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MOUNTAIN HIGH SCHOOLS TEACHERS' CHALLENGES IN THE INTEGRATION OF INDIGENOUS MATERIALS IN TEACHING MATHEMATICS: BASIS FOR PROGRAM RECOMMENDATION

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ABSTRACT

The study determined the challenges faced by mountain high school teachers in the integration of indigenous materials in teaching mathematics as a basis for program recommendation in the Municipality of Leon during the School Year 2025–2026. Employing qualitative research method, the study utilized ten (10 mathematics teachers who shared their narratives through in-depth interviews. The collected narratives were then consolidated, transcribed, analyzed, and interpreted using a thematic approach. Based on the responses from the in-depth interviews with mathematics teachers from various mountain high schools in the Municipality of Leon, those who integrate indigenous materials face diverse challenges, including teacher preparation and lack of training, limited resources and instructional materials, and language and conceptual barriers. To address these challenges in integrating indigenous materials in mathematics instruction, teachers employed professional development and teacher training, development of culturally relevant instructional materials, and culturally responsive teaching strategies.

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INTRODUCTION

Mathematics instruction in many formal school systems has long been dominated by abstract, decontextualized approaches that can feel disconnected from the daily lives and cultural practices of learners — a disparity that is particularly evident in Indigenous and mountain communities.

Researchers argue that this cultural dissonance between "school mathematics" and community mathematical practices contributes to low engagement and poor conceptual understanding among students from indigenous backgrounds. Integrating local and indigenous materials into mathematics teaching is therefore proposed as a form of culturally responsive pedagogy and ethnomathematics that can make concepts meaningful, increase relevance, and help students transfer school learning to real-life contexts (Battibwe, 2024).

Mountain high schools — often located in geographically remote and culturally distinct communities — face additional constraints that affect teaching and learning: limited access to instructional resources, teacher isolation, and curricular materials that are not tailored to local ways of knowing. In these contexts, teachers' practices in sourcing, adapting, and integrating indigenous materials (for example, local tools, traditional games, crafts, measurement practices, and counting systems) become central to students' access to meaningful mathematics learning. Studies from diverse regions show that when teachers intentionally use

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indigenous cultural elements and locally available materials, student engagement and learning outcomes in mathematics tend to improve (Hatton, 2024).

Teacher beliefs, preparation, and available supports strongly shape whether and how indigenous materials are integrated. Research indicates that teachers who recognize the epistemic value of indigenous knowledge, who receive targeted professional development, or who adopt culturally responsive pedagogies are more likely to design lessons that leverage local materials and practices. Conversely, lack of training, heavy curriculum and assessment pressures, and limited documented examples of local materials in curricular guides act as barriers. This situational complexity means teachers' classroom practices vary widely — from occasional use of familiar objects to carefully designed lessons that systematically foreground local mathematical knowledge (Yip, 2024).

Recent empirical work provides evidence that culturally grounded lessons using indigenous games, artifacts, or measurement practices can produce measurable gains in student performance and participation, particularly in primary and lower-secondary grades. These studies also highlight process issues: the need for culturally safe collaboration with community knowledge-holders, co-creation of materials, and careful alignment of local examples with targeted learning objectives so that cultural integrity and academic rigor are both maintained (Xu & Ball, 2024).

Despite growing interest and positive case evidence, gaps remain. There is limited systematic documentation of *how* teachers in mountain high schools identify, adapt, and assess indigenous materials for teaching specific mathematics topics. There is also insufficient

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research on the supports teachers need (policy, training, resource design, community partnerships) to sustain such practices at scale and across varied mountain contexts.

Addressing those gaps is essential for designing teacher education programs and policy supports that enable culturally relevant mathematics instruction without sacrificing the curriculum's learning goals (Luzano, 2025).

MATERIALS AND METHODS

Research Methodology

This chapter presents the research method, research design, study participants, data-gathering procedures, research instrument, and data analysis employed in the study. The purpose of this study is to identify the challenges encountered by mountain high school teachers in integrating indigenous materials in teaching Mathematics as a basis for program recommendation in the Municipality of Leon during the School Year 2025–2026.

Research Method

The study utilized a qualitative research method using in-depth interviews. Deckert and Wilson (2023) describe descriptive research as a method that utilizes tools like surveys, questionnaires, interviews, and observations to collect data. This approach is valuable for identifying and describing variables as they exist in a specific environment, serving as a foundational step in research to understand contexts and characteristics without establishing causal relationships.

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During the interview, the interviewer and interviewee were allowed to sit at an appropriate distance and reflect on a series of questions about a particular issue. The purpose was to obtain the participants' main or essential views on the issue within a social context through their responses.

Research Design

The study employed a phenomenological research design. Phenomenology is regarded as a philosophical approach to qualitative research that seeks to understand how individuals perceive and interpret the world, particularly how their views may differ from commonly accepted perspectives. It focuses on a person's subjective interpretation of lived experiences and is commonly carried out through interviews to gather participants' impressions. This approach is frequently used in fields such as psychology, sociology, and social work.

Moreover, phenomenology centers on the study of structures of consciousness as experienced from the first-person point of view. Its main objective is to examine and describe phenomena as they are consciously experienced, without relying on causal explanations or being influenced by unexamined assumptions (Biemel and Spiegelberg, 2024).

Participants of the Study

The respondents of this study were seven (7) mathematics teachers in mountain high schools located in upland areas in the Municipality of Leon. They are considered the most appropriate participants because they are the direct implementer of mathematics instruction and are expected to have firsthand experience in integrating indigenous materials into their teaching practices.

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The respondents included teachers from both junior and senior high school levels, depending on the school's structure. These teachers are selected using purposive sampling, a non-probability technique that, as Palinkas et al.(2020) explain, allows the researcher to intentionally choose participants who possess specific characteristics relevant to the study's objectives.

