Development and Validation of E-Module in Teaching Earth's Motion for Grade 6

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ABSTRACT

This study used a quantitative-qualitative descriptive. The research design used in this study was One-Group-Pretest-Posttest Design. The data collection technique in this study used a test that is giving a pre-test for learners before the treatment is done by using electronic module-based teaching material. After treatment, learners will be given a post-test again to see the effectiveness of the application of electronic modules. The quantitative research data were obtained from the performance of the respondents in the achievement test. Qualitative research data, on the other hand, were obtained from the perception of the learners towards the use of e-module. The researcher chose the respondents by purposive sampling method which is a sampling technique where the researchers rely on their own judgment when choosing members of the population to participate in the study. The findings from the validation of the e-module focused on four key factors: Content Quality, Instructional Quality, Technical Quality, and Other Findings. In assessing Content Quality, the majority of components received ratings ranging from 3.4 to 4, interpreted as Very Satisfactory (VS). The total points for this factor were 39, indicating that it passed the criterion. Similarly, Instructional Quality was evaluated, with most components scoring between 3.8 and 4, also interpreted as VS. The total points for this factor were 39.8, resulting in a passing evaluation. Technical Quality assessment revealed that the majority of components received ratings of 3.2 to 4, again interpreted as VS. The total points for this factor were 50.4, indicating a passing evaluation.

Keywords: e-module, development, validation, earth's motion, perception, e-learning

INTRODUCTION

The importance of science education in society can be attributed to how it determines each person's level of literacy about scientific concepts, ideas, and principles in the community. Teaching all children to higher performance standards has proven to be a constant challenge for educators, particularly when it comes to giving kids the skills on how to be more functionally literate and globally competitive. The Philippines lags other nations in the world in terms of educational quality, especially in a science topic (Millanes et al., 2017; Rogayan Jr & Dollete, 2019). According to the World Economic Forum by Schwab and Sala-i-Martn, the Philippines' mathematics and science education ranked 70th out of 144 participating nations (2016). The Trends in International Mathematics and Science Study also showed this (Foy et al., 2013).

One issue that frequently affects science students is their lack of scientific topic knowledge. This is corroborated by research by Großschedl et al. (2014), which found that helping students advance their knowledge of subjects like science presents the most challenge for teachers. They stated that a variety of elements, including learners' prior knowledge, intelligence, and motivation, have an impact on these

challenges.

The 7E educational approach is a comprehensive model that supports a range of pedagogical approaches, including direct instruction, group work, cooperative learning, lectures, and laboratory studies (Balci et al., 2011). Learners can examine their views and create new information while eradicating their misconceptions by allowing their mental processes to be apparent (Bulbul, 2010). The 7E learning cycle is a student-centered, inquiry learning strategy that lays the foundation for proper conceptualization by students through various activities, spread across seven phases. These phases, Elicit, Engage, Explore, Explain, Elaborate, Evaluate and Extend, according to Gok et al. (2014), allows students to correct their misconceptions through exploration, and facilitate clarification by the teacher, and aided by explanations by the students themselves. The 7E model of instructional delivery similarly deepen understanding of concepts by other activities, such as evaluating students' conception against acceptable scientific explanations, as well as the extension (application) of obtained knowledge to new situations (Gok et al, 2014). This method encompasses various methods that aid students to construct new knowledge, such as cooperative learning, group work, laboratory investigations and direct instruction, by clearing their thought processes (Bulbul, 2010; Balci et al., 2011). Furthermore, the 7E model, which is a constructivist approach to learning, encourages peer interaction, in which students collaborate and discuss concepts with a view to meaningfully understand them (Zimmerman, 2007). This increases conceptual understanding among students, probably due to gains in understanding during discussions, or because of knowledgeable students among the peer groups (Smith et al., 2008). Being a student-centered pedagogic approach, the 7E model of instruction significantly improves students' satisfaction, self-reported engagement and increases students' achievement (Armbuster, 2009).

According to results of the Division of Iligan City Exit Examination Test conducted last S.Y. 2022-2023, one of the least competencies learned by Grade 6 elementary learners in science is earth science 'Differentiate between rotation and revolution and describe the effects of Earth's motions (S6ES-IVd-f-4-5).' This study aims to design and utilize an e-module as supplementary teaching material. The e-module was developed using the 7E model, which provides a structured and inquiry-based approach to teaching. By utilizing an interactive e-module, the researchers seek to enhance students' understanding and engagement with the topic, ultimately fostering their mastery of the concept.

