enhance UDL implementation and curriculum integration, while advocating for further exploration of UDL theory through studies with diverse learners and qualitative research methods, is recommended.

Keywords: *universal design for learning, multiple linear regression analysis, learning competence*

Introduction

Educators worldwide face significant challenges in inclusive education (Pappas et al., 2018). Teachers are tasked with providing individualized instruction within resource constraints, fostering a harmonious classroom atmosphere, managing learner behavior, and ensuring inclusivity (Al Jaffal, 2022). With the desire to tackle this issue, the struggle with teaching proficiency in inclusive education remains (Ainscow, 2024).

Explicitly, in Europe, the USA, China, and Japan, general education teachers encounter difficulties in adopting inclusive education, such as addressing individual requirements, resource constraints, insufficient training, and the significance of attitude and teamwork (Singh et al., 2023; Johnson et al., 2023; Nah & Neo, 2023; Ainscow & Messiou, 2018). Likewise, public junior high school educators in the Philippines face comparable challenges, reflecting the global struggles of educators and intensifying the complexities of establishing inclusive learning settings (Ali et al., 2021).

To address this need, Violan (2018) identified a requirement for more essential skills and knowledge among public school teachers in Davao City in educating learners with special needs. Specifically, general education teachers in the same secondary school cluster face challenges and constraints in catering to individual learners in inclusive classrooms. Madrazo (2020) emphasized that the failure to train teachers adequately for inclusive education could have severe repercussions, leading to academic setbacks, exclusion, and negative attitudes toward learning for learners with diverse needs. Magno (2019) has emphasized that despite a variety of interventions, inclusive education hampers instructional effectiveness in the education system, thus making inclusive education an immediate imperative. In this urgency, there are also insufficient research findings published on this issue, either in terms of quantity or quality. This study examines the objectives for which it was done.

Research Objectives

The increasing spread of inclusive education has led to a growing need to understand the underlying factors that affect learners' motivation and involvement in diverse learning environments. Nevertheless, as much as inclusive education aims at providing equal opportunities for all students, it is necessary to comprehensively identify the individual determinants that determine learning motivation among them. The present research sought to bridge this gap by delving into what motivates learning within an inclusive educational environment. Specifically, it aimed:

1. To determine the level of Multiple Means of Representation by public Junior High School general education teachers in an inclusive setting in terms of:
 - 1.1. accessible course materials;
 - 1.2. multi-modal sources of information; and
 - 1.3. pedagogical approaches.
2. To determine the level of Multiple Means of Engagement by public Junior High School general education teachers in an inclusive setting in terms of:
 - 2.1. variety in teaching and learning activities;
 - 2.2. use of technology; and
 - 2.3. interaction with others.
3. To determine the level of Multiple Means of Action and Expression by public Junior High School general education teachers in an inclusive setting in terms of:

- 3.1. student choice;
- 3.2. assignments and demonstration of skills;
- 3.3. formulation and conduct of exams; and
- 3.4. opportunities for interaction and feedback.
4. To determine the Level of Learning Competence of Learners as perceived by the teachers in an inclusive educational setting in terms of:
 - 4.1. learners' well-being and engagement; and
 - 4.2. learners' learning achievement.
5. To determine the significance of the correlations between multiple means of representation, engagement, and action and expression and the learning competence of learners as perceived by the teachers in an inclusive educational setting.
6. To determine the significance of the combined degree of influence of multiple means of representation, engagement, and action and expression on the learning competence of learners as perceived by the teachers in an inclusive educational setting.

Literature Review

Universal Design for Learning (UDL)

Canter et al. (2017) informed us that UDL got its roots from the architecture philosophy of Universal Design (UD). UD is an approach that focuses on creating equal means of access; it designs environments and products that are usable by everyone; such as a ramp entrance to a building. They confirmed that UD ensures accessibility and functionality for everyone in the physical realm. UDL similarly assists all learners in navigating the learning process, regardless of their circumstances. Unlike the traditional instructional model that focuses on the "typical" student, UDL addresses all students. To add on, it also accepts that each student learns and thinks differently and has different interests, preferences, abilities, and needs (Rose & Meyer, 2014).

Likewise, King-Sears (2014) described UDL as a proactive teaching framework. The learners' characteristics design the content and lesson, rather than the teacher designing them based on their own preferences. The teacher only then accommodates students with different learning needs. Markou and Diaz-Noguera (2022) specified that, particularly, UDL as a scholarly framework provides flexibility in how teachers present the educational information, how students respond or demonstrate their knowledge and skills, and how they engage in the learning process. Furthermore, they added that UDL reduces barriers in instruction, provides appropriate supports, facilities, and challenges, and supports the achievement of high expectations for all students, including those with disabilities or special education needs.

Significantly, UDL, as a framework for educational planning, motivates teachers to create instructional approaches and learning settings that consider the diverse needs of every student. To boot, teachers take proactive steps to eliminate learning obstacles rather than designing instruction based on an average student and then responding to obstacles that emerge post-instruction. Nonetheless, incorporating UDL into the instructional planning phase does not imply that teachers should create individualized lessons for each student based on their preferences. Instead, they should consider predictable learner variability and build flexible pathways to provide multiple means of accessing and processing information and assessing learning (Thomas et al., 2023).

The application of UDL principles in classroom planning can address the needs of all learners, from those with learning difficulties and disabilities (Hall et al., 2015) to those from different cultural backgrounds (Abacioglu et al., 2023). Notwithstanding, UDL does not intend to meet the needs of every student in the classroom, but rather designs the curriculum to be accessible for the majority of students (Glass et al., 2013). In a classroom that utilizes the UDL framework, teachers should guide instruction, but students are ultimately in charge of their own learning (CAST, 2018).

Markou and Diaz-Noguera (2022) stressed that universal design includes educational tools and services that are (a) directly accessible to students with disabilities or special education needs (without requiring assistive technologies) and (b) compatible with their interoperability with assistive technologies. They emphasized that UDL is an effective framework for meeting the needs of a diverse student population. They added that their study of teachers using this philosophy showed positive results for both students and teachers. The teachers who participated in the research confirmed the above assumption.

