

Development and Evaluation of Television-Based Instructional Materials in Empowerment Technologies 11

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Abstract. This study developed and evaluated Television-Based Instructional (TVBI) materials for Empowerment Technologies 11 at Salinas High School, Bambang, Nueva Vizcaya, Philippines. Using the ASSURE Instructional Design Model, three TVBI episodes were designed to address the least mastered competencies identified from the First Quarter Examination for School Year 2025–2026: (1) using advanced features of productivity tools through mail merge, (2) applying image manipulation techniques via Canva, and (3) creating ICT content using online platforms through Google Sites ePortfolios. The study employed a quantitative descriptive-comparative research design. Thirty respondents—10 learners (Grade 12), 10 subject teachers, and 10 experts (ICT Coordinators and Master Teachers)—evaluated the developed materials using the DepEd Learning Resource Management and Development System (LRMDS) Evaluation Rating Sheet for Non-Print Materials across four domains: content quality, instructional quality, technical quality, and accuracy and mechanics. Results revealed an overall grand mean of 3.64 (Very Satisfactory), indicating that the TVBI materials met acceptable quality standards. Learners gave the highest evaluation ($M = 3.84$), followed by subject teachers ($M = 3.58$), and experts ($M = 3.51$), all rated as Very Satisfactory. One-Way ANOVA results showed statistically significant differences ($p = 0.000$) in the evaluations across all criteria, with post-hoc Scheffé tests revealing significant differences between learners and professional evaluators but not between teachers and experts. The study concludes that the developed TVBI materials are pedagogically sound, technically functional, and curriculum-aligned. These materials represent a viable alternative instructional deliver.

Introduction

The application of Information and Communication Technology (ICT) to meet the requirements of the Senior High School (SHS) curriculum has evolved into an integral component within the educational environment today. ICT provides learners with the information and skills necessary to be successful in navigating, utilizing, and adapting to the constantly changing digital world. In addition, the subject Empowerment Technologies provides learners with essential digital skills that include communication, collaboration, content creation, and productivity. For Grade 11 and 12 learners in the Philippines, Empowerment Technologies enables them to learn how to efficiently apply technology in developing, organizing, and sharing digital content across various tracks including arts, technical-vocational, sports, and academic.

An initial analysis of learners' achievement in Empowerment Technologies at Salinas High School, based on the First Periodic Evaluation for School Year 2025–2026, revealed several least mastered competencies, indicating that learning gaps persist. Learners had difficulty applying advanced skills related to productivity tools, image editing techniques, and the production of ICT content using Internet tools. Environmental and socio-economic factors significantly affect learning continuity in the Philippines. Tropical storms and extreme heat cause many schools to suspend classes, making self-learning modules (SLMs) common alternatives. However, SLMs typically do not provide enough opportunities for scaffolding, feedback, and hands-on practice using ICT tools.

Despite being provided with laptops under the Department of Education's Computerization Program (DCP), Salinas High School continues using older tablets that are now over five years old and cannot run current software versions. Consistent connectivity problems throughout Nueva Vizcaya Province further limit learners' use of online learning systems and web-based applications. In response, the Department of Education (DepEd) has been revitalizing DepEd TV through partnerships with the Knowledge Channel Foundation, Inc. (KCFI) and Solar Pictures, Inc., positioning Television-Based Instruction (TBI) as a viable alternative delivery mode.

Television-Based Instruction (TBI) is grounded in Mayer's Cognitive Theory of Multimedia Learning (Clark & Mayer, 2016), which states that when instructions are presented through both visual and auditory means, learners are able to capture and retain more information. Research consistently affirms the effectiveness of multimedia and television-based instruction. In blended-learning contexts, Saludes (2023) and Santos and Santos (2024) demonstrated the positive impact of TBI on learners' motivation, comprehension, and retention. In the Philippines, Asis and Bayani (2023) recommended the continued use of television-based instruction to enhance accessibility and equity in resource-poor environments.

This study aims to develop a Television-Based Instruction program to enhance mastery of the least mastered competencies in Empowerment Technologies among Grade 11 learners at Salinas High School. By providing an alternative, accessible, and context-responsive instructional approach, the study seeks to improve learners' performance in application-based ICT tasks, strengthen digital literacy, and promote equitable learning outcomes in senior high school education.

Research Questions

This study sought to answer the following questions:

1. What television-based instructional material could be developed to improve the least mastered competencies in Empowerment Technologies 11 using the ASSURE model?
2. What is the evaluation of the learners, subject teachers, and experts on the developed learning material in terms of content quality, instructional quality, technical quality, and accuracy and mechanics?
3. Are there significant differences in the evaluation of the different groups of respondents on the developed TVBI?