By creating an innovative and interactive e-module, this study endeavors to bridge the gap in teaching the Earth's Motions and its effects to Grade 6 learners, aligning with the goals of the Science Framework for Philippine Basic Education and the growing body of research supporting the effectiveness of interactive e-modules in improving student outcomes.

The objective of this study developed an interactive e-module on the Rotation, Revolution and the effects of Earth's motions for Grade 6 learners in order to improve their conceptual understanding on Earth and Space Science. To attain the general objective of this study, this study aims to analyze the effects of e-modules on students':

1. Develop an e-module on Earth's motions for Grade 6 learners.

2. Evaluate the e-module instruction on Earth's motions.

METHODS

Research Design

This study used a quantitative-qualitative descriptive. The research design used in this study was One-Group-Pretest-Posttest Design. The data collection technique in this study used a test that is giving a pre-test for learners before the treatment is done by using electronic module-based teaching material. After

treatment, learners will be given a post-test again to see the effectiveness of the application of electronic modules. The quantitative research data were obtained from the performance of the respondents in the achievement test. Qualitative research data, on the other hand, were obtained from the perception of the learners towards the use of e-module.

The researcher chose the respondents by purposive sampling method which is a sampling technique where the researchers rely on their own judgment when choosing members of the population to participate in the study. Purposive sampling may prove to be effective when only a limited number of participants can serve as primary data sources due to the nature of the research design. The participants were purposely selected by the researchers based on the following: (1) A grade 6 learner, (2) the availability of the class (3) permission and consent form from the adviser, parents, students, Science teacher, and principal.

Research Subjects and Participants

The research subjects of the study were the Grade 6 learners of Mimbalot Elementary School who are enrolled during the school year 2023-2024. The inclusion of Grade 6 learners from Mimbalot Elementary School during this specific school year ensures that the study captures relevant and current insights into the educational needs and experiences of this cohort within the selected research setting. Additionally, another group of Elementary Science teachers, and a panel of experts will be chosen through purposive sampling. Five (Elementary Science teachers) and 10 Grade 7 learners answered the needs assessment survey. Also, a panel of experts evaluated the developed needs assessment survey questionnaire for teachers and learners and the developed e-module.

Data Gathering Procedure

In the development of the e-module, the 4D method will be employed, comprising four stages: Define, Design, Develop, and Disseminate (Thiagarajan et al., 1974; Lestari, 2018). The Define stage is aimed at defining objectives and constraints; the Design stage is to design initial product; the Develop stage is where modification takes place in accordance with feedback from experts and users; and the Disseminate stage is to distribute the final product. Data collection techniques from this research and development are library studies of lecture materials, questionnaires or questionnaires for needs analysis. Interviews with 35 learners, expert validation to determine the feasibility of the products being developed, and the practicality of the products that have been used by learners.

The data gathering procedure were commenced with the Define stage, where a needs assessment survey will be given to five (5) Science teachers who are currently employed as a teacher handling Science subjects and had at least 5 years in service. On the other hand, ten (10) Grade 7 learners were given also the needs assessment survey to collect insights from learners with direct experience in Earth's Motion. This process ensures feedback from learners and teachers familiar with the challenges of instructing Earth's Motion. In addition, learning objectives will be identified alongside a comprehensive analysis of the curriculum, serving as the primary reference in learning. Concurrently, an analysis of tasks and concepts pivotal to the learning goals and media design will be conducted.

Moving to the Design stage, a storyboard was created to outline the structure and flow of the project, ensuring coherence and clarity. The initial part of the e-module contains the initial appearance of the module (cover) and cover subtitles. Meanwhile, for the content section, there is an explanation of the material and practice questions. Content will be developed in alignment with the defined objectives and curriculum analysis, while instructional strategies and multimedia elements were designed to enhance engagement. In the material description section, the researcher designed the preparation of the material by combining materials, pictures, and illustrations. The selection of images is aligned with the content of the material, aiming to strengthen student understanding. This teaching material presents pictures, and detailed material

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descriptions were included in audio-visual technology teaching materials.