To delve deeper, CAST (2018) has developed widely accepted principles for UDL. These principles include (1) multiple means of representation, (2) multiple means of engagement, and (3) multiple means of action and expression. The Universal Design for Learning Guidelines, version 2.2, describe the developmental purpose and the elements that each principle of UDL incorporates. Designing based on UDL principles ensures educators consider a diverse range of student needs. They strategically create curricula and educational experiences that accommodate various learning styles. Definitely, the principles of UDL are aimed at engaging particular brain networks as identified by neuroscience. These networks are the strategic network (perception and gathering of information), the recognition network (planning and performance), and the affective network (motivation and engagement to learn) (CAST, 2018).

Provision of Multiple Means of Representation

This refers to the "what" of learning. Students perceive and understand information in different ways. Students with vision or hearing impairments, intellectual or learning disabilities, or cultural differences, for instance, may require different ways to access content.

Multiple ways of presenting the information also enhance transfer of learning (CAST, 2018). Alternatives should be made available for both language and mathematical representation. This might entail offering information in diverse formats about items to bring to school, options for activities during free periods, and timely reminders regarding processes relevant to new students. This may include using a variety of presenters (i.e., older students speaking to younger students), providing visual cues within text, and utilizing multi-modal formats for both written and spoken content, such as the use of video (Chambers & Coffey, 2019).

Provision of Multiple Means of Engagement

This refers to the "why" of learning. This principle reflects the affective neural network. Navarro et al. (2016) acknowledged that the principle of engagement suggests that students will attend to information relevant to them and have a choice or autonomy in their engagement. When teachers establish a secure learning environment that reduces emotional barriers, students will feel comfortable and be mentally and emotionally ready to engage in the learning process. This network focuses on the learners' internal state and the regulation of the environment, motivation, prioritization, and other behaviors related to engagement (Meyer et al., 2014). Engagement and motivation to learn can vary greatly between individuals. Influences on engagement and motivation include neurology, culture, personal relevance, subjectivity, and background knowledge (CAST, 2018).

Provision of Multiple Means of Action and Expression

This refers to the "how" of learning. Learners have different preferences and strengths; if teachers allow students to interact with the content in various ways, then they are more likely to engage with the material (Johnson-Harris & Mundschenk, 2014). Learners use their strategic network to organize thoughts and actions to engage in the environment (Meyer et al., 2014). This network, connected to the principle of action and expression, enables learners to maximize their strengths and talents (Navarro et al., 2016). Thus, providing many options for action and expression is essential (CAST, 2018).

An example Johnson-Harris and Mundschenk (2014) gave was the reading of a novel in literature class. While some students may use computers to read digital copies or audio copies, some may read hard copies silently at their desks, and some may read in the hallway together. Williams (2020) pointed out that action and expression allow students to demonstrate their knowledge in ways that make sense to them. There should be a selection of alternatives, not just in the presentation of learning, but also in the methods of processing it.

Learning Competence

Learning competence in an inclusive educational setting is vital for both academic success and overall student well-being. Inclusion in education means providing equal opportunities for students with diverse abilities, backgrounds, and learning needs to learn together. It fosters a sense of value, respect, and support for every student. In an inclusive setting, learning extends beyond academics to encompass holistic development, including social and emotional growth (Priyadharsini & Mary, 2024).

Methodology

Research Design

This study utilized multiple linear regression analysis (MLRA) to enhance understanding of the factors influencing learners' learning competence. Multiple Linear Regression (MLR) determines the mathematical relationship among several random variables. In simpler terms, MLR examines the relationship between multiple predictor variables and a single dependent variable. Once each of the explanatory factors has been determined to predict the response variable, the information on the various variables can be used to create an accurate prediction of the level of effect they have on the response or dependent variable (Hayes, 2023). Furthermore, MLRA probes deeper into the relationship between an outcome or response variable and multiple predictor variables, controlling for other relevant factors. This technique identifies significant contributors to learners' learning competence as perceived by the teachers, such as variety in teaching and learning activities and pedagogical approaches.

Respondents

The researcher employed convenience sampling to identify the respondents for this study. Convenience sampling, also known as availability sampling, is a practical and efficient method that is most often used in exploratory studies for non-probability sampling. Rather than having a representative sample group, they use participants who can be easily accessed and are ready. This way can be useful for initial insights and developing hypotheses (Etikan et al., 2016). Within the researcher's working cluster of secondary schools, convenience sampling consisted of 300 respondents, which saved a lot of time and resources. Indeed, focusing on schools within this cluster facilitated data collection, leading to a more targeted and efficient research approach. Specifically, the researcher selected respondents based on the study's criteria: individuals employed as public junior high school (JHS) general education teachers in Davao City during the study period and willing to provide consent to participate. In the event, the researcher distributed and secured the survey forms to/from those first 300 willing respondents. Plainly, the researcher chose only the first 300 random respondents who completed the survey questionnaires as the official respondents. Additionally, the focus on schools in this cluster provided the researcher with easy access to data, resulting in a more targeted research approach that is quite efficient. Specifically, convenience sampling was well-suited because it eliminated bias and ensured the selection of appropriate respondents for scientific purposes. Furthermore, apart from

what has been stated above, the researcher agreed with Al-Harbi (2023), expressing his opinion about the appropriateness of a sample size selection equivalent to 300 as a good one for carrying out multi-linear regression analysis (MLRA). This was conducted after ensuring that statistically significant results would be obtained using this number of subjects, thereby providing an opportunity for a comprehensive study on the areas under investigation.

Instrument

To gather data for the three predictor variables – Multiple Means of Representation, Engagement, and Action and Expression, the researcher adapted the UDL Observation Measurement Tool (UDL-OMT) by Basham, Gardner, and Smith in 2020 (Basham et al., 2020). Likewise, she modified the UDL School Implementation and Certification Criteria Self-Assessment developed by the UDL Implementation and Research Network and CAST Professional Learning in 2021 (CAST, 2021). The researcher refined statements and clarified language to ensure a more comprehensive evaluation. The changes extended beyond the initial foundation, aiming for precision and alignment with current educational practices.

In assessing the provisions of UDL practices of the JHS general education teachers, the respondents assayed the 50-item questionnaire, which has ten indicators against the learning competence of learners. The respondents rated the same questionnaire following the gradation: 5 as strongly agree, 4 as agree, 3 as neutral, 2 as disagree, and 1 as strongly disagree.

