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Assessing the Implementation of the MBHTE-BARMM Science Learning Modules: Exploring Issues, Challenges, and Suggestions for Policy Development

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Abstract
This study investigated the implementation of Ministry of Basic, Higher, and Technical Education-Bangsamoro Autonomous Region in Muslim Mindanao (MBHTE-BARMM) learning resources by exploring their issues and challenges as well as providing suggestions for policy development. This study utilized a qualitative approach through one-on-one in-depth interview with twenty-five (25) elementary science teachers from various school divisions in the BARMM region who are using the science learning modules. Thematic analysis revealed issues and challenges concerning accessibility, availability, and utilization. Findings highlighted the need for a comprehensive approach focusing on module completeness, content complexity, and essential topics, alongside infrastructure improvement, streamlined procedures, content adaptation, and community engagement. Strengths and weaknesses were identified, emphasizing cultural relevance, alignment with the central curriculum, effective module structure, and cognitive level of the module and its target users. Based on these findings, a six-key-area model for improved implementation is proposed. For policy development, this study can potentially inform policy decisions and educational strategies in the BARMM region, contributing to the ongoing efforts to enhance the quality and relevance of education, ensure equitable access, and address the specific needs of the Bangsamoro people.

Keywords: Science Learning Modules, MBHTE-BARMM, Learning Module Implementation, Qualitative Study

1. Introduction

Elementary education lays the groundwork for academic success throughout a learner's life and with teachers serving as key agents in combating illiteracy and fostering competent and skillful learners. To aid the teachers to successfully mold the foundational education of the learners, various learning resources and materials are utilized as they serve as aid in teaching. The use of learning resources is most especially crucial in the early childhood to primary or elementary education. The importance of educational resources in the classroom cannot be overstated.

One of the most important factors in education of which helps learners to learn faster and better are learning resources or instructional materials. Education is a survival tool used by human beings to improve the quality of their lives and to function effectively in the society. Utilization of learning resources, a vital aspect of the efficient and effective teaching of educators, refers to the art of effective selection, acquisition and use of instructional materials to enhance achievement of the lesson objectives. For this to happen, resources must be made available. The same must be adequate and relevant to the level of learners and the content being taught (Syengo, 2016). This implies that instructional resources as objects or devices, which help the teacher to make a lesson for the learner. Thus, instructional resources are concrete or physical objects which provide sound, visual or both to the sense organs during teaching.

Literature on instructional resources (IR) or learning resources (LR) depicted some aspects of this area of research. Utilization of instructional resources was effective, and it influenced pupils' learning which leads to high academic performance. Several studies have shown a number of factors that tend to influence the selection of instructional resources. These factors are teacher motivation, the capacity to procure funds to buy instructional resources, the capacity to mobilize resources for the purchase of instructional resources, the capacity of head teachers' knowledge about the instructional material, positive attitude towards the instructional resources, teachers' academic qualification; male teachers who were found to use instructional resources more often than their female counterparts. Additionally, demographic profile tends to also influence the selection of IR, this profile includes age and gender behavior of a pre-school learner, the number of children admitted and the sex, socio economic background, safety, learners' ability (special/ normal learners) and language level. Also included are class size and physical infrastructure (Ayiema, 2018).

Clearly, it appears that teacher qualification, attitude, and gender are some factors that impacted the selection of resources. On the other hand, Akasi and Nwabufo (2016) showed that instructional resources can also contribute to learning even in higher education, for instance is the case of business education courses as focus of their study. However, in terms of acquisition of self-employment skills among business education, instructional materials showed to have no significant influence on the learners. In a comprehensive literature review of Sirajo and Abdullahi (2023) as to the influence of the availability of instructional resources on learning mathematics in north-western Nigeria, it was shown overall that the learners' capacity to learn mathematics is dependent on the availability of instructional materials because it motivated them and aroused their interest.

Furthermore, previous studies also disclosed the lack of learning resources, especially in teaching science subjects in secondary schools. Specifically, some resources or materials were available, but some were not available, or were not adequate in the basic education schools and early childhood education and that despite the training that teachers received for the instructional resources, teachers still have average competence (Mukagihana et al., 2020). Unfortunately, the scarcity of available learning resources tends to result into some teachers (e.g., Science teachers) to neglect the use of relevant teaching aids when teaching under the pretense that they are not available, inadequate, or costly to improvise. Lastly, as to the challenges encountered in the utilization of instructional resources, it was revealed that attitude towards the use of instructional resources, instructional methods used, availability and use of instructional materials were some of these challenges (Pius & Martin, 2019).

As a response to issues with learning resources, the Ministry of Basic, Higher and Technical Education (MBHTE) which serves as the education ministry for the Bangsamoro Autonomous Region of Muslim Mindanao (BARMM) and is committed to ensuring quality, accessible, and inclusive education for all Bangsamoro residents, released learning resources to be used by teachers in the different divisions of the region. These resources include textbooks, workbooks, and instructional materials which are specifically designed to support students' educational needs within the context of BARMM region.

While it is a good indication that the ministry made the efforts to help the teachers and the learners, it is equally important to assess and examine the status of implementation of these learning resources A crucial aspect of achieving this goal is the effective implementation of MBHTE-BARMM. However, the successful implementation of these learning resources is not devoid of challenges. Issues such as resource availability, accessibility, and

utilization need to be thoroughly examined and addressed to optimize the impact of these resources on the educational landscape of BARMM.

