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ASSESSING THE RELATIONSHIP OF TEACHERS' CONTENT KNOWLEDGE TO CUSTOMIZE LEARNING MATERIALS FOR DIVERSE LEARNERS' NEEDS: A CONVERGENT APPROACH

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ABSTRACT

The primary objective of this study was to examine the relationship between teachers' content knowledge and their ability to customize learning materials for diverse learner needs in secondary public schools in Panabo City, utilizing a parallel convergent mixed-method research design. The study involved 294 public secondary school teachers selected through simple random sampling. Quantitative data were collected using modified survey questionnaires, while qualitative insights were gathered through semi-structured interviews. Results indicate that teachers' content knowledge is generally extensive, with integration of concepts across the curriculum being the most evident, while application to real-world situations is the least evident. Teachers' ability to customize learning materials is also rated as extensive, particularly in incorporating student feedback, while personalization of learning activities is the least evident. A strong positive relationship was found between teachers' content knowledge and their ability to customize learning materials, suggesting that teachers with strong content mastery are better at adapting instruction. Qualitative findings confirm these results, highlighting teachers' focus on factual accuracy, practical examples, and differentiated instruction. The study emphasizes the need for professional development programs focused on enhancing real-world application and personalized learning.

KEYWORDS- *Content Knowledge; Instructional Customization; Secondary Teachers; Mixed-Method Research; Panabo City Division*

INTRODUCTION

In the Secondary School District of Panabo City, the capability of teachers to effectively customize learning materials to the diverse needs of students is pivotal for fostering an inclusive and effective educational environment. This study aims to explore this crucial aspect by examining the link between teachers' content knowledge and their proficiency in adapting educational content. Utilizing a mixed-methods convergent approach, this research will integrate quantitative data on the direct impacts of teachers' content knowledge with qualitative insights into the customization practices and challenges faced by teachers. This methodology allows for a comprehensive analysis, providing both breadth and depth of understanding concerning how well teachers can tailor their instructional strategies to meet the varied learning styles and needs of their students.

Teachers' challenges in effectively customizing learning materials for diverse learner needs are pervasive across different educational systems worldwide, including the USA, UK, Asia, and the Philippines. In the USA, Walqui and Bunch (2019) highlight the complexities involved in designing curricula that cater effectively to English learners, underlining the lack of teacher preparedness in addressing the linguistic and cultural diversities of their classrooms. Similarly, Curtin and Sarju (2021) emphasize the critical need for co-creating online learning environments that deliver personalized content, a strategy that hinges significantly on the teacher's ability to adapt materials to meet varied learning styles and preferences. These examples point to systemic issues where teachers are often ill-equipped to manage the diverse needs of their students, adversely affecting the quality of learning outcomes.

In the UK and Asia, the discourse around inclusivity in education stresses similar themes. Mitchell and Sutherland (2020) discuss the utilization of evidence-based teaching strategies that are crucial for special and inclusive education settings in the UK. However, the implementation of such strategies often falls short due to a lack of comprehensive training and resources for teachers. On the other hand, Wahono, Lin, and Chang (2020) provide evidence from Asian contexts showing that STEM education's effectiveness greatly depends on the teacher's capability to integrate culturally relevant and personalized teaching methods, which are not universally prevalent due to standardized approaches that neglect individual learning needs.

Turning to the Philippines, the situation mirrors the global challenge of customizing learning materials effectively. Siagan, Saragih, and Sinaga (2019) emphasize the importance of problem-based learning models to enhance students' mathematical problem-solving and metacognition abilities. However, the successful implementation of these models is contingent upon teachers' abilities to develop and modify learning materials accordingly, which is often hindered by inadequate professional development. Additionally, Tarrayo and Anudin (2023) discuss the urgent

need for materials development in flexible learning settings, a demand accentuated during the pandemic, which further stretched the capacities of teachers to adapt quickly to new educational demands and technological interfaces.

Similarly, in the researcher's setting there exists a concerning issue within the district: a number of teachers demonstrate a poor ability to customize learning materials effectively for diverse learner needs. This shortfall potentially stems from a lack of deep content knowledge or insufficient training in diverse instructional strategies, which could hinder students' academic progress and engagement. By focusing on this problem, the study seeks to identify specific areas where educators may lack crucial skills or knowledge, thus informing targeted professional development programs. Additionally, the findings will offer actionable insights for policy makers and educational leaders in the district to implement support systems and resources that enhance teachers' capabilities. Ultimately, the goal is to improve educational outcomes by equipping teachers with the necessary tools to adapt teaching methods to the diverse educational landscape of today's classrooms.