The researcher used a custom-made questionnaire to gather data from the respondents on the learning competence of learners as perceived by the teachers in an inclusive educational setting. Equally, the respondents referred to the General Weighted Average for three quarters to determine their learners' learning achievement.

The respondents assessed a 15-item measure, which had the indicators of learners' well-being, engagement, and learning achievement. In evaluating these indicators, the respondents applied the following gradation: 5 as almost always observed, 4 as very often observed, 3 as often observed, 2 as sometimes observed, and 1 as almost never observed. For the analysis of the result, the researcher used the Likert Scale.

In brief, the research tool consisted of a total of 65 questions. Part I, Section 1, related to the first predictor variable, encompassed 15 questions. Section 2, concerning the second predictor variable, contained 15 questions. Section 3, about the third predictor variable, also took in 15 questions. Part II, Section 1, focused on the dependent variable: indicator 1 consisted of 10 questions, and indicator 2 included 5 questions.

Experts validated this questionnaire, and to establish its reliability, the researcher administered a pilot test, yielding an impressive overall Alpha Cronbach test result of 0.981 for the 65-item survey questionnaire.

Procedure

The researcher followed the specific steps in gathering the data for this study:

Requesting Permission to Conduct the Study. After a successful proposal defense, the researcher secured ethical clearance from the HCDC-REC. Once granted, the researcher sought endorsement from the Dean of the Graduate School to commence the study. Once endorsement was granted, the researcher sought permission from the Department of Education, Division of Davao City. Subsequently, the researcher presented the approval memo to the school heads of the selected cluster of public junior high schools in Davao City.

Administration and Retrieval of Questionnaires. Before sharing the survey instrument, the researcher provided the Informed Consent Forms to the respondents. They asked any research-related questions. When there were no questions and everything was clear, respondents entered their email addresses and GCash numbers and clicked 'Submit' in the Informed Consent Form, which signaled their consent to participate. Then, the researcher distributed the Google survey forms.

Once completed, the researcher collected the data by downloading the Google Forms and saving them into a secure drive. The researcher then transmitted the Internet subsidy of P50.00 through the respondents' GCash accounts. Afterward, she acknowledged all her respondents' valuable contributions by sending them "thank you" notes to their FB/Messenger accounts. Moreover, she acknowledged them in the manuscript's acknowledgment section.

Gathering and Tabulation of Data. After successfully administering and retrieving the survey questionnaires, the researcher collated and tabulated the data. Next, she availed the numerical prowess of two statisticians in using appropriate statistical tools to gather, interpret, and further analyze the necessary data.

Ethical Considerations

The researcher adhered to the ethical principles established by the Philippine Health Research Ethics Board (PHREB). These principles are outlined in accordance with the mandate of Republic Act No. 10532 (2013), also known as the Philippine National Health Research System Act of 2013. Section 12 of this Act specifies that PHREB, created under DOST Special Order No. 091 s. 2006, is responsible for ensuring compliance with universal principles for the protection of human participants in research, as stated in PHREB's Guidelines from 2017. Relatively, the Holy Cross of Davao College - Research Ethics Committee (HCDC-REC) religiously upholds and adheres to the universal principles stipulated by the PHREB.

Conjunctively, the researcher espoused her actions in compliance with the nine ethical considerations with the objectives of both PHREB and HCDC-REC. The researcher safeguarded and respected the rights and roles of the respondents, establishing a harmonious balance between them. The researcher observed the nine elements, namely: social value, informed consent, risks, benefits, and safety; privacy and confidentiality of information; justice; transparency; qualification of the researcher; adequacy of facilities; and community involvement during and after the research progression.

Social Value. The researcher asserted that the study holds significance and relevance for the local community and the nation as a whole. This perspective was grounded in the fact that the Department of Education (DepEd) actively advocates for and incentivizes educators to strategize schemes that forward the provisions of Universal Design for Learning (UDL) principles and practices. Moreover, the findings of this study will inform the Department to devise policies and direct allocation of resources in support of inclusive education initiatives aimed at addressing the inclusive educational challenges of teachers and students.

This study focused on examining the social value embedded in the provision of Universal Design for Learning (UDL) principles and practices by public Junior High School (JHS) general education teachers. The investigation aimed to highlight these strategies as inclusive approaches for supporting a diverse student population. The narrowed scope of the study emphasized the importance of understanding how UDL principles and practices contributed to inclusivity within the context of public JHS education. The research sought to substantiate the positive impact of these strategies on catering to the needs of a varied student demographic. In unity, its findings will gear up these inclusive teachers to plan and execute UDL principles and practices in response to the diverse and vital needs of learners in their inclusive classrooms.

Informed Consent. The researcher informed the respondents of the study's purpose, nature, objectives, goals, and procedures. She emphasized the importance of their voluntary participation and that threats, intimidation, or violence would not influence their participation. The researcher highlighted the respondents' option to participate based on their own free will by allowing them to tick the boxes of options, such as 'I agree to participate in this research' and 'I cannot participate in this study'. Furthermore, she notified the respondents of their freedom to disengage from the study at any stage and at any time, without incurring any penalties. In short, the researcher informed the respondents that no threats, intimidation, force, or coercion would be used against them and that they might withdraw from the study at any time. To be precise, their participation was voluntary and coercion-free.

The researcher disseminated and retrieved the consent forms online via Google Forms before completing the survey questionnaire and engaging in data collection. The respondents consented by ticking the box of consent and keying in their active email addresses, FB/Messenger accounts, and Gcash numbers in the provided space. To encapsulate, respondents expressed their acknowledgment and provided their completed informed consent through an online modality using Google Forms. They input their email addresses, FB/Messenger accounts, and Gcash numbers to indicate their agreement to participate. The use of this digital approach streamlined the process of obtaining and confirming participants' consent. The researcher used the retrieved online informed consent forms as her reference when giving the online survey forms. Once more, the researcher distributed the survey questionnaires online via Google Forms only to those who consented to their participation on time.