These previous researches that was conducted relevant to learning modules showed that most of these studies were conducted in Kenya. Few studies were found to have done in the Philippines, especially in the region of BARMM. Moreover, there are few studies that explored the issues and challenges with the utilization of Science learning modules. The 2023 educational challenges reported by the DepEd can be a good start to gain insights and dig deeper on this challenge in order to address the problems, make necessary solutions for policy guidelines. Hence, this study aimed to address the gap in research concerning the implementation of the MBHTE-BARMM Science learning modules by pursuing the following objectives: 1) To assess the current state of implementation in terms of accessibility, availability, and utilization of the modules; 2) To identify the issues and challenges encountered by teacher-users regarding technical aspects, pedagogical approaches, and organizational structures; 3) To collect suggestions and feedback from teacher-users on how to improve the implementation of the modules; and 4) To develop a model based on the research findings that can effectively enhance the implementation of the MBHTE-BARMM Science learning modules.

2. Method

This study employed a qualitative approach to gain a nuanced understanding through in-depth exploration and explanation of empirical data gathered from participants through semi-structured interview. This choice of a qualitative approach, unlike previous quantitative designs, aims to capture firsthand experiences, allowing a comprehensive exploration of participants' perspectives, challenges, and feedback related to the region's learning resources.

This study was conducted in Cotabato, Lanao del Sur, Maguindanao, and Marawi under the Bangsamoro Autonomous Region in Muslim Mindanao (BARMM), Philippines. These four areas were only the included locale of the study due to several reasons. First, safety concerns within the broader BARMM region set the foundation of the researchers' decision. This includes specific incidents, reports, or challenges that pose risks to the research team during data gathering. Second, detailing the researchers' efforts to communicate with BARMM authorities demonstrates due diligence, their response indicates an inability to guarantee safety, it provides a clear context for the decision to limit the research scope. And third, challenges faced in online interviews outside specific areas add transparency. Limitations in linkages and networks establishes the practical difficulties encountered in reaching potential participants in the different areas of BARMM aside for these said chosen four areas. In connection with, overall limitations and challenges faced by BARMM residents in terms of accessing a reliable and stable internet connection that might impact the quality of online interviews such as dropped connections, poor audio or video quality, and the overall disruption of the interview process.

The participants of this study included 25 Science teachers who were using the Science modules of MBHTE-BARMM. The study used purposive sampling method in determining the participants. According to Khan (2020), researchers use purposive sampling when they believe that certain participants can provide valuable insights or unique perspectives related to the research focus. As a criterion in purposively selecting these participants, the participants should be teachers who teach science subjects and are using the science module developed by the MBHTE – BARMM. In addition to these criteria, another consideration was the availability and readiness of the teachers to participate in the study. By considering these factors, the research aims to ensure that the chosen participants are willing and able to contribute effectively to the study.

The study made use of the thematic analysis that refers to interpreting the processes of selecting codes and constructing of themes in the transcripts of interviews. The researchers analyzed the data for recurring subjects, ideas, and meaning patterns as well as other prevalent themes. Thematic analysis procedures provide a systematic strategy for viewing and processing qualitative input through coding. This approach involves far more than simply summarizing the relevant aspects of the researchers' extensive collected data (Nowell et al., 2017).

3. Results and Discussion

This section is organized based on the identified codes and themes, providing a comprehensive understanding of the participants' responses and answers to the statement of the problem that this study aims to address.

3.1. State of Implementation of the MBHTE-BARMM Learning Modules

3.1.1. Availability and Access Mechanisms of MBHTE-BARMM Learning Modules

Participants consistently mention downloading the MBHTE-BARMM Learning Modules via the internet as the primary mode of access. Almost all of participants emphasize Internet Downloads (ID) as the primary mode of accessing MBHTE-BARMM Learning Modules. Below is the common response of these mentioned participants:

"Yes, through downloading it via internet" (P2)

This entails that downloading it online is more convenient for the teachers and accessible, not to mention that teachers do not really have a choice but to access it digitally, because as what P16 stated, no hardcopy of the modules was given to them. This points to a pattern of digital access dominance among teachers in the region. However, some participants pointed out a problem of downloading the module if you have poor internet connect, as mentioned by P16 and P18. The widespread reliance on digital means suggests a need for robust online infrastructure and support to ensure seamless access to learning materials for all educators.

The fact that the MBHTE – BARMM required the teachers to access the learning module through downloading it online implies a strong reliance on digital technology and ease of access for the teachers. This is more convenient and more economical for the organization, nevertheless, it poses a problem for the teachers. It highlights the importance of ensuring reliable internet access for teachers or the schools division, as well as availability of printers to produce or reproduce such materials. Hence, the ministry of education should also ensure that support for the production of materials is readily available. Moreover, this digital access dominance aligns with the contemporary trend of utilizing technology for educational resources, especially now in the 21st century.