In the subsequent Develop stage, a prototype version of the e-module were created, incorporating feedback gathered during content review and usability testing. This stage chooses and determines the design of the e-module content. The e-module were examined in terms of material, media, and language. This stage also involves validation by experts and subsequent revisions to enhance quality and effectiveness. Then, the researcher revised the e-module according to input from experts. The e-module was feedback for the feasibility test. Feasibility testing will then be conducted to assess the practicality of the e-module in real-world settings.

Finally, in the Disseminate stage, pilot testing was conducted to evaluate the practical implementation and gather feedback for further refinement before full-scale deployment. An effective evaluation were carried out to gauge the impact of the e-module on learning outcomes.

Data Analysis

On the data analysis of this study, the needs assessment responses for the learners and teachers were analyzed through thematic analysis. The mean also will be used to compute the ratings of the elementary science teachers, master teacher and ICT teacher on the developed e-module. Learner's scores in their achievement test will be also analyzed using t-test. In addition, the responses of the learners on their perception in the utilization of the e-module will be quantitively analyzed.

RESULTS AND DOSCUSSION

Needs Assessment for Grade 7 Learners

Summary of the Responses of the Grade 7 Learners on Needs Assessment Questionnaire in the Development of e-module in teaching Earth's motion

Code	Category	Mention	Utterance
Detailed Explanation and Misconceptions	Understanding and Definitions	3	"I used to think that Earth's orbit was perfectly circular, but now I understand it's elliptical." **(NAS-L1)** "Earth's motion explains day and night as well as the changing seasons." **(NAS-L5)** "Earth's motion includes its rotation on its axis and revolution around the sun." **(NAS-L6)**
Conceptual Understanding Issues	Challenges/Problems in Teaching	2	"I had trouble understanding how Earth's tilt affects the seasons." **(NAS-L4)** "It was confusing to grasp the difference between rotation and revolution." **(NAS-L3)**
Asking for Help from Teachers	Coping Strategies/Problem-Solving	1	"Getting clarification from my teacher helped me understand better." **(NAS-L7)**
Partial Recall	Recall and Retention	2	"I can remember that Earth rotates on its axis, but I struggle with the details of its revolution." **(NAS-L6)** "I remember some parts of the process, but I need to review to recall everything accurately." **(NAS-L8)**

In the responses from the Grade 7 learners regarding their understanding and learning needs for Earth's

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motion, several themes emerged. Many students provided detailed explanations and addressed misconceptions, showing an evolving understanding of the topic. For instance, one learner noted, "I used to think that Earth's orbit was perfectly circular, but now I understand it's elliptical" (NAS-L1). Another explained, "Earth's motion explains day and night as well as the changing seasons" (NAS-L5), and a third summarized, "Earth's motion includes its rotation on its axis and revolution around the sun" (NAS-L6).

Despite these insights, learners also reported conceptual understanding issues, indicating challenges in grasping key concepts. One student shared, "I had trouble understanding how Earth's tilt affects the seasons" (NAS-L4), while another found it confusing "to grasp the difference between rotation and revolution" (NAS-L3).

To cope with these difficulties, some students sought help from teachers, with one noting, "Getting clarification from my teacher helped me understand better" (NAS-L7). This indicates the importance of teacher support in overcoming learning challenges.

Finally, when it comes to recall and retention, students showed partial recall of the concepts. One student mentioned, "I can remember that Earth rotates on its axis, but I struggle with the details of its revolution" (NAS-L6), and another added, "I remember some parts of the process, but I need to review to recall everything accurately" (NAS-L8). These responses highlight the need for review and reinforcement to solidify understanding.

Overall, the responses suggest that while students have a foundational understanding of Earth's motion, there are significant challenges in conceptual understanding and recall, emphasizing the need for an e-module that provides clear explanations, addresses misconceptions, and offers opportunities for review and reinforcement.

Needs Assessment for Science Teachers

Summary of the Responses of the Science Teachers on Needs Assessment Questionnaire in the Development of e-module in teaching Earth's motion

Code	Category	Mention	Utterance
Conceptual Understanding Issues	Challenges/Problems in Teaching	3	"Many students have misconceptions about how Earth's motion affects seasons and day/night cycles." **(NAS-T1)** "It's difficult for students to visualize the abstract concepts involved." **(NAS-T2)** "Students often struggle to grasp the concept of Earth's motion." **(NAS-T4)**
Classroom Management Techniques	Coping Strategies/Problem-Solving	2	"I use group activities to manage the classroom and keep students engaged." **(NAS-T3)** "Implementing clear rules and routines helps me maintain order during lessons." **(NAS-T5)**
Differentiated Instruction	Pedagogical Approaches	2	"Differentiated instruction allows me to address both advanced learners and those who need extra help." **(NAS-T1)** "Using various teaching methods helps me reach students with different learning styles." **(NAS-T2)**