Risks, Benefits, and Safety. The researcher placed the highest priority on ensuring the well-being and safety of the research respondents. Conducting the research presented no risk of contracting diseases, as the researcher administered the survey questionnaires online using Google Forms. However, the online nature of the survey could pose economic risks, presenting potential challenges. Considering the respondents were professional teachers, this might affect their school-related duties and responsibilities to some degree. In response, the researcher informed respondents that they could conveniently complete the survey questionnaire at their preferred time. Additionally, an Internet subsidy of P50.00 was provided to the randomly selected 300 Junior High School (JHS) general education teachers who participated in the study. This incentive aimed to encourage and support their active involvement in the research.

Similarly, the researcher impartially outlined the study's advantages for the respondents before they completed the survey questionnaires. The respondents can utilize the study's discoveries to self-reflect on their understanding and application of UDL principles and strategies. This self-reflection can help the respondents assess how these aspects affect their teaching effectiveness in an inclusive environment, providing them with valuable insights from the study.

Furthermore, the study's outcomes, outputs, and recommendations will enable the Department to consider its teacher and parent capacitating or upskilling programs, take ownership, and respond suitably in their role as leaders of the agency and the educational community.

Privacy and Confidentiality of Information. The researcher prioritized the utmost confidentiality of the online information gathered from the respondents and ensured this confidentiality throughout the research. Because the respondents completed their answers in Google Forms, it was reassuring, as Google takes pride in safeguarding both the respondents' and the researcher's Google accounts from unauthorized access, alteration, disclosure, or destruction of information. Google also utilizes encryption and has implemented multiple security features, including checkups and two-step verification. Equally, the researcher is committed to using the data collected from the respondents solely for research purposes. In addition, the researcher strictly abided by the Data Privacy Act of 2022, specifically ensuring the protection of respondents' rights to all types of information—whether apparent, personal, or sensitive (Data Privacy Act, 2022).

Eventually, the researcher safeguarded the respondents' sensitive data, employing a strong password that consisted of symbols, uppercase and lowercase letters, and numbers. Likewise, she secured hard copy data in a sturdy filing cabinet with a key lock. She kept it in a restricted-access room in her house for added confidentiality and integrity. This security measure aimed to prevent unauthorized access from individuals outside the research team, not solely relying on Google. Subsequently, after the researcher receives her special order, she will permanently delete all the online information collected from the respondents—every submitted Google Form—to guarantee that the contents can never be recovered.

Additionally, the researcher will use secure deletion methods from operating systems or third-party software to erase files for good. She will then confirm the success of the deletion through thorough post-checks, ensuring the complete elimination of soft copy data and a secure erasure process. Similarly, the researcher will use a cross-cut shredder to dispose of information in hard copy documents thoroughly and irreversibly. This method ensures the complete and irreversible deletion of all collected data.

Justice. The researcher employed convenience sampling to select the cluster of secondary schools and the study's respondents. Rather than seeking a representative sample, the researcher engaged with easily accessible and willing participants. In the researcher's working cluster of secondary schools, convenience sampling involving 300 respondents saved time and resources. Focusing on schools within this cluster facilitated data collection, leading to a more targeted and efficient research approach.

Specifically, the researcher selected respondents based on the study's criteria: individuals employed as public junior high school (JHS) general education teachers in Davao City during the study period and willing to provide consent to participate. In the event, the researcher secured the survey forms of those first 300 willing respondents. Finally, the researcher chose only the first 300 random respondents who completed the survey questionnaires as the official respondents. During data collection, the researcher treated the respondents with dignity and respect.

In connection, the researcher provided her respondents with an Internet subsidy of P50.00 and acknowledged their valuable contribution to the study's success by expressing gratitude for their time and effort on their Facebook and Messenger accounts. Likewise, she saluted their generosity in the acknowledgment section of the research.

Transparency. The researcher observed transparency by being open and honest with everyone involved in the study and accommodating queries from the respondents. This open communication encouraged transparency, smoothed the researcher's conduct of the study, and ensured there was no conflict of interest during or after the research endeavor.

Congruently, the researcher will provide three hard copies of the paper to the HCDC Graduate School, one hard copy to the DepEd Davao City, and another hard copy to the Commission on Higher Education (CHED) XI. These copies will serve as valuable references for teachers, learners, administrators, and officials alike. The researcher willingly agrees to present her study at local, national, and international research conferences. Additionally, the researcher will proactively share the study findings in discussions and forums upon request.

Qualification of Researcher. The researcher holds a valid teaching license in Secondary Education, majored in English, and is pursuing a Master of Arts in Education, majoring in Special Education with a focus on Teaching Learners with Learning Disabilities. She is pursuing Thesis B, a rigorous graduate course mandating the successful culmination of her academic endeavors. In her quest to master quantitative research techniques, the researcher sought guidance from her adviser, the Dean of Graduate School, and some specialists to analyze and interpret essential quantitative data crucial for the study's conclusive insights.

Adequacy of Facilities. The study took place online, using appropriate facilities and materials. The researcher used computer equipment, Internet connections, and software applications to collect and analyze data. Also, devices such as laptops, tablets, and smartphones assisted the researcher in conducting the research efficiently. These tools and technologies ensured the efficient conduct of this study.

Community Involvement. The researcher investigated the respondents' awareness and skills in providing UDL practices: representation, engagement, and action and expression. This study examined the impact of these variables on learners' learning competence as perceived by teachers in an inclusive educational setting. The researcher motivated the respondents to answer the questionnaires honestly, empowering their voices through the valuable data she collected from them. Besides, the researcher affirmed respect towards the respondents and verified the impartiality of questions and choices in the survey questionnaire by having it validated by experts. Experts confirmed that the questionnaire design was unbiased and impartial.

Explicitly, all questions and steps the researcher took prioritized respect for gender, culture, and local traditions and warranted that this consideration spanned the entire data-gathering procedure. Apparently, the researcher guaranteed that the rights of her respondents were preserved with utmost thoughtfulness during and after the data-gathering process. Thus, the whole research progression circumvented discrimination based on respondents' gender, academic proficiency, beliefs, or culture.

Results and Discussion

This section delves into the findings of the study, analyzes them based on the data collected, and ensures that each result is substantiated with relevant literature. The deliberations in this part connect to the problem statement discussed in earlier sections of the study.

Summary of the Level of Multiple Means of Representation by Public Junior High School General Education Teachers in an Inclusive Setting

The first objective of this study was to determine the level of multiple means of representation by public junior high school general education teachers in an inclusive setting. Table 1 presents the answer to this objective. This section presents the findings according to the study's research questions.