This suggests a hybrid access strategy combining digital and physical means. Understanding hybrid access approaches emphasizes the importance of accommodating diverse preferences and ensuring inclusivity by providing multiple avenues for educators to access learning resources. The mention of learning modules being available through both photocopy and internet sources suggests a hybrid approach to access. This flexibility caters to different preferences and situations, acknowledging the diversity in educators' access needs. The availability of learning modules through both photocopy and internet sources, presents a hybrid access approach. This flexibility caters to diverse preferences, acknowledging the varied needs of educators in accessing learning materials. This is practically most needed and fit the context of BARMM wherein not all teachers or students have access to strong internet connections, nor do they have the financial means to print copies of modules (Anderson & Johnson (2018).

The findings highlight the critical role of digital access in contemporary education. While internet downloads dominate, the resourceful adaptation to alternative methods and the challenges associated with technology dependence call for a comprehensive approach to ensure equitable access to Science learning modules in the BARMM. The synthesis of these findings has profound implications for practice, suggesting strategic interventions to enhance access to MBHTE-BARMM Science Learning Modules. These implications include improving digital infrastructure, enhancing distribution strategies, promoting flexibility in access, and capacity building for educators.

3.1.2. Completeness of MBHTE-BARMM Learning Modules: Availability

Participants consistently express positive feedback on module availability, almost all of participants consistently emphasize Positive Feedback on Module Availability. Below is the common response from these mentioned participants:

"Yes, available" (P4)

Participants consistently mention that the MBHTE-BARMM Learning Modules are available. This overarching theme reflects the overall positive response regarding the availability of the modules. Overall, there is positive feedback on the availability of MBHTE- BARMM Learning Modules. This provides a foundation for the effectiveness of the curriculum in reaching out to teachers. Positive feedback on module availability is foundational for the effectiveness of the curriculum in reaching teachers and facilitating learning.

According to the study of Bugler et al., (2017), teachers indicated that they crave materials that better serve the range of students in their classrooms and that enliven learning. Indeed, teachers in more than one of the focus groups described themselves as materials "hunter-gatherers." Teachers spent looking for resources that they need in order to support their students' learning. Teachers resisted quantifying precisely how much time they spent searching for resources; typical responses to this question included "too much" and "you don't really want to know." Cajayon & Benavides (2022) pointed out that the lack of suitable instructional materials and other devices that the teacher can use in teaching all over the country resulted in poor performance of the students in the National Achievement Test. This failure is also connected to the fact that instructional materials that are aligned with the target competencies are scarce.

3.1.3. Evaluating Accessibility of MBHTE-BARMM Learning Modules

Almost all of participants consistently emphasize Accessibility with High Internet Connection as the primary mode of accessing MBHTE- BARMM Learning Modules. Below is the common response from these mentioned participants:

"It is very accessible for those who have high internet connection" (P2).

The findings indicate a unanimous agreement among participants, indicating a shared consensus on the high accessibility of the internet. This collective agreement points towards a strong correlation between internet connectivity and the accessibility of learning modules. The participants seem to confirm that a reliable and robust internet connection is a crucial factor influencing how easily they can access educational materials. High-speed internet plays a critical role in ensuring accessibility to learning resources. The emphasis on high-speed internet underlines the importance of a fast and stable connection for effective engagement with educational content.

This external reference aligns with the participants' collective viewpoint, providing additional support to the notion that internet accessibility is pivotal in the context of accessing learning modules. The consensus among participants regarding high internet accessibility serves as further validation of Smith and Brown's emphasis on the critical role of high-speed internet. This alignment in perspectives emphasizes the interconnected nature of internet connectivity and the effective utilization of learning resources. Promoting internet accessibility ensures advocating for improved internet infrastructure to enhance accessibility for all educators, minimizing dependency on specific individual (Brown et al., 2022).

3.1.4. Exploring Access Methods for MBHTE-BARMM Learning Modules

Nearly all participants have consistently emphasized that the modules can be accessed via internet through downloading, added to that is their mentioned of the tendency for teachers to save a soft copy. Below is the common response from these mentioned participants:

"It can be accessed via internet through downloading it and save a soft copy of it" (P2)

The uniform emphasis on digital access highlights the consistency in participants' understanding of accessing modules via the internet, reflecting a technological standardization. The foundational role of standardized digital access, emphasizing that a consistent understanding is vital for promoting technological literacy among educators. This highlighted the importance of digital accessibility for educational materials, emphasizing that a standardized approach, as seen in the uniform understanding, contributes to effective learning outcomes. Strengthening digital literacy means promoting digital literacy among educators to ensure a standardized understanding of accessing modules through the internet. In their research on digital literacy in education, the need for continuous professional

development to enhance educators' digital literacy skills and ensure effective utilization of online resources (Brown et al., 2022).

3.1.5. Exploring Access Methods for MBHTE-BARMM Learning Modules

The majority encountered by the participants is the low internet connection, which makes the learning module inaccessible. Participants consistently mention High Internet Connection Requirement as a challenge in accessing MBHTE-BARMM learning module, almost all of participants namely consistently emphasize High Internet Requirement.

"It is not very accessible for those who have low internet connection (P2)"

Most participants highlighted the issue on low internet connection, a situation where the participants have a slow or unreliable internet connection. In the context of BARMM, a province in the southern part of Mindanao, internet connectivity is often problematic due to lack of available infrastructure to boost its internet. The low internet connection could be due to various reasons such as a weak Wi-Fi signal, limited bandwidth, or other technical issues related to internet connectivity. The main consequence of the low internet connection is that it makes the learning module inaccessible. Participant 2 specifically pointed out that the modules are not very accessible for those with low internet connections. This means that even though the learning modules are supposed to be available online, participants with poor internet connections are facing challenges in accessing and utilizing these resources effectively.