Understanding of E-Learning	Familiarity and Application of e-learning	2	"It's about leveraging technology to provide interactive and engaging learning experiences." **(NAS-T2)** "E-learning involves using digital tools and online platforms to enhance teaching and learning." **(NAS-T3)**

The responses from science teachers highlight several key themes and challenges in teaching Earth's motion, which are crucial for the development of an effective e-module. Many teachers identified significant conceptual understanding issues among students. One teacher noted, "Many students have misconceptions about how Earth's motion affects seasons and day/night cycles" (NAS-T1). Another pointed out the difficulty for students to visualize abstract concepts, stating, "It's difficult for students to visualize the abstract concepts involved" (NAS-T2). Furthermore, it was mentioned that "students often struggle to grasp the concept of Earth's motion" (NAS-T4).

In addressing these challenges, teachers have employed various coping strategies and problem-solving techniques. Classroom management is key, with one teacher saying, "I use group activities to manage the classroom and keep students engaged" (NAS-T3). Another emphasized the importance of clear rules and routines, stating, "Implementing clear rules and routines helps me maintain order during lessons" (NAS-T5).

To cater to diverse learning needs, teachers have also adopted differentiated instruction approaches. One teacher remarked, "Differentiated instruction allows me to address both advanced learners and those who need extra help" (NAS-T1). Another highlighted the use of various teaching methods, noting, "Using various teaching methods helps me reach students with different learning styles" (NAS-T2).

Regarding the familiarity and application of e-learning, teachers recognized its potential to enhance teaching and learning. One teacher explained, "It's about leveraging technology to provide interactive and engaging learning experiences" (NAS-T2). Another described e-learning as "using digital tools and online platforms to enhance teaching and learning" (NAS-T3).

Overall, the teachers' responses underscore the need for an e-module that effectively addresses conceptual misconceptions, incorporates diverse instructional strategies, and leverages technology to engage students in learning about Earth's motion.

Experts Rating on the Developed Needs Assessment Questionnaire

Experts Rating on the Developed Needs Assessment Survey

Components	**Mean**	**Description**
Content and Development	2.78	Satisfactory
Format, Organization, and Structure	2.86	Satisfactory
Grammar	2.98	Satisfactory
Overall Average	2.87	Satisfactory

Note: 1.00-1.79 Needs Assessment 3.20-4.19 Very Satisfactory

1.80-2.39 Fair 4.20-5.00 Outstanding

2.40-3.19 Satisfactory

The experts' rating of the needs assessment questionnaire indicates a satisfactory evaluation across all key components. Specifically, the "Content and Development" component received a mean score of 2.78,

reflecting a satisfactory level of relevance and accuracy in the questions posed. The "Format, Organization, and Structure" component scored slightly higher at 2.86, denoting a satisfactory arrangement and coherence of the questionnaire. The "Grammar" component achieved the highest mean score of 2.98, suggesting that the language used in the questionnaire is clear and grammatically sound. The overall average rating of 2.87 confirms that the questionnaire meets satisfactory standards in all evaluated areas. This feedback demonstrates that while the questionnaire is adequately prepared, there is room for minor improvements to enhance its effectiveness further.

Expert Validation of the Developed e-module

Experts' validation of the developed e-module involved engaging subject matter experts with specialized knowledge and experience in the relevant field. The evaluator reviewed the e-module's content, instructional design, and interactive elements to assess its accuracy, relevance, and effectiveness in achieving the stated learning objectives. Their evaluation focuses on various aspects, including the clarity of explanations, the appropriateness of multimedia resources, and the alignment with educational standards and best practices. Experts provided constructive feedback and recommendations for improvement, drawing on their expertise to ensure the module meets the highest standards of quality and educational efficacy. The evaluator validated the credibility and instructional value of the e-module, ensuring it effectively supports student learning and engagement. By incorporating the insights and recommendations of subject matter experts, the e-module can be refined to maximize its educational impact and usability in diverse learning environments.