Table 1. *Summary of the Level of Multiple Means of Representation by Public Junior High School General Education Teachers in an Inclusive Setting*

<i>Indicators</i>	<i>Mean</i>	<i>Descriptive Level</i>
Accessible course materials	4.15	High
Multi-modal sources of information	4.19	High
Pedagogical approaches	4.26	Very High
Overall	4.20	Very High

Table 1 reveals the level of multiple means of representation by public junior high school general education teachers in an inclusive setting. Means of representation include accessible course materials (4.15, high), multi-modal sources of information (4.19, high), pedagogical approaches (4.26, very high), and the overall mean 4.20, very high.

Eventually, the overall mean of 4.20 is "Very High," which indicates that, by and large, public junior high school general education teachers excel in providing multiple means of representation within their inclusive classrooms.

Explicitly, among the three indicators in the provision of multiple means of representation by public junior high school general education teachers in an inclusive setting, respondents perceived that the indicator "pedagogical approaches" has the highest mean score of 4.26, indicating a "Very High" level. This score suggests that public junior high school general education teachers practiced and observed inclusive pedagogical approaches throughout the study. The result further implies that these general education teachers excel in providing inclusive pedagogical approaches by customizing instruction based on their students' needs, interests, and backgrounds, employing flexible grouping strategies to allow their learners to work with different peers, evaluating and reflecting on their teaching methods, content, and assessments; and working with colleagues to share effective teaching methods.

This finding confirms how Al-Azawei et al. (2016) described Universal Design for Learning (UDL) as a proactive teaching framework. They emphasized that the learners' characteristics design the content and lessons rather than the teacher designing them based on their preferences. Along with this, Bruckner and Nunn (2023) found that effective teachers accommodate learners with diverse learning needs. They tailor instruction to meet individual needs, interests, and backgrounds. Flexible grouping strategies are employed to foster collaboration among learners. Teachers evaluate and reflect on their teaching methods, content, and assessments. Additionally, they collaborate with colleagues to share practical teaching approaches.

To continue, the indicator, multi-modal sources of information, obtains a mean score of 4.19, which is High. This result shows that public high school general education teachers are highly skillful in inserting interactive questions/quizzes into their video lessons, supplementing lecture and reading assignments with visual aids (e.g., photographs, videos, diagrams, interactive simulations), adding an audio file explaining a major topic or assignment in their class chatroom, uploading video recordings of their lectures for those who cannot attend classes in-person, presenting the essential information in multiple formats, and including text, graphics, audio, video, or physical movement.

The findings substantiate that supplementing lectures and reading assignments with photographic resources impacts learners' experience. In addition, they make content more captivating and memorable and bring the subject matter to life, allowing students to grasp complex concepts with ease. By using photos, teachers create a creative learning experience that impacts learners.

Using graphics improves understanding and makes learning more engaging and satisfying. They also reinforce important concepts, help learners better understand and relate to the topic, and simplify complex ideas and processes. This practical method enhances material understanding. By incorporating visual and interactive elements, teachers can significantly enhance the learning environment (Shabiralyani et al., 2015; Dalali et al., 2022).

However, accessible course materials mark the lowest at 4.15. This proposes that public junior high school teachers still excel in making learning resources accessible to all learners. They accomplish this by displaying course transcripts, offering diverse pursuits, giving out customized handouts, and exhibiting text on screen for deaf or learners with hearing difficulty.

This result validates the idea of Markou and Diaz-Noguera (2022) that, particularly, UDL, as a framework for educational planning, motivates teachers to create instructional approaches and learning settings that consider the diverse needs of every learner. To boot, teachers take proactive steps to eliminate learning obstacles rather than design instruction based on an average learner and then respond to barriers that emerge post-instruction (Stapleton-Corcoran, 2022).

Nonetheless, incorporating UDL into the instructional planning phase does not imply that teachers should create individualized lessons for each learner based on their preferences. Rather, they should consider predictable learner variability and build flexible pathways to

provide multiple means of accessing and processing information and assessing learning (Thomas et al., 2023).

Outstanding teachers use teaching styles that cater to diverse learning styles. They create engaging and productive learning environments for all students and contribute to a comprehensive and inclusive educational experience. Each approach is effective when applied in the appropriate context, benefiting a wide range of learners (Chambers & Coffey, 2019).

Summary of the Level of Multiple Means of Engagement by Public Junior High School General Education Teachers in an Inclusive Setting

The second objective of this study was to determine the level of multiple means of engagement by public junior high school general education teachers in an inclusive setting. Table 2 exhibits the answer to this objective.

Table 2. Summary of the Level of Multiple Means of Engagement by Public Junior High School General Education Teachers in an Inclusive Setting

<i>Indicators</i>	<i>Mean</i>	<i>Descriptive Level</i>
Variety in teaching and learning activities	4.43	Very High
Use of technology	4.14	High
Interaction with others	4.26	Very High
Overall	4.28	Very High

Table 2 presents the level of multiple means of engagement by public junior high school general education teachers in an inclusive setting. This means of engagement includes variety in teaching and learning activities (4.43, very high), use of technology (4.14, high), interaction with others (4.26, very high), and the overall mean, 4.28, very high.

The registered overall mean of 4.28 is "Very High," which designates that, typically, public junior high school general education teachers excel in providing multiple means of engagement within their inclusive classrooms.

In the pool of indicators in the provision of multiple means of engagement, respondents supposed that the indicator, variety in teaching and learning activities, has the highest mean score of 4.43, indicating a "Very High" level. This result suggests that public junior high school general education teachers consistently offered a variety of teaching and learning activities throughout the study. This point stresses that they excel in providing a variety of teaching and learning activities by linking classroom activities to real-world contexts, incorporating discussions and small group activities into their lecture classes, using different activities to boost and sustain their students' interest and engagement, inserting engagement materials in lecture notes, such as sample exam questions or puzzles, and creating a dynamic learning environment where their students actively participate, explore, and experiment.

The observed outcomes lend credence to the initial idea of Kampen (2023), who validated that good teaching involves using different activities to help learners learn. This strategy is not just about keeping things interesting, but it is also about engaging learners in different ways. We all know that every learner is unique and has their reasons for wanting to learn. So, offering a range of activities can help all learners get the most out of their education.