In essence, the finding highlights a technological barrier (low internet connection) in the context of BARMM that is hindering the teachers from fully engaging and accessing the learning modules. This entails the need for officials in the MBHTE – BARMM to address internet connectivity issue to ensure equal access and participation for all education stakeholders, regardless of their internet connectivity constraints. Potential solutions might include optimizing the modules for slower internet speeds, providing alternative offline materials, or improving overall internet infrastructure for the participants. Challenges with low internet accessibility, fluctuating signals, and extra expenses for teachers in remote areas highlight disparities in internet access, affecting module accessibility. In their study on internet accessibility, this highlights that challenges with low internet accessibility and fluctuating signals contribute to inequities in accessing online modules, especially in remote areas. Improving internet accessibility. This refers to addressing internet accessibility challenges, especially in remote areas, by exploring alternative connectivity solutions and reducing extra expenses for teachers (Brown et al., 2022).

3.1.6. Frequency of Integration: Utilizing MBHTE-BARMM Learning Modules in Teaching

Participants consistently mention Continuous and Encouraged Usage in utilizing the MBHTE-BARMM Learning Modules, almost all of participants consistently emphasize Continuous and Encouraged Usage.

"I constantly use it since, even now, it is still highly recommended to be taken (P2)"

"…we always use it because it is really required to use especially during pandemic even up to now it is still advisable to be used (P5)"

Continuous and highly encouraged usage is consistently highlighted across participants, underscoring the ongoing relevance of MBHTE-BARMM Learning Modules. The importance of continuous usage of educational materials to foster a consistent learning environment. Johnson and Williams (2018) argue that ongoing encouragement for utilization aligns with effective teaching practices, ensuring that educators capitalize on valuable resources. Continuous relevance means continuous and highly encouraged usage of resources indicates the sustained relevance of MBHTE-BARMM Learning Modules in the teaching practices of the teachers.

3.1.7. Evaluating Efficacy of MBHTE-BARMM Learning Modules in Attaining Learning Objectives

Participants consistently mention that these Science learning modules are helpful in achieving the learning objectives, almost all of them consistently emphasize Positive Affirmation.

"Yes, it helps (P1-P8)"

"Yes, using the module really helped (P21)"
"Yes, Maam but they are limited resources (P22)"

Instructional Materials such as learning modules are important elements to achieving effective delivery of instruction and achieving learning objectives. According to the study of Olipas (2023), instructional materials are both print and non-print materials used to convey knowledge to learners during the learning process. Prints, textbooks, periodicals, newspapers, slides, photographs, workbooks, and electronic media are examples of instructional resources. Instructional materials are devices or objects employed by teachers to facilitate the teaching- and-learning process. As expressed by Abubakar (2020), instructional materials contribute to the improvement of the academic performance of learners. Thus, instructional materials are essential elements in the delivery of quality instruction and the achievement of learning objectives.

In today's generation, quality education is continuously improved and developed through the different efforts and activities of learning institutions for the benefit of learners. The use of instructional materials is intended to increase the quality of education for students to achieve better academic results. Through instructional materials like learning modules that serve as learning resource, learning abstract concepts is facilitated by concretizing ideas and stimulating the minds of the learners. Properly designed instructional materials also contribute to the increase in engagement and motivation among the learners. Also, selecting, designing, and/or using appropriate IMs are advantageous and useful in the teaching-and-learning process for both the learners and the teachers (Ajoke, 2017). Thus, IMs improve the learning process.

3.1.8. Assessing the Strengths and Weaknesses of MBHTE-BARMM Learning Modules

Participants consistently mention structural strength vs. comprehension hurdles when they were asked about the strengths and weaknesses of the MBHTE-BARMM Learning Modules, almost all of participants consistently emphasize structural strength vs. Comprehension Hurdles.

The advantages and benefits of using Science learning modules enabling teachers to teach conveniently and learners to acquire knowledge and develop new skills due to its best structural features. It helps in encouraging learners to increase pay higher levels of attention and enhance the student's interest if its structures are vivid and show the blueprint of the lesson directly just like what is in the Activity 3 portion of the MBHTE-BARMM learning modules. that shows the brief background of the lesson with the key concepts.

The utilization of instructional materials improves students' memory, facilitates the teaching-learning process, and increases their accumulation rate. It also assists teachers in correcting misconceptions among students, providing personal lessons, encouraging teacher innovation, and allowing students and teachers to learn activities that promote the concept of self-evaluation in tangible terms. Instructional materials also influence the attainment of student learning outcomes in schools (Muraina, 2015). Thus, the integration of appropriate instructional materials into different courses is necessary for the effective learning process.

3.2. State of Implementation of the MBHTE-BARMM Learning Modules

3.2.1. Exploring Technical Challenges in Utilizing MBHTE-BARMM Learning Modules: Identification and Analysis of Specific Issues

Participants consistently reported typographical errors as a technical issue encountered in the implementation of the MBHTE-BARMM learning modules as perceived by the teacher- user participants, almost all of them consistently emphasize typographical errors.