Null Hypothesis

There is no significant difference in the evaluation of the developed Television-Based Instructional (TVBI) material among the different groups of respondents.

Theoretical and Conceptual Framework

This study was anchored on the ASSURE instructional design model (Kurt, 2016) and further supported by Mayer's Cognitive Theory of Multimedia Learning, as discussed by Clark and Mayer (2016). These theoretical frameworks guided the systematic development of the Television-Based Instructional (TVBI) material designed to address the least mastered competencies in Empowerment Technologies for Grade 11 learners.

According to Kurt (2016), the ASSURE Instructional Design Model provides a systematic method for integrating media and technology into lessons effectively. The acronym ASSURE derives from six components: (A) Analyze learners, (S) State the standards and objectives, (S) Select strategies, technologies, media, and materials, (U) Use technology, media, and materials, (R) Require learner participation, and (E) Evaluate and revise.

Mayer's Cognitive Theory of Multimedia Learning explains how learners process information when instructional materials present both words and images. The theory rests on three key assumptions: the dual-channel assumption (learners process visual and auditory information separately), the limited capacity assumption (each channel processes only limited amounts of information at a time), and the active processing assumption (learners learn more effectively when they select, organize, and integrate information). Clark and Mayer (2016) emphasized that multimedia instruction is most beneficial when properly designed and aligned with specific course goals.

This research employed an input-process-output (IPO) paradigm. The input consisted of the least mastered competencies identified from the First Periodical Examination. The process involved developing the TVBI using the ASSURE model, followed by evaluation across four quality domains. The output was the developed and evaluated TVBI material designed to enhance mastery of selected Empowerment Technologies competencies.

Methodology

Research Design

This study employed a quantitative descriptive-comparative research design. The descriptive component determined the level of acceptability of the developed TVBI in terms of four quality domains, while the comparative component analyzed and compared the mean evaluations provided by different groups of respondents. The study was conducted in two phases: (1) development of three TVBI episodes using the ASSURE model, and (2) evaluation of the material by learners, subject teachers, and expert respondents.

Research Environment

The study was conducted at Salinas High School, located at Barangay Salinas, Bambang, Nueva Vizcaya. Established through Republic Act No. 7073 signed on June 21, 1991, the school serves surrounding communities including San Fabian, Mapayao, Kayapa, Salinas, Barat, San Leonardo, and Pallas. The school has benefited from DepEd's Computerization Program (DCP) and connectivity initiatives including the DICT Broadband ng Masa project, making it a suitable setting for television-based instructional interventions.

Respondents

Table 1 presents the frequency and percentage distribution of the study's 30 respondents, divided equally into three groups: 10 experts (ICT Coordinators and Master Teachers from the Southern District of Nueva Vizcaya), 10 subject teachers (currently teaching or having previously taught Empowerment Technologies with at least two years of experience), and 10 Grade 12 learners who had previously completed Empowerment Technologies 11.

Group	No. of Respondents	Percentage
Experts (Master Teachers and ICT Coordinators)	10	33.33%
Subject Teachers	10	33.33%
Grade 12 Learners	10	33.33%
Total	30	100%

Table1. Frequency and Percentage Distribution of Respondents

Sampling Procedure

This study employed a combination of purposive sampling and simple random sampling. Expert evaluators were selected through purposive sampling based on their current appointment as ICT Coordinator or Master Teacher, experience in evaluating educational materials, and active teaching in government secondary schools. Subject teachers were also purposively selected based on their Empowerment Technologies teaching experience. Grade 12 learner respondents were selected through simple random sampling to minimize selection bias and ensure authentic learner-centered feedback.

Research Instrument

A checklist questionnaire patterned after the Department of Education Learning Resource Management and Development System (LRMDS) Evaluation Rating Sheet for Non-Print Materials was used. The instrument assessed the TVBI across four domains: (1) Content Quality—alignment with DepEd learning competencies, relevance, accuracy, and appropriateness; (2) Instructional Quality—effectiveness of teaching methods, learner engagement, and critical thinking promotion; (3) Technical Quality—clarity of audio and visuals, synchronization, readability, and absence of technical faults; and (4) Accuracy and Mechanics—correctness of information and absence of factual, grammatical, or typographical errors. Each of the 37 indicators used a four-point descriptive rating scale (1 = Very Poor, 2 = Poor, 3 = Satisfactory, 4 = Very Satisfactory).