Pressing on, the indicator, interaction with others gains a mean of 4.26, remains at a considerable level, and implies that these general education teachers create a class climate in which student diversity is respected, involve their students in creating class rules to foster ownership and engagement, incorporate a variety of social learning opportunities, such as in-class and online discussions, problem-based learning, and inquiry-based learning; foster a sense of community and enhance their students' critical thinking and problem-solving skills; and get to know their learners' interests, preferences, and needs to customize their teaching approach and meet their individual needs.

The data proves the underlying premise of Dari (2023), who asserts that establishing a class climate that respects learner diversity is paramount for educators. This technique involves creating an inclusive environment where students from all backgrounds and identities are valued. Celebrating different cultures, experiences, and perspectives and incorporating these diverse elements into the curriculum ensures that all learners feel comfortable participating in class discussions.

In spite of scoring lowest at 4.14 in using technology, public general education teachers remain excellent in providing diverse engagement activities. They ensured the involvement of students through social media, facilitated collective undertakings and discussions on real-time platforms, and ensured the availability of educational materials in their inclusive classrooms. They made the most of AT tools to meet each learner's extraordinary needs, empowering them to use AT devices like spelling and grammar checks, dictation software, and text-to-speech features. This modified tactic not only supports learners in their education but also nurtures their independence and confidence in using technology to enhance their academic experience.

This finding backs the UDL concept by AbdElsamie (2023), emphasizing the value of online learning for engaging diverse learners. Teachers can utilize tools like discussion boards, chat rooms, and breakout rooms to encourage collaboration and resource sharing in small group tasks.

The data confirms Lin's (2018) belief that online quizzes and interactive tools serve as valuable assets for evaluating student comprehension and offering instant feedback. When these tools are used as "knowledge checks" rather than graded evaluations,



educators can concentrate on delivering prompt feedback to students. This form of feedback helps students pinpoint their strengths and areas needing improvement, enabling them to adapt their learning methods and enhance their grasp of the subject matter.

The noticed patterns resonate with and strengthen the suggested approach of UDL, emphasizing the three teaching techniques for captivating students: 1) sparking their interest, 2) supporting their progress, and 3) guiding them in managing their own learning. These strategies prove valuable in developing content that sustains students' motivation throughout a course (Posey, n.d.).

Summary of the Level of Multiple Means of Action and Expression by Public Junior High School General Education Teachers in an Inclusive Setting

In this study, the third goal aimed to assess the extent to which public junior high school general education teachers in an inclusive environment implement various ways of action and expression. The findings related to this objective are detailed in Table 3.

Table 3. *Summary of the Level of Multiple Means of Action and Expression by Public Junior High School General Education Teachers in an Inclusive Setting*

<i>Indicators</i>	<i>Mean</i>	<i>Descriptive Level</i>
Student choice	4.13	High
Assignments and demonstration of skills	4.31	Very High
Formulation and conduct of exams	4.16	High
Opportunities for interaction and feedback	4.32	Very High
Overall	4.23	Very High

Table 3 shows the level of multiple means of action and expression by public junior high school general education teachers in an inclusive setting. This means of action and expression comprises student choice (4.13, high), assignments and demonstration of skills (4.31, very high), formulation and conduct of exams (4.16, high), opportunities for interaction and feedback (4.32, very high), and an overall mean of 4.23, also very high.

The impressive average score of 4.23, signifying "Very High," illustrates that, in general, public junior high school general education teachers exhibit remarkable skill in providing a wide range of opportunities for action and expression in their inclusive classrooms.

This result reinforces the assertion put forth by Dzaman and their team (2022) that offering various avenues for action and expression allows learners to demonstrate their comprehension through diverse forms of communication. They added that by fostering active participation and offering meaningful opportunities for learners to connect with the material, engagement is further supported, and learners' learning competence is enhanced.

Amid the four indicators of the provision of multiple means of action and expression by public junior high school general education teachers in an inclusive setting, respondents indicated that the highest indicator, opportunities for interaction and feedback, has a mean of 4.32, indicating a "Very High" level. This result indicates that public junior high school general education teachers reliably excel in providing clear expectations and rubrics as standards for assignments, projects, and assessments, checking on learners to see how they are doing and offering them extra support, allowing learners to learn from each other, gain different perspectives, and enhance their skills and knowledge, enabling learners to enhance learning through active, critical, and collaborative experiences at their own pace, and motivating learners to take turns helping each other with assignments and problem-solving even outside of regular classroom settings.

The result demonstrates the soundness of the hypothesized idea of Haleem et al. (2022), which states that when teachers incorporate online discussion boards, podcasts, and blogs, they not only facilitate class communication but also promote participation. These platforms allow learners to engage in meaningful discussions at their own pace. Polling software encourages inclusive participation where every opinion is valued. Using textbook questions reinforces learning and prepares students for assessments. In-class peer feedback promotes critical thinking and communication skills, while rubrics enable self-assessment.

To advance, the second highest indicator, assignments and demonstration of skills, garners a mean of 4.31, which is Very High and infers that these general education teachers design multiple opportunities to engage learners in hands-on activities or simulations that mimic real-life situations, employ different methods for learners to demonstrate their skills, such as roleplay, debate, or discussions, use diverse assessment strategies like quizzes, case studies, model building, and oral presentations, provide learners with diverse platforms and activities to demonstrate and showcase their learning and abilities, and supply to-do-checklists for students to track their progress and manage their tasks.

The empirical evidence confirms the notion of Pappas (2023), which purports that employing diverse assessment strategies, like quizzes, case studies, presentations, and roleplay, is crucial to gauge students' understanding and allow them to showcase their knowledge. Presentations enhance communication skills, while debates and discussions foster critical thinking. Real-world opportunities, such as internships, cultivate transferable skills. By employing various assessment strategies, educators develop a comprehensive approach that promotes critical thinking, collaboration, and practical skill development, thereby preparing learners for success in their academic and professional endeavors.



In congruence, the third highest indicator, formulation and conduct of exams earns a mean of 4.16, which is High. Data results confirm that general education teachers are highly skillful in promoting higher-order thinking through holistic assessment by encouraging visual interpretation and analysis, incorporating a variety of question types (multiple choice, matching, short answer, fill in the blank, equations, even labeling a diagram) on exams, aligning them with Bloom's Taxonomy; creating a sensory-sensitive testing area for diverse learners with accommodations for text font size and style, lighting, space, ventilation, and sound; and formulating data-driven assessments to make informed instructional decisions and meet learners' specific needs.

