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DEVELOPMENT AND VALIDATION OF e LEARNING ACTIVITY SHEETS FOR GRADE 8 SCIENCE

J'CAROL S. TARE

Saint Columban College, Pagadian City

ABSTRACT

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*Corresponding Author:

jcarol1984@gmail.com

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E-learning activity sheets offer a promising solution to bridge the instructional gap in Science education by promoting active, student-centered learning. This study aimed to develop and validate e-Learning Activity Sheets in terms of content, instructional and technical quality, and educational soundness to enhance Grade 8 Science learning. A quantitative descriptive-developmental research design was used, following the ADDIE model (Analysis, Design, Development, Implementation, Evaluation), and the materials were created using Kotobee Author. The study was conducted in a public secondary school in Misamis Occidental during SY 2023–2024 and involved ten purposively selected Grade 8 student-users and five teacher-experts. A four-point validation checklist and a five-point student feedback form were used. Data were analyzed using descriptive statistics and thematic analysis. Findings revealed that the activity sheets were rated very satisfactory in content ($M = 3.92$), instructional ($M = 3.74$), and technical quality ($M = 3.51$). Educational soundness was confirmed with high integrity (86.6%), learner focus, and usability, while accessibility (80%) required improvement. Validators recommended improving alignment and interactivity. Students found the materials clear, engaging, and effective. It was concluded that the materials were effective and educationally sound. It was recommended that the materials be implemented more broadly in science classes, supported by further validation and teacher training for full integration.

Keywords: *development, e-learning modules, Kotobee Author, validation*

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Introduction

The integration of technology into education has transformed the way students access, engage with, and construct knowledge. In Science education, digital learning tools have become increasingly important in promoting scientific literacy, critical thinking, and problem-solving skills through interactive and learner-centered approaches (Bybee, 2013; Moya, 2021). In the Philippines, the Department of Education (DepEd) has strengthened this direction through the Learning Continuity Plan (DepEd Order No. 32, s. 2020) and the Basic Education Development Plan 2030 (DepEd Order No. 24, s. 2022), which encourage the development and use of innovative digital learning resources to ensure quality, accessible, and inclusive education.

Despite these initiatives, many Grade 8 Science classrooms continue to rely on printed modules and textbook-based instruction, which often provide limited opportunities for interaction, visualization, and independent learning. Science concepts frequently require multimedia presentations, simulations, and inquiry-based activities that conventional materials cannot adequately deliver. Consequently, learners may experience reduced engagement, motivation, and conceptual understanding, highlighting the need for interactive, curriculum-aligned, and validated e-learning resources that respond to the needs of today's digital-native learners (Delos Santos & Rodrigo, 2020; Bernardo, 2021).

E-learning activity sheets present a practical solution by incorporating multimedia elements such as videos, animations, interactive quizzes, hyperlinks, and simulations that support differentiated and self-paced learning. Studies have shown that interactive digital learning materials enhance learner engagement, improve conceptual understanding, and promote independent learning, particularly in Science education (Hasbiyati et al., 2019; Sari et al., 2022; Siano et al., 2021). However, locally developed and validated e-learning materials aligned with the Philippine Grade 8 Science curriculum remain limited, creating a need for context-specific instructional resources.

To address this gap, this study focuses on the development and validation of interactive e-learning activity sheets using Kotobee Author, a user-friendly platform that enables educators to create multimedia-rich digital learning materials for both online and offline use. Its accessibility and compatibility with various devices make it a practical tool for teachers with varying levels of technological expertise (Sofia & Biléu, 2018). Through the development of curriculum-aligned and validated e-learning activity sheets, this study aims to provide an innovative instructional resource that enhances students' learning experiences and supports effective Science instruction in Grade 8.

Methods

This study employed a quantitative descriptive-developmental research design to develop and validate interactive Grade 8 Science e-learning activity sheets using Kotobee Author following the ADDIE model (Analysis, Design, Development, Implementation, and Evaluation). Conducted during School Year 2023–2024 in a public school in the Division of Misamis Occidental, the study involved 10 Grade 8 student-users and 5 purposively selected science teacher-experts who evaluated the developed materials using adapted validation instruments. Data were gathered through expert validation, student evaluation, pilot testing, and feedback, while descriptive statistics, particularly the mean and standard deviation, were used to analyze the quantitative data. The study also adhered to established ethical standards by ensuring informed consent, confidentiality, anonymity, and respect for intellectual property throughout the research process.