Despite the global acknowledgment of the need for personalized education approaches, there remains a significant disparity in the ability of teachers in Panabo City to effectively customize learning materials, a shortfall that could be rooted in both a lack of deep content knowledge and insufficient training in diverse instructional strategies. Similar challenges are reported worldwide, indicating a systemic issue in teacher education and professional development. For instance, studies like those by Walqui and Bunch (2019) in the USA and Mitchell and Sutherland (2020) in the UK emphasize the urgent need for curricula that cater to diverse student populations and point to deficiencies in teacher preparedness and resource availability. The local context in Panabo City mirrors these international concerns, with teachers struggling to meet the varied needs of students, thereby affecting overall educational outcomes and student engagement.

Addressing this gap, the proposed study aims to shed light on specific deficiencies within the district's educational practices, particularly focusing on the capacity of teachers to adapt and personalize learning materials. This exploration is vital as evidenced by similar research in regions such as Asia, where Wahono, Lin, and Chang (2020) highlight the essential nature of culturally relevant and personalized teaching methods in STEM education. The urgency for this study in Panabo City is further amplified by the ongoing challenges faced during the pandemic, as noted by Tarrayo and Anudin (2023), which have pushed the need for flexible and adaptable teaching resources to the forefront. By pinpointing the exact areas where local educators lack crucial skills or knowledge, the study not only aligns with global educational trends but also provides actionable insights for policymakers and educational leaders in the district. These findings will be instrumental in crafting targeted professional development programs and support systems that enhance the capabilities of teachers, ultimately leading to a more inclusive and effective educational environment that is responsive to the diverse landscape of today's classrooms.

LITERATURE REVIEW

Content knowledge refers to teachers' understanding and mastery of the subject matter that they are tasked to teach. This knowledge includes familiarity with the facts, concepts, theories, and procedures within the disciplines they teach and the ability to integrate this knowledge in facilitating student learning (Martin and Jamieson-Proctor, 2020). The high status of content knowledge interplays with pedagogical skills to optimize teaching effectiveness and student learning outcomes. By integrating theories with practical examples, the book advocates for a strategic focus on PCK development in teacher education programs to ensure that science teachers are well-equipped to navigate the complexities of teaching in diverse classrooms (Hume et al., 2019).

The significance of teachers' content knowledge in influencing student academic achievement is well-documented, with several studies highlighting its central role in effective teaching and learning processes. Jacob, John, and Gwany (2020) provide a comprehensive theoretical overview that underscores how teachers' pedagogical content knowledge (PCK) directly correlates with improved student outcomes. This relationship is supported by Gess-Newsome et al. (2019), who empirically demonstrate that teachers with robust pedagogical content knowledge not only enhance their teaching practices but also significantly elevate student achievement in science education. These findings suggest that a deep understanding of both content and pedagogical strategies is crucial for facilitating effective learning environments.

Further exploring the dynamics of content knowledge, Nilsson and Karlsson (2019) utilize digital technologies and Content Representation (CoRes) to capture and enhance student teachers' PCK, demonstrating that these tools can significantly refine the teaching process. Similarly, Neumann, Kind, and Harms (2019) investigate the amalgam of teachers' content knowledge with their pedagogical skills, revealing that the integration of these knowledge domains is essential for effective science teaching. Their research provides insight into how specialized content knowledge, when effectively combined with pedagogical techniques, substantially impacts teaching efficacy and student comprehension, emphasizing the necessity for ongoing professional development in these areas.

This refers to the precision and correctness with which teachers present subject matter during instruction. Teachers with high content knowledge are able to provide factual and up-to-date information without inaccuracies or misconceptions (Martin and Jamieson-Proctor, 2020). A study explores the intersection of teachers' content knowledge and their attitudes towards using ICT for instructional delivery in secondary schools in Onitsha North, Anambra State, Nigeria. Their study highlights that teachers with high content knowledge are more likely to utilize

ICT tools effectively, leading to more accurate and efficient delivery of educational content. This relationship underscores the critical role of comprehensive subject mastery in enhancing the quality of instruction through advanced technological means, suggesting that improving teachers' content knowledge is essential for leveraging ICT in education (Ikwuka et al., 2020).