This finding supports Main's (2021) conviction that by incorporating diverse question types and aligning them with Bloom's Taxonomy, teachers can create comprehensive exams that effectively assess learners' understanding and skills. Graphics can be included when appropriate to enhance the assessment process. This approach promotes critical thinking and knowledge application and provides a fair opportunity for learners to demonstrate their learning. Ultimately, it contributes to a more effective and meaningful assessment process that supports learner growth and achievement.

On the flip side, the lowest indicator, student choice, procures a mean of 4.13, persistently High, and depicts that these general education teachers are highly skillful in providing multiple means of action and expression by allowing learners to choose the learning format (in-person classes, online courses, blended learning, or self-paced modules) that best suits their learning style and circumstances, empowering them to choose assessment methods that align with their strengths and interests, and providing students with assignment format choices like research papers, presentations, websites, posters, videos, podcasts, and more.

Similarly, data results reveal that public junior high school general education teachers allow students to choose between two options: a specific due date for turning in their work or a specific topic for presenting in class or online, and inspiring them to propose and pursue their projects or research topics that align with their passions and interests.

These results validate the UDL theory, which emphasizes the importance of providing learners with options to demonstrate mastery of the course learning outcomes, as this allows them to showcase their understanding and skills in ways that align with their strengths and interests (Dzaman et al., 2022).

Summary of the Level of Learning Competence of Learners as Perceived by the Teachers in an Inclusive Educational Setting

In this study, the fourth goal was to assess how teachers perceive the level of learning competence among learners in an inclusive educational setting. The specific findings related to this goal are outlined in Table 4.

Table 4. *Summary of the Level of Learning Competence of Learners as Perceived by the Teachers in an Inclusive Educational Setting*

<i>Indicators</i>	<i>Mean</i>	<i>Descriptive Level</i>
Learners' well-being and engagement	4.29	Very High
Learners' learning achievement	4.28	Very High
Overall	4.28	Very High

In Table 4, teachers reveal their perceptions of learners' learning abilities, including learners' well-being and engagement (4.29, very high), and learners' learning achievement (4.28, very high). The total mean is 4.28, also very high.

The total mean, 4.28, "Very High," denotes the learning competence of learners as exceptional and observed by teachers. The information supports the crucial idea that having strong learning skills in an inclusive educational environment is essential for students to succeed academically and thrive overall. In inclusive settings, education extends beyond academics to promote overall growth, encompassing social and emotional development (Priyadharsini & Mary, 2024).

Evidently, between the two indicators in the learning competence of learners in an inclusive educational setting, respondents considered learners' well-being and engagement, which has a mean of 4.29, a "Very High" level, as exceptional, as evidenced by learners' learning outcomes. Based on data results, diverse learners in an inclusive setting enjoy their time in class and find it to be a source of fun and excitement; exude cheerfulness and bring positive energy to the classroom; have formed strong and meaningful friendships, demonstrating genuine care and concern for their friends; have a supportive network of individuals who genuinely care about their well-being and happiness; hold a confident belief that positive things are bound to happen to them; and believe that things will work out, despite any challenges they encounter.

Parallel to this, teachers also observed that diverse learners in an inclusive setting work diligently to achieve their goals, stay focused on their schoolwork until they finish it, get completely absorbed in what they are doing, and even lose track of how much time has passed when they are learning something new. This finding corroborates the core belief that when learners experience a sense of well-being, they feel secure, supported, and valued within the learning environment. This positive climate for learning fosters a deep understanding of belonging and emotional security, which in turn enhances learners' engagement and motivation to learn. Learners who feel connected to their teachers and peers are more likely to participate in classroom activities actively, feel comfortable asking questions, and take ownership of their learning journey (Dichoso, 2024).

In comparison, the lower indicator, learners' learning achievement, secures a mean of 4.28, incessantly Very High, and illustrates that



learners in an inclusive setting demonstrate their regular presence, sense of belonging, and engagement in the learning process; show mastery of subject matter, as indicated in the assessment results; exhibit exceptional social-emotional skills and well-being, contributing to their overall learning achievement; have benefited from the individualized support services for learners with special needs; and improve their academic performance, achieving required competencies with distinction.

The evidence supports the fundamental principle that learning achievement is a decisive measure of the progress learners make in their learning journey, serving as a reflection of their academic attainment and growth over time. While the primary purposes of assessing learning achievement are to guide and inform the learning process, it also has value in evaluative contexts where the focus is on evaluating the impact of teaching (Assessment: evaluating learners' progress and achievements, LinkedIn, 2021).

Significance of the Correlations between Multiple Means of Representation, Engagement, and Action and Expression by Public Junior High School General Education Teachers and the Learning Competence of Learners as Perceived by the Teachers in an Inclusive Educational Setting

The fifth objective of this study was to determine the significance of the correlations between multiple means of representation, engagement, action, and expression by public junior high school general education teachers and the learning competence of learners. Table 5 confirms the answer to this objective.

Table 5. Significance of the Correlations between Multiple Means of Representation, Engagement, Action and Expression by Public Junior High School General Education Teachers and the Learning Competence of Learners as Perceived by the Teachers in an Inclusive Educational Setting

	<i>Learning Competence of Learners in an Inclusive Educational Setting</i>			
	<i>r</i>	<i>p-value</i>	<i>Decision on Ho @ 0.05 level of significance</i>	<i>Interpretation</i>
Multiple Means of Representation	0.424	0.000	Reject Ho	Significant
Engagement	0.384	0.000	Reject Ho	Significant
Action and Expression	0.601	0.000	Reject Ho	Significant

Table 5 reflects the significant correlations between the multiple means of representation, multiple means of engagement, multiple means of action and expression, and the learning competence of learners as perceived by the teachers in an inclusive educational setting. It also demonstrates the correlation between the two in the results. With an overall p-value of 0.000, the association is significant at a 0.05 level. Therefore, rejecting the null hypothesis is the decision.

