DEVELOPMENT EVALUATION AND ACCEPTABILITY OF MODULE IN SCIENCE TECHNOLOGY AND SOCIETY

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ABSTRACT

The purpose of this study is to develop, evaluate, and determine the acceptability of an instructional module in Science, Technology, and Society (STS) for students at West Visayas State University. The study aims to assess how effectively the module enhances student learning outcomes, focusing on its instructional quality, content relevance, and technical accuracy. In response to the increasing demand for high-quality educational materials, particularly in the field of STS, this research addresses the need for structured, self-paced learning tools that support both student engagement and academic performance. Modules provide a flexible learning environment that aligns with contemporary educational practices and meets the growing need for autonomous learning resources. The study utilized the ADDIE model, a systematic instructional design framework, to guide the development of the module. Participants included 51 students enrolled in the Bachelor of Secondary Education and Bachelor of Elementary Education programs. Data were collected through pre-tests, post-tests, and evaluations by expert validators. The module was assessed on various criteria including content accuracy, instructional quality, and technical aspects such as design and layout. Results indicated significant improvement in student performance, with post-test scores increasing from "poor" to "very good." Expert validators rated the module as "Very Acceptable" across most categories, particularly in instructional quality, although some recommendations for improving content accuracy were noted. The study concludes that the developed STS module is an effective instructional tool for enhancing student learning outcomes. The findings suggest that continuous updates to the module's content are necessary to maintain its relevance and accuracy. Further research could explore the long-term impact of such modules on student engagement and retention, with recommendations for integrating multimedia enhancements to foster a more dynamic learning experience.

Keywords: Instructional Module, Science Technology and Society, ADDIE Model, Educational Material Development, Acceptability

INTRODUCTION

The increasing demand for high-quality education calls for the development of effective instructional materials. Modules, as self-instructional tools, play a crucial role in improving learning outcomes by offering a structured, autonomous learning experience. In response to the mandate of the Commission on Higher Education (CHED) to improve curricular programs, particularly for Science, Technology, and Society (STS), this study seeks to develop and evaluate an instructional module in STS.

Research suggests that instructional modules have become essential tools in education, offering a self-paced, structured learning experience that supports both teachers and students. Seidman (2019) emphasizes that

faculty-developed instructional materials improve teaching effectiveness and student outcomes, particularly when aligned with curricular goals. Modules enhance students' engagement by providing clear, step-by-step guidance, allowing learners to build knowledge progressively.

Several studies, such as those conducted by Kamisah Osman (2018), demonstrate the positive impact of modules on student learning outcomes, particularly when tailored to specific learning styles and integrated with technological resources. These findings underscore the need for well-designed instructional materials that reflect contemporary teaching approaches.

This study is anchored on the ADDIE Model, a well-known framework for instructional design that stands for Analyze, Design, Develop, Implement, and Evaluate. The ADDIE model offers a structured approach to developing educational materials, ensuring that every phase contributes to the overall effectiveness of the module. The analysis phase focused on understanding the needs of STS learners and the objectives of the subject. During the design and development phases, the module was created with clear learning outcomes, incorporating assessments and instructional activities aligned with STS concepts.

Additionally, Vygotsky's Zone of Proximal Development (ZPD) theory was applied in the design of the module, providing scaffolding through guided instruction that allows students to progress with support from peers and teachers. This aligns with the constructivist approach, where learning is facilitated through meaningful interaction and problem-solving, tailored to the students' cognitive levels. The use of ZPD ensured that the module catered to both independent learning and collaborative inquiry.

Lastly, Behaviorism and Cognitivism theories were incorporated to ensure the module's content fosters both knowledge retention and engagement. Behaviorism was applied by reinforcing correct responses, while Cognitivism guided the module's design to enhance intellectual processing through structured learning sequences. Together, these frameworks contributed to the effective design, evaluation, and acceptability of the instructional module.

OBJECTIVES OF THE STUDY

This study aims to determine the development process, evaluation, and acceptability of an instructional module in Science Technology and Society (STS) for West Visayas State University students.

It also aims to 1) develop an instructional module in Science Technology and Society; 2) evaluate its content, instructional quality, and technical quality, and 3) determine its level of acceptability based on evaluators' assessments.