The researcher utilized Guidelines and Processes for LRMDS Assessment and Evaluation (Evaluation Rating Sheet for Non-Print Materials) to evaluate the e-module by the experts. There were five (5) Science Teachers from Mimbalot Elementary School who were asked to Evaluate the e-module after being Face Validated by the the Thesis Adviser.

The evaluators will consider the four (4) factors of the E-module: Content Quality, Instructional Quality, Technical Quality, and others.

Table 10 Factor A. Content Quality of the e-module

Factor A. Content Quality	E1	E2	E3	E4	E5	MEAN
1. Content is consistent with topics/skills found in the DepED Learning Competencies for the subject and grade/year level it was intended.	4	4	4	4	4	4
2. Concepts developed contribute to enrichment, reinforcement, or mastery of the identified learning objectives.	4	4	4	4	4	4
3. Content is accurate.	4	4	4	4	4	4
4. Content is up-to-date.	4	4	4	4	4	4
5. Content is logically developed and organized.	3	4	3	3	4	3.4
6. Content is free from cultural, gender, racial, or ethnic bias.	4	4	4	4	4	4
7. Content stimulates and promotes critical thinking.	4	4	4	3	3	3.6
8. Content is relevant to real-life situations.	4	4	4	4	4	4
9. Language (including vocabulary) is appropriate to the target user level.	4	4	4	4	4	4
10. Content promotes positive values that support formative growth.	4	4	4	4	4	4

Note: Resource must score at least 30 points out of a maximum 40points to pass this criterion. Please put a check mark on the appropriatebox	TOTAL POINTS	39

Evaluation: Passed

The table shows the evaluation of the extent of e-module in the content quality. Majority of the components obtained a rating of 3.4- 4 interpreted as Very Satisfactory VS. The total points of factor A (content Quality) is 39 interpreted as PASSED.1

Factor B. Instructional Quality

Factor B. Instructional Quality	E1	E2	E3	E4	E5	MEAN
1. Purpose of the material is well defined.	4	4	4	4	4	4
2. Material achieves its defined purpose.	4	4	4	4	4	4
3. Learning objectives are clearly stated and measurable.	4	4	4	3	4	3.8
4. Level of difficulty is appropriate for the intended target user.	4	4	4	4	4	4
5. Graphics / colors / sounds are used for appropriate instructional reasons.	4	4	4	4	4	4
6. Material is enjoyable, stimulating, challenging, and engaging.	4	4	4	4	4	4
7. Material effectively stimulates creativity of target user.	4	4	4	4	4	4
8. Feedback on target user's responses is effectively employed.	4	4	4	4	4	4
9. Target user can control the rate and sequence of presentation and review.	4	4	4	4	4	4
10. Instruction is integrated with target user's previous experience.	4	4	4	4	4	4
Note: Resource must score at least 30 points out of a maximum 40 points to pass this criterion. Please put a check mark on the appropriate box	TOTAL POINTS					39.8

Evaluation: Passed

The table shows the evaluation of the extent of the e-module in the Instructional quality. Majority of the components obtained a rating of 3.8- 4 interpreted as Very Satisfactory VS. The total points of factor B (Instructional Quality) is 39.8 and is interpreted as PASSED.

Factor C. Technical Quality

Factor C. Technical Quality	E1	E2	E3	E4	E5	MEAN
1. Audio enhances understanding of the concept.	4	4	4	4	4	4
2. Speech and narration (correct pacing, intonation, and pronunciation) is clear and can be easily understood.	4	4	4	4	4	4
3. There is complete synchronization of audio with the visuals, if any.	4	4	4	4	4	4
4. Music and sound effects are appropriate and effective for instructional purposes.	4	4	4	4	4	4
5. Screen displays (text) are uncluttered, easy to read, and aesthetically pleasing.	4	4	4	4	4	4
6. Visual presentations (non-text) are clear and easy to interpret.	4	4	4	4	4	4
7. Visuals sustain interest and do not distract user's attention.	4	4	4	4	4	4

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8. Visuals provide accurate representation of the concept discussed.	4	4	4	4	4	4
9. The user support materials (if any) are effective.	3	3	4	4	4	3.6
10. The design allows the target user to navigate freely through the material.	4	4	4	3	3	3.6
11. The material can easily and independently be used.	4	4	4	4	4	4
Technical Evaluation: Complete Section G. Interoperability: Technical format Checklist for conformance If not already completed prior to this review.						
12. The material will run using minimum system requirements.	4	4	4	4	4	4
13. The program is free from technical problems.	3	3	3	4	3	3.2
Note: Resource must score at least 39 points out of a maximum 52 points to pass this criterion. Please put a check mark on the appropriate box	TOTAL POINTS					50.4

EVALUATION: PASSED

The table shows the evaluation of the extent of the e-module in Technical quality. Majority of the components obtained a rating of 3.2- 4 interpreted as Very Satisfactory VS. The total points of factor C. (Technical Quality) is 50.4 and is interpreted as PASSED.