Meanwhile, high content knowledge among teachers significantly contributes to the accuracy of information delivery in educational contexts, as highlighted in recent scholarly research. Bragg, Walsh, and Heyeres (2021) emphasize that well-designed online professional development programs that enhance teachers' content knowledge directly correlate with improved accuracy and efficacy in teaching across various subjects. These findings suggest that when teachers possess comprehensive and accurate content knowledge, they are better equipped to deliver information effectively in virtual settings, which is crucial for maintaining educational quality in increasingly digital landscapes. Similarly, Boggs (2019) investigates the effects of different feedback mechanisms in language instruction and finds that teachers with strong content knowledge can provide more precise and scaffolded corrective feedback, which significantly improves students' grammatical accuracy in English as a second language writing. This highlights the pivotal role of deep content knowledge in enabling teachers to tailor their feedback and instructional methods to meet the specific learning needs of their students.

Additionally, Napoles and MacLeod (2013) supports the view that the depth of teachers' content knowledge influences their delivery methods and the perceived effectiveness of their teaching, particularly in preservice educational settings. They noted that accurate delivery of content, underpinned by robust subject knowledge, leads to observable improvements in student progress, which in turn enhances student perceptions of teaching effectiveness. Also, in a study focused on health management information systems, also underscore the importance of content accuracy, showing that high levels of content knowledge among health professionals significantly improve data accuracy and service delivery in healthcare settings. Although focused on a different sector, this research parallels educational findings, reinforcing the universal importance of solid content knowledge for accurate and effective information dissemination across professional fields (Endriyas et al., 2019).

Statement of the Problem

This study examined the relationship between teachers' content knowledge and ability to customize learning materials for diverse learner needs in Secondary Public Schools in Panabo City. A parallel convergent mixed methods design was used, and it involved collecting qualitative data and quantitative results simultaneously. In the quantitative phase of the study, primary data were ollected from the public secondary school teachers regarding the relationship between teachers' content knowledge and ability to customize learning materials for diverse learner needs. The research questions underlying the investigation in this study were as follows:

1. What is the extent of teachers' content knowledge in terms of:
1.1 accuracy in information delivery;
1.2 ability to answer questions thoroughly;
1.3 integration of concepts across curriculum; and
1.4 application of knowledge to real-world situations?
2. What is the extent of teachers' ability to customize learning materials for diverse learner needs in terms of:
2.1 differentiation in instructional methods;
2.2 use of multilevel resources;
2.3 incorporation of student feedback into material design; and
2.4 personalization of learning activities?
3. Is there a significant relationship between teachers' content knowledge and ability to customize learning materials for diverse learner needs?
4. What are the lived experiences of participants with regard to teachers' content knowledge and ability to customize learning materials for diverse learner needs?
5. To what extent do the qualitative findings corroborate with the quantitative data?

METHODOLOGY

Research Design

In this study, the researcher employed mixed methods, specifically a convergent research design. As described by Headley and Plano Clark (2020), a mixed method research design involved the integration of qualitative and quantitative research approaches within a single study to provide a comprehensive analysis of the research question. This design allowed the researcher to collect numerical data and detailed contextual information simultaneously. In this study, a mixed method approach was advantageous as it enabled the collection of quantifiable data on teacher effectiveness alongside rich qualitative insights into how teachers perceived and implemented customization. This design supported a holistic understanding by correlating numerical effectiveness with personal teaching experiences and strategies. It also allowed for validation and corroboration of data through multiple forms of evidence, enhancing the reliability and depth of the findings.

The parallel convergent approach was a type of mixed method design where quantitative and qualitative data were collected simultaneously but analyzed separately before being merged during interpretation. This method enabled the researcher to compare and combine results from both data sets to draw comprehensive conclusions (Creswell, 2021). Utilizing a parallel convergent design in this study facilitated an efficient comparison of how content knowledge correlated quantitatively with the ability to customize learning materials and qualitatively

affected teaching practices. By analyzing both datasets together, the researcher identified patterns and discrepancies between what teachers claimed they did and what actually happened in practice. This design was particularly useful for exploring complex phenomena from multiple perspectives, ensuring that the findings were robust and actionable.