"Yes, typo errors only (P1)"
"I think there are less technical issues on it because mostly are typo errors only. (P4)"
"Yes, what I possibly observe are misspelled words but due to typo errors only of course no one is perfect (she smiles) (P5)"

The consistent mention of typographical errors indicates a prevalent issue in the accuracy of written content within the modules. This issue may affect the clarity and understanding of the learning materials. According to Davis and Smith (2018), the presence of typographical errors in educational materials can significantly impact the accuracy and clarity of content. Addressing this issue is crucial for ensuring the reliability and effectiveness of the learning modules. In a nutshell, the technical challenges encountered by the teachers that are found in the learning module they use, from MBHTE – BARMM poses various implications. The typographical errors reported by participants highlight a need for thorough proofreading and editing of the learning modules before distribution. Addressing this issue is crucial for ensuring the accuracy and reliability of the content.

The consistent identification of typographical errors within the learning modules underscores a pervasive challenge in maintaining the accuracy of written content. This issue has the potential to compromise the clarity and overall comprehension of the educational materials, posing significant concerns for effective learning. As asserted by Davis and Smith (2018), the presence of typographical errors in educational materials can have far-reaching consequences, adversely affecting both the accuracy and clarity of the content, there will be a need of refined accuracy with its presence. The impact of typographical errors extends beyond mere technicalities; it influences the reliability and effectiveness of the learning modules. The reported technical challenges faced by teachers utilizing modules from MBHTE – BARMM reveal various implications for the educational landscape. The presence of typographical errors, as highlighted by participants, underscores a critical need for meticulous proofreading and editing of learning modules before their distribution. In essence, the recognition of typographical errors as a recurrent issue serves as a call to action for comprehensive quality assurance processes in content creation.

By addressing these technical challenges, particularly through rigorous proofreading and editing, educational institutions can ensure the accuracy, reliability, and overall efficacy of learning materials. This commitment is pivotal for upholding the integrity of the educational content and, by extension, fostering an optimal learning environment for both teachers and students. With this, refined accuracy is essential for upholding the integrity of information, enhancing communication effectiveness, and building trust among the audience or users. It reflects a commitment to delivering high-quality and reliable content by addressing any shortcomings or inaccuracies that may compromise the overall clarity and credibility of the material. In various contexts, refining accuracy may involve thorough proofreading, fact- checking, and quality control measures to ensure that the information presented is free from errors and aligns with established standards. This can be relevant in academic writing, research, content creation, or any situation where the precision and correctness of information are critical. Refine accuracy refers to the process of improving and enhancing the precision, correctness, and reliability of information, data, or content. When you refine accuracy, you are actively taking steps to eliminate errors, inconsistencies, or inaccuracies in order to produce a more reliable and trustworthy outcome.

3.2.2. Examining Pedagogical Challenges in Utilizing MBHTE-BARMM Learning Modules: Identification and Analysis of Specific Issues

Participants consistently mention Cognitive Load and Questioning Complexity as a pedagogical challenge encountered in the implementation of the MBHTE-BARMM Science learning modules as perceived by the teacher-user participants, almost all of them consistently emphasize Cognitive Load and Questioning Complexity.

> *"Problem exists with the high level of questions and information found in the learning modules (P1)"*
> *"Even if the child is smart and have an idea of what an earthquake is, but they made two topics into one topic (P2)"*

Participants identify a problem with the high level of questions and information in modules, impacting learners' ability to express themselves effectively. As can be seen from the sample interview transcripts, expressed concerns about the high level of questions and the integration of complex topics in the learning modules, impacting learners' ability to comprehend and respond effectively. For instance, P1 mentioned that the in the science learning modules, there are parts where students are required to express themselves to answer the questions. However, she stated that the task is quite challenging for the learners who have no capacity yet to express themselves, especially after the learning gaps they experience as a result of the pandemic. On the other hand, P2 said that some topics were

appeared to have shortcut and that there are some aspects to the topic that were not expanded or discussed in the module, such as the discussions on earthquake.

The finding implies an issue on cognitive load, thus, there is a need for learning module to be contextualized and individualized to the target learners, and the kind of learners who will use it. As argued by Smith et al. (2019), that personalized learning paths, achieved through differentiated activities, are essential for addressing the diverse needs of students, fostering engagement, and achievement. The identified challenges related to the cognitive load and questioning complexity highlight potential barriers to effective learning. Simplifying questions and ensuring topics are appropriately segmented could enhance learner understanding. Cognitive load theory suggests that excessive cognitive demands, such as those posed by complex questions, can hinder learning. Simplifying questions and breaking down complex topics align with strategies to manage cognitive load and enhance comprehension (Sweller et al., 2020).

3.2.3. Exploring Organizational Issues in Utilizing MBHTE-BARMM Learning Modules: Identification and Analysis of Specific Issues

Participants consistently mention Limited Sharing Resources as an organizational challenge encountered in the implementation of the MBHTE-BARMM Science learning modules as perceived by the teacher-user participants, almost all of them consistently emphasize Limited Sharing Resources.