Results and Discussions

Table 1

Expert Validators' Ratings of the e-Learning Activity Sheets in terms of Educational Soundness

EDUCATIONAL SOUNDNESS	YES	NO
Qualities		
1. Integrity	86.67%	13.33%
2. Learner Focus	90%	10%
3. Usability	100%	0
4. Accessibility	80%	20%

The data gathered from table pertains to the ratings provided by expert validators about the educational quality of the e-Learning Activity Sheets. According to the assessment conducted by the 5 Teacher-experts, Factor B, "Learner Focus," and Factor C, "Usability," obtained the greatest percentage. Factor A, namely "Integrity," achieved a score of 86.6%. Factor D, specifically referred to as "Accessibility," accounted for 80% of the total. The e-learning activity sheets were assessed by teacher-experts and found to use content in a manner that is genuine and suitable for learners. The examples provided were authentic, pertinent, and comprehensible to the learners.

In his study, Gholam (2019) highlighted the significance of students actively participating and being fully engaged in the process of acquiring knowledge. According to him, this type of experiential learning is genuine, comprehensive, and demanding. By utilizing the advancement of metacognitive processes, students can engage in introspection about their cognitive abilities, focusing specifically on significant tasks performed within real-life situations. The proponent deliberately structured the lectures in a way that effectively helps pupils establish links to essential concepts.

The e-learning activity sheets clearly describe the objectives, procedures, and desired results. The Department of Education (DepEd) has shifted its focus towards reforming the educational system to cultivate pupils who possess a comprehensive and high-quality education, leading to their whole holistic development (Manalastas, 2023).

Afterwards, the researcher implemented all the suggested alterations and improvements made by the teacher experts for the two e-learning activity sheets prepared for Science 8 using Kotobee creator. The Science 8 e-learning activity sheets prepared by the Kotobee author were validated by teacher specialists, who provided feedback, recommendations, and comments on the sheets.

Comments and Suggestions of the Teacher-Experts and Student-Users

The teacher-experts generally found the developed Grade 8 Science e-learning activity sheets to be highly acceptable and recommended them for classroom use and possible LRMDs publication. They commended the materials for being informative, practical, learner-friendly, and capable of supporting science instruction, particularly for learners with limited internet access. Nevertheless, they also identified several areas for improvement, including refining learning objectives, improving grammar and punctuation, adding more contextualized examples, strengthening explanations of complex concepts, increasing the use of images, illustrations, graphs, and diagrams, enhancing interactive feedback, maintaining consistency in font style and formatting, citing image sources properly, and improving alignment and navigation within the activity sheets. These suggestions were carefully considered and incorporated into the final version of the developed materials, resulting in a more organized, visually appealing, and interactive learning resource.

The evaluation of the revised e-learning activity sheets by the ten student-users further confirmed their quality and acceptability. The materials received an overall rating of 4.55 (SD = 0.55), interpreted as "Strongly Agree," with both the format (M = 4.59, SD = 0.56) and content (M = 4.50, SD = 0.54) earning the same interpretation. Students described the activity sheets as well-designed, easy to understand, interactive, and engaging, highlighting the clear organization, simple language, attractive layout, and immediate feedback provided by the Kotobee platform. Although a few learners suggested enlarging some fonts, incorporating more illustrations, and allowing all activities to be answered directly within the application, the overall findings indicate that the developed e-learning activity sheets effectively enhanced learner engagement, comprehension, and independent learning, supporting their use as a supplementary instructional material for Grade 8 Science.

Conclusions

Based on the findings of the study, the researcher concluded that the developed e-learning activity sheets in Science 8 using Kotobee Author are valid, reliable, and effective supplementary learning materials. Both teacher-experts and student users affirmed that the materials meet the required standards of content accuracy, instructional soundness, technical usability, and educational integrity. Furthermore, the overwhelmingly positive feedback from students indicates that the materials are engaging, interactive, and supportive of diverse learning needs, fostering both understanding and enjoyment in learning Science 8. Therefore, the e-learning

activity sheets demonstrate strong potential as practical and innovative tools to enhance science education and may serve as a model for developing future digital instructional materials.

Recommendations

Based on the findings of the study, it is recommended that the developed Grade 8 Science e-learning activity sheets be adopted and utilized by science teachers as supplementary instructional materials to further evaluate their effectiveness in diverse classroom settings. Future studies may involve larger and more diverse groups of students and expert validators to strengthen the evidence of their acceptability and effectiveness. Likewise, science teachers should be provided with continuous professional development on the design and development of digital learning resources, and the validated e-learning activity sheets may be endorsed for inclusion in the Learning Resource Management and Development System (LRMDS) and for use in Alternative Delivery Mode (ADM) instruction.

Conflict of Interests

The author declares that they have no conflicts of interest

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