Data Gathering Procedure

The researcher developed the evaluation questionnaire and subjected it to expert validation. Upon obtaining necessary approvals from the Schools Division Office, District Office, and school heads, the TVBI materials were distributed to respondents. Respondents were given ample opportunity to view the TVBI episodes and complete the evaluation checklist through either printed or electronic forms. Ethical considerations were strictly followed: informed consent was secured, participation was voluntary, and all data were treated confidentially per DepEd Order No. 16, s. 2017 and the Data Privacy Act of 2012.

Statistical Treatment

Data were analyzed using descriptive and inferential statistics. Frequency counts and percentages described respondent distribution. Mean scores determined the level of acceptability of the TVBI across all four domains. One-Way Analysis of Variance (ANOVA) was used to determine significant differences in evaluations among the three groups, with post-hoc Scheffé tests conducted to identify specific between-group differences. All inferences were tested at a significance level of $\alpha = 0.05$.

Results and Discussion

Problem 1: Television-Based Instructional Material Developed

The researcher developed three TVBI episodes using the ASSURE Instructional Design Model to address the least mastered competencies in Empowerment Technologies 11. Table 2 presents the initial competency analysis based on First Quarter Examination results.

Competencies	Mean Percentage Score	Mastery Level
Use Advanced Features of Productivity Tools	42%	Average Mastery
Apply Image Manipulation Techniques	47%	Average Mastery
Create ICT Content Using Online Platforms	34%	Low Mastery
Overall	41%	Average Mastery

Table 2. Least Mastered Competencies in Empowerment Technologies 11

The overall compounded mean percentage of 41% across the three identified competencies indicates average to low mastery. Creating ICT content using online platforms received the lowest mean percentage (34%), suggesting that learners encounter the greatest difficulty with tasks requiring independent content creation, integration of multiple digital tools, and higher-order thinking in authentic online environments.

Following the ASSURE model steps, the TVBI episodes were developed systematically. Analyzing learners revealed that Grade 11 students at Salinas High School—a disaster-prone area with limited ICT infrastructure—needed instructional support in application-based competencies. Standards and objectives were aligned with DepEd MELCs, targeting mail merge, Canva-based image manipulation, and Google Sites ePortfolio creation. Selected strategies included scripted 12–15 minutes episodes with embedded pause-and-practice prompts and post-viewing hands-on activities verified through group chat submissions.

Problem 2: Evaluation by Respondent Groups. Table 3 presents the respondents' evaluation of the developed TVBI materials.

Criteria	Learners	Subject Teachers	Experts	Overall Mean
Content Quality	3.75 Very Satisfactory	3.50 Very Satisfactory	3.30 Satisfactory	3.52 Very Satisfactory
Instructional Quality	3.80 Very Satisfactory	3.60 Very Satisfactory	3.50 Very Satisfactory	3.63 Very Satisfactory
Technical Quality	3.79 Very Satisfactory	3.41 Satisfactory	3.59 Very Satisfactory	3.60 Very Satisfactory
Accuracy and Mechanics	4.00 Very Satisfactory	3.80 Very Satisfactory	3.65 Very Satisfactory	3.82 Very Satisfactory
Overall Mean	3.84 Very Satisfactory	3.58 Very Satisfactory	3.51 Very Satisfactory	3.64 Very Satisfactory

Table 3. Summary of Respondents' Evaluation on the Developed TVBI Materials

The overall grand mean of 3.64 (Very Satisfactory) indicates that the instructional material met and exceeded acceptable standards across all evaluation domains. Learners provided the highest overall evaluation (M = 3.84, Very Satisfactory), indicating strong learner acceptance of the material. Subject teachers obtained an overall mean of 3.58 (Very Satisfactory), while experts provided an overall mean of 3.51 (Very Satisfactory).

Content Quality (overall M = 3.52, Very Satisfactory) demonstrated that the materials were curriculum-aligned, clearly presented, and relevant to real-life situations. Instructional Quality (overall M = 3.63, Very Satisfactory) indicated that the

TVBI employed effective teaching strategies, clearly defined objectives, and meaningful learner engagement consistent with multimedia learning principles (Branch & Dousay, 2018; Mayer, 2020). Technical Quality (overall M = 3.60, Very Satisfactory) reflected that the clarity of audio, synchronization of visuals, and text readability enhanced learners' educational experience. Accuracy and Mechanics received the highest overall mean (M = 3.82, Very Satisfactory), confirming that the material was accurate, reliable, and free from factual and grammatical errors.

Problem 3: Significant Differences Among Respondent Groups. Table 4 presents the ANOVA F-test results comparing evaluations across the three respondent groups.