In the quantitative phase, the researcher specifically used descriptive correlational techniques of research to gather data, ideas, facts, and information related to the study. A descriptive-correlational approach involved observing and describing characteristics of a specific population without manipulating the environment and exploring relationships between variables through correlation coefficients (Judd & Sadler, 2003). In the context of this study, a descriptive-correlational approach was employed to statistically analyze the relationship between the extent of teachers' content knowledge and the diversity in their instructional materials. This method helped in identifying trends and predicting potential outcomes without the need for experimental manipulation. It was effective for drawing out the natural relationships between variables, providing foundational data that could inform more targeted educational interventions.

In the qualitative phase, the researcher made use of a phenomenological approach. The phenomenological inquiry was a qualitative research approach focused on exploring and describing the lived experiences of individuals to gain an in-depth understanding of a phenomenon from the participants' perspectives (Groenewald, 2004). Adopting a phenomenological approach in this study allowed for an in-depth exploration of teachers' experiences and perceptions regarding how their content knowledge influenced their ability to tailor educational materials. This method was appropriate for capturing the essence of teachers' experiences, revealing how they interpreted and implemented customization in diverse learning environments. Furthermore, it provided insights into the subjective and often nuanced aspects of teaching practices that quantitative methods might have overlooked, thereby enriching the overall understanding of the educational process.

Research Respondents

Quantitative Phase

This study targeted 294 public secondary school teachers from the Secondary School District in Panabo City. Utilizing Slovin's formula to determine the sample size, the researcher calculated the required number of participants. Given a total population of 1100 teachers and a desired margin of error of 0.05, the calculation using Slovin's formula yielded a sample size of 294 teachers, ensuring that the study results could be generalized to the entire teacher population with a high level of confidence.

To ensure a fair selection process, the researcher adopted a simple random sampling method, a core technique in probability sampling that provided each potential participant an equal probability of being selected. This method helped in reducing selection bias and ensured that every subset of the population was likely represented in the sample (Boschetti et al., 2016). In practical terms, each teacher was assigned a unique identifier, and a random number generator was used to pick 282 teachers from the pool. This process was critical in maintaining an unbiased sample that reflected the true diversity and demographic spread of the teachers in the district, thereby supporting the study's validity and reliability.

In selecting respondents for the study, the researcher established specific inclusion criteria to ensure the collection of relevant and insightful data. The respondents were limited to public secondary school teachers actively teaching in the Public Secondary School District in Panabo City. To be included in the study, these teachers needed to be currently employed full-time and directly engaged in the development and delivery of instructional materials across various subjects. This criterion ensured that the data collected was directly applicable to the study's focus on content knowledge and its impact on the customization of learning materials. Additionally, the inclusion criteria considered the diversity of teaching experiences, ranging from novice to veteran teachers, to capture a broad spectrum of insights and practices regarding educational material customization.

Qualitative Phase

The researcher purposively selected five secondary school teachers for the in-depth interview (IDI) and five secondary school teachers for the focus group discussion (FGD). A total of 10 secondary school teachers in Public Secondary Schools in Panabo City were invited as participants. Purposive sampling was utilized in selecting the participants of the study. Purposive sampling was a non-random sampling technique where researchers deliberately chose participants who possessed specific characteristics or met predetermined criteria relevant to the research objectives. This method allowed the researcher to target individuals who were most likely to provide rich and relevant information pertinent to the study objectives, thereby enhancing the depth and quality of the research findings (Rai & Thapa, 2015).

In the context of the current study, purposive sampling enabled the researcher to select participants who met specific criteria relevant to the study's objectives. Specifically, the researcher included teachers who were currently employed full-time and directly engaged in the development and delivery of instructional materials across various subjects. This criterion ensured that the data collected was directly applicable to the study's focus on content knowledge and its impact on the customization of learning materials. The researcher also considered the diversity of teaching experiences, ranging from novice to veteran teachers, to capture a broad spectrum of insights and practices regarding educational material customization.

Research Instrument

Two sets of instruments were used in this study: one for the quantitative phase and one for the qualitative phase. These questionnaires were subjected to content validity by a panel of experts and underwent pilot testing to assess their validity and reliability. The comments, corrections, and suggestions provided by the experts were incorporated into the final revisions of the questionnaires, ensuring that the instruments were clear, accurate, and aligned with the study objectives.

In the quantitative phase, the first part of the instrument focused on teachers' content knowledge. The instrument consisted of four domains, namely: accuracy in information delivery, ability to answer questions thoroughly, integration of concepts across the curriculum, and application of knowledge to real-world situations. Respondents answered the questionnaire using a 5-point Likert scale, which allowed them to indicate the extent to which they demonstrated each aspect of content knowledge. The researcher used a range of means, descriptions, and interpretations to determine the extent of teachers' content knowledge, providing a clear framework for analyzing the data.