METHODOLOGY

This study utilized a descriptive-correlational research design to evaluate the development, effectiveness, and acceptability of the instructional module in Science, Technology, and Society (STS). The descriptive aspect of the study focused on detailing the module's development process and evaluating its acceptability among students and experts, while the correlational aspect sought to identify the relationships between the module's instructional quality and the student's performance. The overall framework of the study was guided by the ADDIE model (Analyze, Design, Develop, Implement, and Evaluate), which provided a systematic approach to creating and assessing the instructional material.

During the Analysis phase, a thorough review of the STS curriculum was conducted to identify the core competencies that students must master. This step involved consulting the official curriculum guidelines to ensure that the module aligned with the learning outcomes expected from the STS course. Through this analysis, specific topics and concepts that required reinforcement were identified, and these were integrated into the module's lessons. The Design phase followed, where the structure of the module was outlined. This included the creation of a sequential learning path with 15 lessons, each designed to address key competencies. Pre-tests and post-tests were incorporated into the design to assess student knowledge before and after engaging with the module, alongside various learning activities aimed at promoting active student engagement and higher-order thinking.

The Development phase involved the actual creation of the instructional module. A total of 15 lessons were developed, each featuring a mix of theoretical concepts, practical applications, and interactive activities to keep students engaged. These lessons were grounded in active learning principles, with activities such as group discussions, critical analysis, and reflective exercises incorporated to enhance student participation. Once the module was developed, it was piloted during the Implementation phase, where 51 students from the Bachelor of Secondary Education (BSED) and Bachelor of Elementary Education (BEED) programs at West Visayas State University were selected as participants. These students were chosen to test the module and provide feedback on its usability and instructional effectiveness.

The final stage of the ADDIE model, the Evaluation phase, included both formative and summative assessments. Five expert validators, comprising educators and subject matter experts, were tasked with evaluating the module on several criteria, including content accuracy, instructional quality, design layout, and technical aspects. The evaluation process involved using a rating sheet, which was adapted from established instructional material evaluation criteria, to ensure a standardized assessment across all dimensions. The validators provided qualitative and quantitative feedback, which was used to refine the module further.

For the statistical analysis, several tools were employed. Frequency counts and means were used to summarize the feedback from the expert validators, while t-tests and standard deviation measures were applied to analyze the pre-test and post-test results. The software SPSS (Statistical Package for the Social Sciences) was used to process the data, with a significance level set at 0.05, which allowed for rigorous testing of the module's effectiveness. This statistical approach enabled the study to assess whether the observed improvements in student performance after using the module were statistically significant, providing a reliable measure of the module's impact on student learning outcomes.

RESULTS AND DISCUSSION

1. The instructional module in Science Technology and Society

The findings of this study revealed a notable improvement in students' understanding of the subject of Science, Technology, and Society (STS). Prior to the introduction of the instructional module, students' pre-test scores were categorized as "poor," reflecting a lack of foundational knowledge in the key concepts of STS. However, following the implementation of the module, post-test scores showed a marked improvement, with the majority of students achieving "very good" results. This significant shift in performance highlights the effectiveness of the module in enhancing students' comprehension of the subject. The structured learning path provided by the module allowed students to progress at their own pace, encouraging incremental learning. This gradual build-up of knowledge helped students absorb complex concepts more effectively, leading to higher engagement and a deeper understanding of the subject matter.

2. Content, Instructional Quality, and Technical Quality of Instructional Module In Science Technology And Society

The evaluators of the module, comprising educational experts, rated it as "Very Acceptable" in several key areas. In terms of content, the module was recognized for its relevance and alignment with the learning outcomes of the STS curriculum. It was commended for its instructional quality, providing clear, well-organized lessons that facilitated independent learning and supported various learning styles. The technical quality of the module, including its layout, design, and user-friendliness, also received positive feedback, as it was visually appealing and easy to navigate, thus enhancing the overall learning experience.

Despite these positive evaluations, there were some areas for improvement noted by the evaluators. One area of concern was the accuracy and up-to-datedness of the information provided in the module. While the content was deemed

acceptable, certain aspects were rated as "Acceptable" rather than "Very Acceptable," indicating that some of the scientific and technological information needed updating to reflect the most recent developments in the field. This suggests that while the module is an effective teaching tool, periodic revisions and updates are necessary to maintain its relevance and ensure that students are learning the most current information in STS.