Sampling Design

The study employed a purposive sampling design. According to Nikolopoulou (2023), purposive sampling is a non-probability sampling technique in which participants are intentionally selected because they possess the specific characteristics required for the sample. In other words, individuals are chosen deliberately in purposive sampling.

This method depends on the researcher's judgment in identifying and selecting the individuals, cases, or events that can provide the most relevant information for achieving the objectives of the study.

Purposive sampling is commonly used in qualitative and mixed-methods research. It is especially useful when the researcher needs to identify information-rich cases or maximize limited resources, although it also carries a high risk of research bias, such as observer bias.

Research Instrument

The research instrument used in the study was a researcher-developed interview schedule.

The interview schedule consisted of three questions that are Voice and video recorders

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were used for data gathering and documentation, subject to the participants' permission.

Validity of the Research Instrument

Before the validity of the researcher-made interview schedule is established, the adviser, the Dean of the Graduate School, and a panel of jurors recognized for their expertise in research, testing and assessment, and English were asked to review and validate each question for possible revision and improvement.

Validity refers to the appropriateness, meaningfulness, accuracy, and usefulness of the inferences made by a researcher. In terms of content-related validity, it is important that the content and format of the measuring instrument are aligned with the definitions of the variables and the group of subjects to be assessed. This alignment is essential in validating questionnaire items and ensuring that the instrument accurately measures the intended constructs (Creswell & Creswell, 2022).

The comments, corrections, and suggestions of the panel of validators regarding the interview schedule were taken into account using the appropriate form of Good and Scates (Appendix A).

Data Gathering Procedures

Approval to conduct the study was secured from the adviser, the Dean of the Graduate School, the Office of the Schools Division Superintendent, and the Office of the District Supervisors.

The researcher personally visited the schools, community, or any place convenient for

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the participants in order to conduct the interviews.

Through the use of in-depth interviews, voice and video recorders were utilized to fully capture the interviewees' responses. After completing the series of interviews, the researcher compiled and organized all the data gathered.

Data Analysis

The data gathered were analyzed using a thematic approach.

Thematic analysis is a method of identifying patterns or themes within qualitative data. It is a commonly used approach that enables researchers to examine and understand the meanings embedded in information collected from interviews, focus group discussions, and other qualitative sources (Braun & Clarke, 2023).

The purpose of thematic analysis is to identify significant or interesting themes in the data and use them to address the research questions or provide insights into a particular issue. This process involves summarizing, analyzing, interpreting, and making sense of the data collected.

RESULTS AND DISCUSSIONS

This study aimed to determine the challenges faced by mountain high school teachers in integrating indigenous materials into mathematics teaching in the Municipality of Leon during the School Year 2025–2026.

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The study employed a qualitative research method through in-depth interviews and adopted a phenomenological research design. It involved 7 respondents who were purposively selected from high schools located in the mountainous areas of the Municipality of Leon.

Before the validity of the researcher-made interview schedule is established, the adviser, the Dean of the Graduate School, and a panel of jurors recognized for their expertise in research, testing and assessment, and English were asked to review and validate each question for possible revision and improvement.

Validity refers to the appropriateness, meaningfulness, accuracy, and usefulness of the inferences made by a researcher. In terms of content-related validity, it is important that the content and format of the measuring instrument are aligned with the definitions of the variables and the group of subjects to be assessed. This alignment is essential in validating questionnaire items and ensuring that the instrument accurately measures the intended constructs (Creswell & Creswell, 2022).

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Through the use of in-depth interviews, voice and video recorders were utilized to fully capture the interviewees' responses. After completing the series of interviews, the researcher compiled and organized all the data gathered.

The following are the findings of the study:

Based on the responses from the in-depth interviews with mathematics teachers from various mountain high schools in the Municipality of Leon, those integrating indigenous materials face diverse challenges. These challenges are, namely, Teacher Preparation and Lack of Training, Limited Resources and Instructional Materials, and Language and Conceptual Barriers.

Based on the results of the in-depth interviews, the coping strategies employed to address the challenges in integrating indigenous materials in mathematics instruction include Professional Development and Teacher Training, the Development of Culturally Relevant Instructional Materials, and Culturally Responsive Teaching Strategies.

Based on the findings, the following insights were drawn:

Mathematics teachers in the mountain high schools recognize the value of integrating indigenous materials, they encounter systemic and contextual constraints that hinder effective implementation.

Their challenges indicate that teachers need structured support to confidently connect indigenous knowledge with formal mathematical concepts. At the same time, reflect the geographical and economic realities of mountain schools, making contextual material development difficult. Moreover, it highlights the gap between learners' cultural knowledge

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and the academic language of mathematics. The successful integration of indigenous materials requires not only teacher willingness, but sustained institutional support, localized resources, and culturally responsive pedagogical approaches.

Mathematics teachers actively respond to integration challenges by strengthening their professional competence, creating culturally relevant instructional materials, and applying culturally responsive teaching strategies. These coping strategies demonstrate teachers' commitment to making mathematics more meaningful and culturally connected, despite existing limitations in training, resources, and language barriers.

CONCLUSION

It is recommended that the school district establish a structured support system that includes sustained teacher training, development of localized instructional materials, and the use of culturally responsive teaching approaches. Providing institutional support, adequate resources, and language-bridging strategies will strengthen teachers' capacity to effectively integrate indigenous materials into mathematics instruction.

It is recommended that schools and district leaders further institutionalize and support these initiatives by providing continuous professional development, allocating resources for culturally relevant material development, and promoting culturally responsive teaching practices to sustain and strengthen the integration of indigenous materials in mathematics instruction.

To confirm the findings of the present study, similar investigations should be conducted on a broader scale and should include other variables not covered in this research.

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