> *"Yes, not all teachers who have figured out how to download and obtain a copy of the learning modules are willing to share the soft copy of those modules with others (P4)"*

Majority of the participants shed light on a different organizational challenge related to interpersonal dynamics among teachers. The participant expressed concerns about a lack of willingness among some teachers to share knowledge. There seems to be a reluctance to freely exchange information, potentially hindering the collaborative learning environment. Moreover, the participant shares a personal struggle tied to communication issues, particularly as someone not originally from the local community. This dual challenge of information sharing reluctance and communication barriers poses hurdles to effective collaboration and professional development among teachers.

Moreover, the statements from participants in the interview transcripts highlight a common challenge related to knowledge-sharing and collaboration among teachers. According to P4, not all teachers who have successfully figured out how to download and obtain learning modules are willing to share the soft copy of those modules with their colleagues. This reluctance to share valuable resources creates a barrier to collaborative learning and can potentially hinder the overall effectiveness of the teaching community.

The findings shed light on the need for fostering a more open and collaborative culture among teachers in MBHTE - BARMM. Overcoming the hesitancy to share learning resources is essential for creating an environment where educators can benefit from each other's expertise and contribute collectively to the improvement of teaching practices. This calls for initiatives that encourage knowledge-sharing, collaboration, and the development of a supportive community within the educational institution. Addressing these cultural aspects can contribute to a more harmonious and effective teaching environment, ultimately benefiting both teachers and students in their educational journey.
This entails that the reliance on self-initiative for resource access indicates that teachers take individual responsibility for obtaining learning materials. Encouraging proactive approaches and providing necessary tools can empower teachers in resource acquisition. Reluctance among teachers to share resources highlights potential barriers in collaboration. Fostering a culture of generosity and resource-sharing is essential for a supportive teaching community. Collaborative efforts and networks play a crucial role in accessing modules. Establishing clear communication channels and networks within the teaching community can enhance resource-sharing practices (Burt, 2010).

According to Cobcroft et al., (2006), the reliance on self-initiative for resource access emphasizes individual efforts among teachers. Encouraging proactive approaches to obtain learning materials could contribute to a more

empowered teaching community. Meanwhile, the reliance on networks and collaborative efforts to access modules indicates the importance of a supportive teaching community. Establishing clear communication channels and networks can facilitate resource sharing. Collaborative efforts and networks play a crucial role in accessing modules. Establishing clear communication channels and networks can facilitate resource-sharing practices.

3.3. The Suggestions given by the Teacher-Users to Improve the Implementation of the MBHTE-BARMM Learning Modules

3.3.1. Enhancing Availability and Accessibility: Stakeholder Suggestions for Improving MBHTE-BARMM Learning Modules in Schools

Many participants collectively suggested that there should be available module for offline accessibility. This emphasizes the need for Science learning modules to be accessible without an internet connection. This also underscores concerns about exclusive online availability and the importance of accommodating various access scenarios. It can be recalled in the previous sections that the respondents mentioned that some of them do not have strong internet connection to permit them to access or download the learning modules. Advocacy for offline accessibility of learning resource materials is a crucial initiative that focuses on ensuring that educational content can be accessed without requiring a continuous internet connection. This is particularly relevant in regions or situations where internet access is limited or unreliable. Together, these stakeholders can work towards implementing solutions that enhance offline accessibility. Thus, advocating for offline accessibility in learning resource materials is a proactive approach to address challenges associated with limited or unreliable internet access. It is a crucial step towards making education more inclusive, equitable, and resilient in diverse global contexts. The concept of an "offline access drive" has become increasingly significant, reflecting a proactive response to the challenges posed by limited or unreliable internet connectivity, particularly in underserved regions.

According to Smith (2021), the need for offline access to digital resources, such as educational materials and digital libraries, has gained prominence due to the recognition that not everyone has consistent internet access. This is particularly crucial in remote areas where individuals may face obstacles in connecting to the online world regularly. In the implementation of offline access drives, organizations and institutions strategize the distribution of offline versions of digital resources through tangible mediums like USB drives, DVDs, or other storage devices. The objective is clear: to empower individuals in areas with restricted internet connectivity to access educational modules, e-books, or videos even without a continuous internet connection. The offline access drive aligns with the broader goal of fostering inclusivity in education by bridging the digital gap that might impede learning opportunities for those in remote or marginalized communities. In essence, the offline access drive emerges as a practical and impactful solution to promote digital inclusivity, acknowledging the diverse needs and challenges faced by individuals in different parts of the world. This further emphasizes that by reducing dependency on continuous internet access, these initiatives contribute significantly to democratizing access to education and information, fostering a more inclusive and equitable global learning landscape.

3.3.2. Enhancing Utilization: Teacher Recommendations for Improving the Use of MBHTE-BARMM Learning Modules in Teaching

Participants recommended that modules should be simplified based on the level of comprehension of their learners to ensure meaningful utilization, aligning content with cognitive abilities of their children, almost all of them consistently emphasize simplicity for learner comprehension.

Most importantly, the recurring theme of advocating for simplicity in modules emphasizes the importance of clarity and comprehension. Teachers recognize potential challenges in learner understanding and propose strategies to enhance overall comprehension. Overall, the findings reflect a teacher-centric perspective on enhancing the utilization of MBHTE-BARMM Science Learning Modules. These insights provide valuable guidance for educational authorities in developing and refining instructional materials, ensuring that they meet the diverse needs of teachers and students in the region. Additionally, the recommendations underscore the importance of ongoing collaboration between teachers, educational institutions, and policymakers to create a robust and responsive educational ecosystem. Differentiated activities include easy to moderate activities that matches the

cognitive level or abilities of the learners in the BARMM. The call for differentiated activities in the context of MBHTE – BARMM implies a departure from a one-size-fits-all instructional model. Instead, it suggests an approach where writers of modules provide a range of activities within the modules to address the diverse learning styles, strengths, and challenges of Bangsamoro learners These activities may vary in complexity, format, or focus, allowing students to engage with the content in ways that align with their individual preferences and abilities.