Mohr & Shelton (2019) highlight the importance of faculty training in instructional design, noting that effective teaching strategies significantly improve student persistence and success. This perspective aligns with Gyurko et al. (2018), who found that coordinated professional development for faculty positively influences student retention and achievement.

Modules also offer flexibility and adaptability in learning environments. According to Mubarok (2021), multimedia-based modules allow students to learn more effectively by incorporating interactive and visual elements, making complex subjects more accessible. Augmented reality and other digital tools further enhance the learning experience, as shown in studies by Grinshkun (2021).

3. Level of Acceptability Based on Evaluators' Assessments

Students' feedback on the module was overwhelmingly positive. Many highlighted the self-paced nature of the module as a key strength, as it allowed them to engage with the material at a pace that suited their individual learning needs. This flexibility fostered a sense of ownership over their learning process and enabled them to delve deeper into more challenging STS concepts without feeling rushed or overwhelmed. The design of the module also encouraged active participation and critical thinking, as it included various interactive activities that stimulated student interest and reinforced learning.

Finally, the importance of evaluating instructional materials is emphasized in studies by Kenobi Krukru (2021), who found that acceptability is closely linked to the relevance, accuracy, and design of the module. These insights provide the foundation for the evaluation process conducted in this study.

In conclusion, the module's structured design, alignment with curricular goals, and positive reception from both evaluators and students demonstrate its effectiveness as a teaching tool. However, the need for regular content updates to ensure the accuracy and relevance of information should be prioritized. With ongoing improvements, the module has the potential to serve as a sustainable, long-term resource for enhancing student learning in Science, Technology, and Society.

CONCLUSIONS

Based on the findings of the study, the following conclusions are drawn:

1. The development of the STS module using the ADDIE model effectively enhanced student learning, moving from poor to very good performance.
2. Evaluators considered the module highly acceptable, particularly in content and instructional quality, though improvements in accuracy and up-to-datedness of information are recommended.
3. The module provides a structured, self-paced learning path that improves student engagement and facilitates incremental learning.

RECOMMENDATIONS

Based on the conclusions drawn, the following are recommended:

1. To sustain the positive impact of the STS module on student learning, regular evaluation and iteration of the module using the ADDIE model should be continued. This will ensure the module adapts to changing educational needs and keeps improving over time.
2. Given the feedback on the need for improvements in content accuracy and the up-to-dateness of the information, it is recommended that annual content reviews

be conducted. Collaborating with subject matter experts will ensure that the module reflects the latest developments in Science, Technology, and Society.

3. To further enhance the structured, self-paced learning experience, additional interactive features such as multimedia elements (videos, quizzes, and simulations) should be incorporated into the module. This will increase student engagement and support diverse learning preferences, encouraging more dynamic and interactive learning.

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AUTHOR'S PROFILE

Rea A. Cerbo is a dedicated educator and researcher with extensive experience in the field of science education. Currently pursuing her Doctor of Philosophy in Educational Management at Guimaras State University, Rea also holds a Master of Arts in Education Major in Physics, having been a DOST Scholar at West Visayas State University, where she previously earned her Bachelor of Secondary Education, Major in Physics, graduating Cum Laude. Rea's teaching career spans over a decade, beginning at Panuran National High School and continuing at West Visayas State University-Lambunao Campus, where she now serves as an Instructor III in the Science Department. Her expertise includes developing and implementing science curricula, fostering creativity, and promoting higher-order thinking skills to enhance student performance. Known for her commitment to research and curriculum development, Rea has facilitated numerous programs such as the annual Science Month Celebrations and Research Proposal Defense for Senior High School students. A proactive participant in educational development, Rea has attended multiple national and international seminars and training workshops focused on gender sensitivity, smart teaching methodologies, and research. She is deeply committed to advancing science education through innovative teaching strategies and staying updated with cutting-edge educational technologies. Rea's passion for fostering student engagement and academic excellence continues to drive her professional growth and contributions to the field of education.

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