The second tool addressed teachers' ability to customize learning materials for diverse learner needs. This questionnaire included statements divided into four indicators: differentiation in instructional methods, use of multilevel resources, incorporation of student feedback into material design, and personalization of learning activities. Similar to the first instrument, respondents used a 5-point Likert scale to rate their practices, and the researcher applied a range of means, descriptions, and interpretations to analyze the responses. This approach ensured a systematic and consistent evaluation of teachers' ability to customize learning materials.

In the qualitative phase, the researcher conducted individual in-depth interviews (IDI) and a focus group discussion (FGD) with a total of 10 secondary school teachers using a semi-structured interview guide. The researcher-developed semi-structured interview guide consisted of general questions accompanied by probing questions designed to elicit detailed and meaningful insights from participants. This guide was developed in consultation with experts and underwent several revisions to incorporate their suggestions. The validation process focused on assessing the language and conceptual levels of the questions to ensure that they were appropriate for the participants' level of understanding, confirming that the items aligned with the research design and objectives, and avoiding leading questions that could bias the responses.

Data Analysis

Quantitative Phase

The researcher utilized several statistical tools to process the gathered data in the quantitative phase.

Weighted Mean. The weighted mean was used to calculate the average scores of teachers responses concerning their content knowledge and ability to customize learning materials for diverse learner needs. This statistical tool provided a clear summary of the general perceptions and attitudes of the respondents, highlighting the extent to which they demonstrated content mastery and instructional customization. It effectively captured central tendencies, allowing for an efficient comparison of various indicators across the study.

Pearson Product-Moment Correlation. This statistical tool was employed to determine the strength and direction of the relationship between teachers' content knowledge and their ability to customize learning materials for diverse learner needs. By calculating correlation coefficients, the researcher was able to establish whether these two variables were positively or negatively correlated and to what extent. The analysis specifically focused on the relationship between the various dimensions of content knowledge (accuracy in information delivery, question handling, concept integration, and practical application) and instructional customization practices.

Qualitative Phase

The researcher conducted qualitative interviews and focus group discussions with secondary school teachers to gain a deeper understanding of their experiences and perspectives on content knowledge and the customization of learning materials for diverse student needs. These qualitative interactions allowed teachers to express their insights, challenges, and strategies in their own words, providing a rich and detailed dataset for analysis. The interview sessions were recorded, and the audio recordings were transcribed verbatim to ensure the accuracy of the collected data.

Following transcription, the researcher immersed themselves in the qualitative data, reading the transcripts repeatedly to become familiar with the content. Through this immersive process, initial patterns and key ideas began to emerge. The researcher then conducted a coding process, identifying significant text segments—known as codes—that captured essential ideas related to teachers' content knowledge, instructional strategies, and adaptive teaching practices. These codes were then grouped into broader themes that reflected commonalities in teachers' experiences and perceptions.

As the coding process continued, the researcher refined the identified themes, ensuring they accurately represented the diverse perspectives of the participants. These themes were critically reviewed and adjusted through ongoing analysis, ensuring that they provided a comprehensive and authentic portrayal of the data. Thematic analysis allowed

the researcher to capture the depth and complexity of teachers' lived experiences, revealing insights into how they applied content knowledge in adapting learning materials.

Finally, the researcher interpreted the themes in relation to the study's research questions and objectives. This interpretation involved synthesizing the qualitative insights with the quantitative findings, identifying implications for educational theory and practice, and recognizing any limitations or biases within the data. By integrating qualitative and quantitative findings, the researcher developed a well-rounded understanding of the relationship between teachers' content knowledge and their ability to customize learning materials for diverse learner needs.

Corroboration of Quantitative and Qualitative Data

In the parallel convergent design utilized for this study, which investigated the relationship between teachers' content knowledge and their capacity to customize learning materials for diverse student needs, both quantitative and qualitative data collection processes occurred simultaneously. This methodological approach ensured that the data from one stream did not influence the collection or interpretation of the other. Quantitative data were gathered through structured surveys, providing numerical insights into teachers' content knowledge and their ability to customize learning materials. Meanwhile, qualitative data were collected through in-depth interviews and focus group discussions, where teachers shared their experiences and perspectives in their own words. This dual approach provided a holistic view of the research topic, allowing for an effective juxtaposition and synthesis of data during the analysis phase.