Criteria	Groupings	Mean	F-value	p-value	Decision	Remarks
Content Quality	Learners	3.75	12.42	0.000	Reject H ₀	Significant
	Teachers	3.30				
	Experts					
Instructional Quality	Learners	3.80	19.69	0.000	Reject H ₀	Significant
	Teachers	3.50				
	Experts					
Technical Quality	Learners	3.79	12.76	0.000	Reject H ₀	Significant
	Teachers	3.59				
	Experts					
Accuracy & Mechanics	Learners	4.00	22.20	0.000	Reject H ₀	Significant
	Teachers	3.65				
	Experts					
Overall	Learners	3.84	29.10	0.000	Reject H ₀	Significant
	Teachers	3.51				
	Experts					

Table 4. Summary of F-test on Respondents' Evaluation of the Developed TVBI

The ANOVA results show statistically significant differences ($p = 0.000$, $p < 0.05$) across all evaluation criteria. Post-hoc Scheffé tests revealed consistent patterns: learners' evaluations were significantly higher than those of subject teachers and experts across all domains, while no statistically significant differences were found between subject teacher and expert evaluations.

For Content Quality ($F = 12.42$), learner ratings ($M = 3.75$) were significantly different from teacher ratings ($p = .035$) and expert ratings, while teacher and expert ratings showed no significant difference ($p = .106$). For Instructional Quality ($F = 19.69$), significant differences existed between learners and teachers ($MD = 0.2$, $p = .001$) and between learners and experts ($MD = 0.3$, $p = .000$), but not between teachers and experts ($p = .141$). For Technical Quality ($F = 12.76$), learners' ratings significantly differed from teachers' ratings ($MD = 0.38$, $p = .000$), but no significant difference existed between learner and expert means ($p = .046$) or between teacher and expert means ($p = .070$). The overall F-value of 29.10 confirmed that learners' evaluations ($M = 3.84$) were significantly higher than both teacher ($MD = 0.26$, $p = .000$) and expert evaluations ($MD = 0.32$, $p = .000$), while teachers' and experts' evaluations did not significantly differ ($MD = 0.07$, $p = .352$).

These findings suggest that learners evaluated the TVBI materials based on their personal learning experience and perceived engagement, while professional evaluators applied more critical pedagogical and technical standards. The distinction underscores the importance of incorporating multiple evaluator perspectives to ensure that instructional materials are not only technically sound and curriculum-aligned but also genuinely engaging and accessible for learners.

Conclusion and Recommendations

Based on the findings, the following conclusions were derived: (1) A Television-Based Instructional Material (TVBI) was successfully developed using the ASSURE Instructional Design Model to address the least mastered competencies in Empowerment Technologies 11, focusing on advanced productivity tools (mail merge), image manipulation (Canva), and online content creation (Google Sites ePortfolios). (2) The developed TVBI passed evaluation in all four quality domains with an overall grand mean of 3.64 (Very Satisfactory), as confirmed by learners, subject teachers, and experts from the Southern District of Nueva Vizcaya. (3) Statistically significant differences ($p < 0.05$) were found in the evaluations among the three respondent groups across all criteria, with learners consistently rating the material higher than professional evaluators, though all groups agreed on its overall high quality.

These findings have significant implications for instructional design in Philippine public education, particularly in resource-limited and disaster-prone areas. Television-Based Instruction offers a viable alternative delivery mode that leverages existing broadcast infrastructure, does not require stable internet connectivity, and can be adapted to various learning contexts. The positive evaluations affirm that well-designed TVBI materials grounded in the ASSURE model and multimedia learning principles can effectively address identified learning gaps.

Recommendations

1. School Administrators may conduct trainings or workshops on developing Television-Based Instruction for teachers using the ASSURE model, and establish a repository of instructional materials for use during calamities or class suspensions.
2. Curriculum Developers may use the ASSURE Model as a framework for developing televised and digital instructional materials adaptable to other subject areas and grade levels.
3. Teachers may integrate TVBI into lesson delivery, especially during class suspensions, by facilitating hands-on follow-ups, virtual submissions, and collaborative ICT projects.
4. A pilot test of the finalized TVBI through DepEd TV or classroom broadcast may be conducted to evaluate its effectiveness in improving learners' mastery in Empowerment Technologies 11.
5. Future Researchers may explore the longitudinal effects of TVBI integration on digital literacy and academic performance using experimental or quasi-experimental designs.

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Competing Interests Statement

The author declares no conflict of interest

Data Availability Statement

No new datasets were generated or analyzed during this study.

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Appendices

No appendices are attached to this study.