Cognitive simplification is an act of ensuring accessible learning. Ensuring accessible learning refers to multifaceted concept that revolves around creating an inclusive and equitable educational environment that accommodates the diverse needs and abilities of all learners. The goal is to remove barriers to learning, providing every student with an equal opportunity to participate, engage, and succeed in their educational journey. Ensuring accessible learning is a multifaceted concept essential for fostering an inclusive and equitable educational environment that caters to the diverse needs and abilities of all learners. This comprehensive approach aims to eliminate barriers to learning, ensuring that every student has an equal opportunity to actively participate, engage, and succeed in their educational journey. The commitment to accessibility reflects a dedication to creating a learning environment where the unique strengths and challenges of each student are recognized and accommodated, promoting an educational landscape that values diversity and supports the holistic development of every learner.

Ensuring accessible learning is a multifaceted concept crucial for establishing an inclusive and equitable educational environment that caters to the diverse needs and abilities of all learners (Jones, 2023). This comprehensive approach is centered on the removal of barriers to learning, striving to grant every student an equal opportunity to actively participate, engage, and succeed throughout their educational journey. Embracing accessibility in education signifies a commitment to recognizing and addressing the unique strengths and challenges of each student, cultivating an educational landscape that values diversity and promotes the holistic development of every learner.

3.3.3. Strategic Module Preparation: Addressing Challenges, Incorporating Suggestions, and Identifying Key Topics for Comprehensive Inclusion

Participants consistently target Ensuring Accessible Learning as suggestion on how the Learning Modules should be Prepared, almost all of them consistently emphasize Ensuring Accessible Learning.

Ensuring accessible learning is a critical aspect of building an inclusive and equitable education system. Accessible learning refers to the provision of educational opportunities that are available and tailored to meet the diverse needs of all learners, irrespective of their physical or cognitive abilities. This theme is rooted in the belief that education is a fundamental right and should be accessible to every individual, regardless of their background, abilities, or disabilities. In this comprehensive analysis, we will explore the importance of accessible learning, its benefits, challenges, and potential solutions, with a focus on reinforcing the need for inclusive education. The emphasis on differentiated activities reflects a learner-centric approach, recognizing the diversity of student abilities and the need for personalized learning paths. DU363, P13 emphasizes the need for supplementary activities for students who may struggle with certain module tasks, promoting inclusivity.
Accessible learning ensures that every student has an equal opportunity to access and benefit from education. It promotes a level playing field, allowing individuals with diverse abilities to participate and thrive in the learning environment. The findings reveal a comprehensive set of recommendations and perspectives from participants on module preparation. The overarching themes highlight a commitment to learner-centered, accessible, and contextualized education. The alignment with the MELC framework underscores a dedication to adhering to curriculum guidelines, ensuring that modules address essential competencies outlined by DepEd. Thus, the synthesized insights and recommendations from participants contribute to a holistic understanding of how modules should be prepared, taking into account the unique needs, abilities, and challenges of learners. These findings provide valuable guidance for educational authorities and curriculum developers in creating responsive and effective learning materials for the MBHTE-BARMM region. As highlighted by Tomlinson (2001), inclusive education calls for supplementary activities that address individual student needs, ensuring no learner is left behind. The suggestion to incorporate real objects and vivid visuals aims to enhance multisensory engagement,

making the learning experience more enjoyable and impactful, particularly in subjects like science. This is especially crucial for students in remote areas of the BARMM region with limited exposure to technology.

3.4. Proposed Model to Improve the Implementation of the MBHTE-BARMM Learning Modules

Based on the results and discussions presented in the study, a model for improving the implementation of MBHTE-BARMM Science learning modules is proposed. This model integrates key themes and recommendations identified throughout the research. As can be seen, the proposed model consists of 6 dimensions or areas where the implementation of the MBHTE – BARMM can be improved. This model addresses the critical areas of improvement that all stakeholders or persons involved in the development of science learning modules in MBHTE – BARMM should take into consideration.

Developed from a thorough analysis of four crucial research questions, the SPECTRA model goes beyond conventional frameworks, introducing six key dimensions to enhance the implementation of MBHTE-BARMM Science learning modules:

1) Offline Access Drive: Focused on ensuring modules are accessible offline, this dimension addresses the need for flexibility in resource utilization, catering to diverse learning environments.
2) Constant Usage: The SPECTRA model promotes continuous engagement with Science learning modules, emphasizing a sustained and immersive learning experience for teacher-users and students alike.
3) Refined Accuracy: Precision in content and delivery is paramount. The Refined Accuracy dimension of SPECTRA ensures that MBHTE-BARMM Science learning modules meet the highest standards of quality and effectiveness.
4) Cognitive Simplification: Recognizing the importance of user-friendly content, SPECTRA emphasize the simplification of complex concepts to enhance comprehension, facilitating a more effective teaching and learning process.
5) Fostered Knowledge-Sharing: Collaboration is key. SPECTRA encourage a culture of knowledge-sharing among teacher-users, fostering an environment where insights, best practices, and challenges are openly discussed and addressed.
6) Ensuring Accessible Learning: The ultimate goal of SPECTRA is to make quality education accessible to all. This dimension focuses on removing barriers to access, ensuring that the benefits of MBHTE-BARMM Science learning modules are extended to every learner.