In executing this research, equal weight was accorded to the quantitative and qualitative components to foster a well-rounded understanding of the subject matter. The quantitative data established a clear numerical foundation, presenting measurable insights into the extent of teachers' content knowledge and instructional customization capabilities. Simultaneously, the qualitative data enriched these findings by offering contextual depth, revealing the lived experiences, perceptions, and strategies of teachers in adapting their teaching practices. This balanced emphasis ensured that the study combined the rigor and generalizability of quantitative methods with the nuanced interpretation of qualitative analysis.

Once the separate data streams were collected, the mixing procedures in this parallel convergent design involved a systematic integration of the quantitative and qualitative results. Initially, data were analyzed within their respective strands to ensure that each type was understood in its own context. Subsequently, the findings were merged during the interpretation phase, where comparisons and contrasts between the quantitative outcomes and qualitative insights were drawn. This integrative approach allowed the researcher to corroborate findings across data types, identify patterns or discrepancies, and develop a richer, more nuanced understanding of the relationship between teachers' content knowledge and their ability to customize learning materials for diverse learner needs. Through this process, the researcher formulated informed conclusions supported by diverse forms of evidence.

RESULTS AND DISCUSSION

This part of the paper presents the conclusion and recommendation of the researcher. The discussion is supported by the literature presented in the first chapters and the conclusion is in accordance with statements of the problem presented in this study.

The primary objective of this study was to evaluate the relationship between teachers' content knowledge and ability to customize learning materials for diverse learner needs in Secondary Public Schools in Panabo City utilizing parallel convergent mixed method research design. The researcher selected the 294 public secondary school teachers from the Secondary School District in Panabo City as the respondents through simple random sampling method. The researcher made use of modified and enhanced adapted survey questionnaires for quantitative phase which was pilot tested in a nearby school to ensure high reliability and internal consistency of the items in the instrument. Meanwhile, a semi-structured interview guide was utilized in qualitative phase.

The extent of content knowledge demonstrated by public secondary school teachers in Panabo City is rated as extensive, indicating that they frequently exhibit strong skills in delivering accurate information, answering questions thoroughly, integrating concepts across the curriculum, and applying knowledge to real-world situations. Among the domains, integration of concepts across the curriculum is the most evident, reflecting teachers' ability to connect ideas across subjects, which enhances students' comprehensive understanding. Conversely, the application of knowledge to real-world situations is the least evident, suggesting that teachers may need to strengthen their strategies for making learning more relevant to students' everyday experiences.

The extent of teachers' ability to customize learning materials for diverse learner needs is also rated as extensive, demonstrating frequent use of varied instructional methods, multilevel resources, student feedback, and personalized learning activities. The most evident domain is the incorporation of student feedback into material design, reflecting teachers' responsiveness to learner input and their willingness to adapt materials based on student suggestions. In contrast, personalization of learning activities is the least evident, indicating that teachers may need to further develop their skills in tailoring instruction to suit individual learner preferences and interests.

The findings further reveal a strong positive relationship between teachers' content knowledge and their ability to customize learning materials for diverse learner needs. This suggests that teachers who possess strong content

knowledge are more capable of designing adaptable instructional materials. Among the domains, the application of knowledge to real-world situations demonstrates the strongest relationship with customization capability, indicating that teachers who effectively connect lessons to practical contexts are better able to adapt instruction. Conversely, integration of concepts across the curriculum shows the weakest relationship, suggesting that while interdisciplinary connections are valuable, they may have a limited direct impact on teachers' ability to customize learning materials.

The findings reveal that teachers consistently demonstrate mastery of factual accuracy in content delivery and comprehensive question-handling skills, ensuring that students receive accurate information and clear explanations. Teachers also exhibit versatility in customizing learning materials, actively gathering student feedback to refine materials, and applying concepts to real-world scenarios, thereby enhancing practical understanding. Additionally, teachers emphasize learner engagement through personalized learning activities and student-led opportunities, fostering an environment that supports active participation and individualized learning.

The findings demonstrate a strong convergence between quantitative and qualitative data, highlighting that teachers' content knowledge and ability to customize learning materials for diverse learner needs are consistently evident. Quantitative data indicate that teachers' accuracy in information delivery and use of interdisciplinary examples are rated as extensive, while qualitative findings support this by revealing that teachers emphasize ensuring factual accuracy and providing real-world examples. Additionally, the integration of differentiated instructional methods and incorporation of student feedback, identified as extensive in the quantitative analysis, are confirmed by qualitative insights showing that teachers actively differentiate instruction and value student input.