The finding shows that there is a significant moderate correlation between Multiple Means of Representation and the Learning Competence of Learners in an inclusive educational setting, with a correlation coefficient of $r = 0.424$. A weak correlation was found between Multiple Means of Engagement and the Learning Competence of Learners in an inclusive educational setting, with a correlation coefficient of $r = 0.384$. A strong correlation was observed between Multiple Means of Action and Expression and the Learning Competence of Learners in an inclusive educational setting, with a correlation coefficient of $r = 0.601$.

Thus, the overall results provide strong support for rejecting the null hypothesis. It further explains that changes in the independent variables are accompanied by reasonable development and improvement in the dependent variable.

Apparently, data results show significant correlations between the multiple means of representation, multiple means of engagement, multiple means of action, and expression, as well as the learning competence of learners in an inclusive educational setting. This significance suggests that the provisions of Universal Design for Learning (UDL) practices are interconnected and influence the learning outcomes in such a setting. The existence of these correlations in the results indicates that these factors play a role in the learning process.

Moreover, the overall p-value of 0.000 proposes that the association between these variables is statistically significant at a 0.05 level of significance. This significance provides strong evidence for rejecting the null hypothesis, indicating that there is indeed a significant relationship between the variables under investigation.

Furthermore, the correlation coefficients further shed light on the strength and direction of these relationships. The significant moderate correlation ($r = 0.424$) between Multiple Means of Representation and the Learning Competence of Learners advocates that as the use of different representation methods increases, there is a corresponding moderate improvement in the learning competence of learners in an inclusive educational setting.

Similarly, the weak correlation ($r = 0.384$) between varied ways of engagement and learners' learning competence indicates a smaller but still noteworthy relationship between these factors. The strong association ($r = 0.601$) between various modes of action and expression and learning capacity demonstrates their relevance.

These relevant findings provide key viewpoints into how the availability of various modes of action and expression correlates with students' perceived learning abilities. The notable results imply that using a variety of methods to present information, engage students, and enable diverse forms of expression can improve academic success (Evmenova, 2018).



Regression Analysis on the Significance of the Combined Degree of Influence of Multiple Means of Representation, Engagement, and Action and Expression on the Learning Competence of Learners as Perceived by the Teachers in an Inclusive Educational Setting

The sixth objective of this study was to determine the combined impact of providing UDL practices on learners' learning competence. Table 6 presents the findings related to this objective.

Table 6. *Regression Analysis on the Significance of the Combined Degree of Influence of Multiple Means of Representation, Engagement, and Action and Expression on the Learning Competence of Learners as Perceived by the Teachers in an Inclusive Educational Setting.*

Independent Variables	Learning Competence of Learners in an Inclusive Educational Setting						
	Unstandardized Coefficients			Standardized Coefficients			
	B	Std. Error	Beta	t	Sig.	Decision on Ho	Interpretation
Constant	1.600	0.224		7.127	0.000		
Multiple Means of Representation	0.124	0.064	0.136	1.936	0.054	Failed Reject Ho	Not Significant
Engagement	-0.130	0.076	-0.128	-1.717	0.087	Failed Reject Ho	Not Significant
Action and Expression	0.643	0.070	0.602	9.180	0.000	Reject Ho	Significant

R = 0.609; R2 = 0.370; F-value = 58.024; p-value = 0.000

Table 6 presents the regression analysis that specifies that only the predictor variable "Action and Expression" in the analysis table shows a significant influence on the dependent variable "Learning Competence of Learners as Perceived by the Teachers in an Inclusive Educational Setting." The standardized coefficient beta of 0.602 with a p-value of 0.000 indicates a significant influence of the predictor variable on the dependent variable.

Contrariwise, the Multiple Means of Representation and Engagement, with beta values of 0.136 and -0.128, respectively, and p-values of 0.054 and 0.087, do not show a significant influence on the dependent variable, the Learning Competence of Learners in an Inclusive Educational Setting. This result advises that the decision is to fail to reject the null hypothesis, indicating that these predictor variables do not have a statistically significant impact on the dependent variable.

The noted results are deemed primarily non-significant due to the fact that the p-values for the Engagement and Representation variables (0.054 and 0.087) exceed the standard significance level of 0.05. According to Andrade (2019), the data suggest that the observed effects of these predictor variables on learners' learning competence are likely the result of random variation and are not statistically significant. This is because there is not enough statistical evidence to reject the null hypothesis.

To recapitulate, Table 6 shows an R-value ($R^2 = 0.370$) of 37%, meaning that the combined influence of different modes of representation, engagement, and action and expression can explain 37% of the overall variability in the learning competency variable. This standpoint suggests that changes in these predictor factors collectively account for approximately 37% of the variance in learning competency. Additionally, the associated P-value (p-value = 0.000), which is less than the 0.05 significance threshold, underscores the statistical importance of the impact.

The results of this study emphasize that determinants other than numerous forms of representation and involvement may affect the learning ability of learners in inclusive environments (Mebert et al., 2020). Likewise, these results accentuate the necessity for more investigations to pinpoint the critical factors influencing learning outcomes in these complex learning contexts.

Explicitly, regression analysis reveals a complex link between the factors and the dependent variable when it produces inconsistent findings, with some predictor variables showing statistical significance and others not (Frost, 2018). The study offers some support for the Universal Design for Learning (UDL) hypothesis, even if it does not fully validate it. To gain a deeper understanding of how different factors impact successful learning in inclusive educational settings, the researcher encourages other academics to delve deeper into these complexities.

Eventually, the regression analysis remains significant, with an F-value of 58.024 and a p-value of 0.000. These values are commonly used to determine the significance of regression analyses, where a low p-value indicates statistical significance (Almeqdad et al., 2023; Mahbobi & Tiemann, 2015).

Conclusions

Based on the findings, it can be concluded that the multiple means of representation, engagement, and action and expression, when considered as predictors, collectively have a significant influence of 37% on learning competence, which serves as the criterion variable. The other 63% influence may be attributed to other variables not examined in this study. However, since the first two predictors were found to have no significant degree of influence on the criterion variable, the theory of Universal Design of Learning (UDL) was partially affirmed, stating that multiple means of representation, engagement, and assessment enhance learning.

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Affiliations and Corresponding Information

Ruth Llorando Pepito-Orilla, MAED-SPED

Davao City National High School

Department of Education – Philippines