Visualized in Figure 1, the SPECTRA model serves as a dynamic guide for stakeholders, encapsulating the insights from research questions and offering a strategic, multi-dimensional approach to elevate the educational experience in the BARMM region and beyond.

Figure 1: *SPECTRA Model*
(Science Module Excellence Framework for MBHTE-BARMM)

4. Conclusion

This study provided a thorough examination of various facets of the MBHTE- BARMM Science Learning Modules, focusing on its accessibility, availability, and utilization. The importance of digital access in contemporary education is evident, with a dominance of internet downloads. However, challenges related to technology dependence call for a comprehensive approach to ensure equitable access. The positive feedback on the availability of learning modules and proposed improvement strategies underscores the commitment to enhancing the curriculum's effectiveness and addressing educators' concerns. Strategies for improvement in accessibility encompass a wide range of measures, including addressing coordination issues, promoting digital literacy, fostering collaboration, and institutionalizing access protocols.

These efforts are essential to creating effective access methods for educators, emphasizing a balanced approach that leverages both individual efforts and institutional support. Moreover, the comprehensive approach to addressing challenges in accessing MBHTE-BARMM Learning Modules involves infrastructure improvement, streamlined procedures, content adaptation, and community engagement. This approach aims to contribute to a more inclusive and effective learning environment for educators and students alike. Additionally, findings emphasize the multifaceted nature of module integration, requiring ongoing support, strategic planning, and adaptive approaches to ensure effective utilization in teaching practices.

The evaluation of MBHTE-BARMM Science learning module implementation indicates a consistent acknowledgment of the modules' availability. Participants consistently convey positive feedback, highlighting the overall positive response regarding the accessibility of MBHTE-BARMM Learning Modules. This suggests that proposed improvement strategies aim to enhance the curriculum's overall effectiveness, addressing specific concerns raised by educators for a more impactful learning experience. Concerning the accessibility of MBHTE-BARMM learning modules, the prevalence of internet downloads underscores the crucial role of digital access in contemporary education.

This implies that while internet-based distribution is widespread, challenges associated with technology dependence necessitate a comprehensive approach to ensure equitable access. Regarding utilization, there is an emphasis on continuous and encouraged usage to foster a consistent learning environment. This implies that the ongoing encouragement aligns with effective teaching practices, ensuring that educators capitalize on valuable resources. Continuous relevance, denoting continuous and highly encouraged usage of resources, indicates the sustained significance of MBHTE-BARMM Learning Modules in the teaching practices of educators.

Issues and challenges in the implementation of MBHTE – BARMM Science learning modules reveal technical, pedagogical, and organizational hurdles. Technical issues, such as typographical errors, underscore the need for thorough proofreading and editing before module distribution to ensure accuracy and reliability. Pedagogical challenges involve the high level of questions and information in modules, impacting learners' ability to express themselves effectively. This implies an issue with cognitive load, necessitating the simplification of learning modules for the target Bangsamoro learners. Organizational issues highlight concerns about some teachers' reluctance to share knowledge, potentially hindering a collaborative learning environment. Thirdly, suggestions for improving MBHTE-BARMM learning modules consistently emphasize the importance of cognitive simplicity. Participants advocate for simplicity in modules, implying the significance of clarity and comprehension. Bangsamoro teachers recognize potential challenges in learner understanding and propose strategies to enhance overall comprehension. Overall, the findings reflect a teacher-centric perspective on enhancing the utilization of MBHTE-BARMM Learning Modules.

Suggestions for improving the implementation of the use of MBHTE-BARMM Science learning modules consistently target Ensuring Accessible Learning. This includes localizing learning content, ensuring ease of access and availability, tailoring to children's cognitive level, timely weekly module availability, differentiation for diverse learning needs, and employing diverse distribution channels. Grounded in the findings of the study, this paper proposes the SPECTRA model, a comprehensive framework designed to address identified challenges and enhance the overall effectiveness of MBHTE-BARMM Learning Modules in the Bangsamoro region.

Continuous efforts are recommended, focusing on cultural relevance, alignment with the central curriculum, effective module structure, and addressing challenges related to comprehension, printing, accessibility, and content dynamics. Ongoing evaluation and refinement are crucial for adapting modules to evolving student and educator needs.

On the other hand, the identified areas for improvement in instructional design and the recognition of the multifaceted strengths and weaknesses of learning modules being implemented in MBHTE - BARMM calls for continuous efforts. Critical findings that were explored in this study which revealed of the several key areas that MBHTE–BARMM need to address for the improvement of the implementation of the learning module, entails that releasing or production of learning modules need to undergo first thorough evaluation and a smooth systematic way of production and distribution. While this study shed light on the status of the implementation of the learning module in the BARMM region, more studies need to be conducted to also explore the other regions as to the learning materials they implemented.

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