Factor D. Other Finding

Factor D. Other Findings Note down observations about the information contained in the material, where the following errors are found:	E1	E2	E3	E4	E5	MEAN
1. Conceptual errors.	4	4	4	4	4	4
2. Factual errors.	4	4	4	4	4	4
3. Grammatical and / or typographical errors.	4	4	4	4	4	4
4. Other errors (i.e., computational errors, obsolete information, errors in the visuals, etc.).	4	4	4	4	4	4
Resource must score at least 16 points out of a maximum 16 points to pass this criterion. Please put a check mark on the appropriate box	TOTAL POINTS					16

EVALUATION: PASSED

The table the evaluation of the extent of the e-module in Technical quality. All of the components obtained a rating of 4 interpreted as Very Satisfactory VS. The total points of factor D (Other finding: Conceptual errors, Factual errors, etc.) is 16 points and is interpreted as PASSED.

Overall, the e-module meets the required points to proceed to implementation in the classroom. The e-module is passed in the factors A-D in Evaluation for Non-Print Materials. Findings from different research papers should give an eye-opener to the government in particular to the Department of Education to come up with the necessary approaches to provide immediate solutions to address all these problems identified to ensure that the goals of this new curriculum can be achieved. Thus, the claim on the use of interactive teaching was supported by the study by Gordonas, A., (2017), which stated that the teaching method

dominated teaching strategies.

The findings also provided the government with a road map of what was required to be done and that an immediate response was needed to avoid delay in the outcome, especially for learners who were key participants in this program. As a result, the partnership and coordination of the different experts in education have been essential to the creation of the best action plan that worked in addressing these issues arising upon the implementation of this program**.**

CONCLUSION

Based on the results of the implementation of the e-module, several conclusions were drawn regarding its effectiveness in enhancing learning outcomes. Firstly, the findings indicate that the e-module successfully engages learners and facilitates their understanding of complex scientific concepts related to Earth's motion and celestial phenomena. The incorporation of interactive learning activities, such as simulations and collaborative tasks, promotes active engagement and deepens comprehension among participants. Additionally, the e-module demonstrates its value in promoting independent learning, self-discipline, and critical thinking skills, empowering learners to explore learning materials at their own pace and develop a deeper understanding of the subject matter. Moreover, the positive feedback from learners regarding the usefulness and ease of use of the e-module underscores its potential to support diverse learning needs and preferences. Overall, the conclusions drawn from the implementation of the e-module highlight its effectiveness in fostering meaningful learning experiences and empowering learners to achieve their educational goals in the digital age.

RECOMMENDATIONS

Based on the results of the implementation of the e-module, several recommendations can be made to further enhance its effectiveness and optimize learning outcomes:

1. Regularly review and update the e-module content to ensure it remains aligned with curriculum standards, incorporates the latest advancements in the field, and addresses any identified gaps or areas for improvement. This will help maintain relevance and keep learners engaged with up-to-date information.
2. Incorporate more interactive learning activities, such as simulations, games, and hands-on experiments, to promote active engagement and deeper understanding of complex concepts. These activities can cater to different learning styles and enhance retention of information.
3. Foster collaboration and peer interaction by integrating collaborative learning features into the e-module, such as discussion forums, group projects, and peer-to-peer feedback mechanisms. Encouraging social learning can enhance knowledge sharing, critical thinking, and communication skills.
4. Offer professional development opportunities and training sessions for educators to enhance their proficiency in utilizing the e-module effectively. This could include workshops on instructional design principles, technology integration strategies, and best practices for online teaching and facilitation.

By implementing these recommendations, educational institutions can maximize the effectiveness of e-modules in facilitating engaging, personalized, and accessible learning experiences for all learners, ultimately fostering academic success and lifelong learning skills.

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