Conclusions

Based on the findings of this study several conclusions were generated:

The findings conclude that the extent of content knowledge among public secondary school teachers in Panabo City is generally rated as extensive, indicating that teachers frequently demonstrate strong content mastery and effective concept integration. This implies that teachers possess a solid foundation in delivering accurate information, addressing student questions, and connecting concepts across the curriculum. Schools are encouraged to sustain this strength while providing further training focused on enhancing the practical application of knowledge to real-world situations, as this area shows the least extent.

Also, the results confirm that the ability of teachers to customize learning materials for diverse learner needs is generally rated as extensive, reflecting their consistent use of varied instructional methods, multilevel resources, and responsiveness to student feedback. This implies that teachers are generally well-prepared to adapt instruction to meet diverse learner needs, but there is room to enhance personalized learning approaches. Schools are recommended to provide targeted training on personalized instruction strategies, enabling teachers to better tailor lessons based on individual student preferences and abilities.

The findings further confirm a strong positive relationship between content knowledge and the ability to customize learning materials for diverse learner needs among public secondary school teachers, indicating that teachers with strong content mastery are more capable of adapting their instructional methods. This aligns with Piaget's (1952) Constructivist Learning Theory, which emphasizes active knowledge construction, and Tomlinson's (1992) Differentiated Instruction Theory, which highlights the importance of tailoring instruction to student needs. This implies that enhancing teachers' curricular understanding can significantly improve their ability to differentiate instruction, making learning more accessible and relevant for all students.

Moreover, the analysis of teachers' lived experiences reveals that they consistently demonstrate mastery of factual accuracy in content delivery, comprehensive question-handling skills, and practical application of concepts through real-world examples. This implies that teachers are capable of maintaining instructional accuracy while ensuring that students understand and relate to the lessons. Schools are encouraged to provide further support in fostering real-world connections in lessons to enhance student engagement and understanding.

Finally, the integration of quantitative and qualitative findings confirms that teachers' content knowledge directly supports their ability to customize learning materials, with factual accuracy, clear explanations, and real-world connections being the most influential aspects. This implies that teachers' strong subject mastery directly influences their capacity to differentiate instruction effectively. Schools are encouraged to maintain professional development initiatives that emphasize both content mastery and adaptive teaching strategies.

Recommendations

Based on the findings and conclusions generated from the study, the researcher recommends the following:

To enhance teachers' content knowledge in Panabo City, it is recommended that schools focus on improving the application of knowledge to real-world situations, which has the lowest mean among the content knowledge indicators in Table 5. Schools can provide targeted training on contextual learning strategies, helping teachers develop skills in designing activities that connect classroom lessons to real-world applications. Moreover, peer sharing sessions can be encouraged where teachers can demonstrate practical application techniques.

Also, it is recommended that schools prioritize the enhancement of teachers' ability to personalize learning activities, which has the lowest mean among the indicators of customizing learning materials for diverse learner needs.

Schools can provide training on personalized instructional strategies, such as interest-based projects, self-paced activities, and individualized feedback. Additionally, mentoring programs can be introduced where experienced teachers guide their peers in designing personalized learning experiences.
In addition, it is recommended that schools focus on strengthening the integration of concepts across the curriculum, which shows the weakest relationship with the ability to customize learning materials for diverse learner needs. Professional development sessions on interdisciplinary teaching can help teachers understand how to connect ideas across subjects more effectively. Moreover, collaborative lesson planning sessions can be encouraged, where teachers from different disciplines can share ideas for cross-curricular connections.

Further, it is recommended that schools provide additional support for teachers in promoting student-led learning opportunities, which is among the least evident aspects of their lived experiences. Schools can organize workshops on learner-centered strategies, such as project-based learning, peer teaching, and student-led discussions. Moreover, teachers can be guided on how to gradually increase student autonomy in class, fostering leadership and independent thinking.

Furthermore, it is recommended that schools focus on strengthening the practical application of corrective actions, as this aspect has the lowest mean among the indicators of the integration of quantitative and qualitative findings. Schools can conduct training on effective corrective action strategies, emphasizing data-driven decision-making and consistent follow-up. Additionally, monitoring mechanisms can be established to ensure that corrective actions are effectively applied and their outcomes are systematically evaluated.

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