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Development and Evaluation of Instructional Videos in Computer Systems Servicing for Grade 11 Students

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Index Terms:

ADDIE model, computer systems servicing, instructional material evaluation, instructional video

Abstract. This study developed and evaluated an Instructional Video designed to address the low mastery of Grade 11 Computer Systems Servicing learners in assembling and disassembling computer hardware at Bonfal National High School, Bayombong, Nueva Vizcaya, Philippines for School Year 2025 to 2026. Using the ADDIE model, the material was carefully planned, designed, developed, and assessed through a quantitative descriptive approach involving instructional materials experts, and CSS teachers. This material also adopted developmental research approach that involves the systematic design and development of the instructional video. DepEd's Learning Resources Management and Development System (LRMDS) evaluation rating sheet for non-print materials were used in evaluating the instructional video. Findings revealed that the developed video effectively supported learners' understanding and skill development, as reflected in positive learner feedback. The material obtained a very satisfactory overall rating (M = 3.83), demonstrating high acceptability in terms of content, instructional, technical, and accuracy components, with content quality receiving the highest evaluation (M = 3.90) followed by accuracy at (M=3.84) and technical quality at (M=3.83), while instructional quality was rated slightly lower (M = 3.76), results still confirmed the video's relevance in classroom instruction. Mann-Whitney U test with a significance level of 0.05 showed no significant difference between the evaluations of experts and teachers ($p = 0.624 > 0.05$) across all assessed criteria indicating a shared perception of quality and effectiveness. The study concludes that well designed instructional videos can enhance competency-based learning and serve as reliable teaching tools, particularly in skills-based subjects although continuous improvement in learner engagement strategies is recommended to maximize student engagement, learning outcomes and educational impact.

Introduction

The development of procedural competencies in technical-vocational education is essential for workforce readiness and industry alignment, particularly in Computer Systems Servicing (CSS), where learners are expected to demonstrate mastery of hands-on technical skills. In real-world applications, competencies such as assembling and disassembling computer hardware are foundational, as they support higher-level tasks in installation, maintenance, and troubleshooting of computer systems.

A substantial body of literature highlights that learners in technical-vocational programs often encounter persistent difficulties in acquiring procedural skills due to limited hands-on exposure, inadequate laboratory resources, and an overreliance on theoretical instruction. Within the Philippine Technical-Vocational-Livelihood (TVL) context, CSS instruction is designed to develop competency aligned with national certification standards; however, evidence suggests that learners continue to struggle with least mastered competencies, particularly hardware assembly tasks. Studies consistently show that effective CSS instruction requires repeated exposure to authentic procedures and structured guidance to support skill mastery (Abdul & Silor, 2024; Richter et al., 2016). Across prior research, there is strong

agreement that bridging the gap between theory and practice requires multimodal instructional approaches that enhance procedural understanding and learner engagement.

To address these challenges, multimedia-based instructional interventions, particularly instructional videos, have gained increasing attention. Instructional videos allow learners to observe, pause, and replicate technical procedures, thereby improving task accuracy, procedural fluency, and learner confidence (Brame, 2015; Henderson & Schroeder, 2021; Caligayahan & Briones, 2023; Caratiquit, 2022). Empirical findings further indicate that learners exposed to video-assisted instruction demonstrate higher levels of procedural understanding compared to those relying solely on text-based or traditional methods (Muñoz & Sison, 2023). These patterns suggest that multimedia instruction is an effective tool for supporting competency-based learning in resource-constrained environments.

Despite these established benefits, several limitations remain evident in existing instructional practices. Commercially available and standardized instructional videos, including those aligned with national training frameworks, often assume prior knowledge, present procedures at a rapid pace, and lack contextualization for beginner learners. Additionally, these materials frequently provide insufficient scaffolding, minimal emphasis on safety procedures, and limited guidance on common errors. Research also notes that without intentional instructional design, multimedia resources may fail to optimize learning due to cognitive overload or poor alignment with learner needs (Mayer, 2024). Furthermore, while multimedia interventions are widely studied, there is a lack of localized, systematically developed instructional videos specifically targeting least mastered competencies in CSS, as well as limited comparative evaluation between instructional materials experts and practicing teachers.

This gap has both theoretical and practical implications. Theoretically, it calls for the integration of competency-based education, multimedia learning principles, and systematic instructional design models such as ADDIE to enhance procedural skill acquisition. The ADDIE framework ensures alignment among objectives, content, and learner needs, while Mayer's Cognitive Theory of Multimedia Learning supports effective information processing through dual-channel design and cognitive load management (Spatioti et al., 2022; Adeoyi et al., 2024; Mayer, 2024). Practically, the gap highlights the need for contextually appropriate instructional materials that are validated using established frameworks such as the Department of Education's Learning Resources Management and Development System (LRMDS), which evaluates content quality, instructional design, technical quality, and accuracy (DepEd, 2009). Addressing this gap is particularly timely in the post-pandemic educational landscape, where technology-enhanced learning has become essential, yet access to hands-on training remains limited.

Guided by these considerations, this study addresses the following research questions:

(1) What instructional videos were developed using ADDIE model to address the performance of Grade 11 learners in CSS in terms of assembling and disassembling computer hardware?
(2) What is the evaluation of the instructional materials experts and CSS teachers on the developed instructional videos in terms of content quality, instructional quality, technical quality, and accuracy?
(3) Is there a significant difference between the evaluations of the IM experts and CSS teachers?

Accordingly, this study aims to develop and evaluate instructional videos to address the least mastered competency in Computer Systems Servicing.

Methodology

Research Design

This study employed a quantitative, developmental–descriptive design to develop and evaluate an instructional video addressing the least mastered competency in Computer Systems Servicing (CSS), specifically assemble computer hardware particularly in assembly and disassembly. The design was appropriate for generating measurable evaluative data and comparing expert and practitioner judgments without manipulating variables.

Research Environment

The study was conducted at Bonfal National High School, a public senior high school in Nueva Vizcaya, Philippines, offering the Technical-Vocational-Livelihood (TVL) track with Computer Systems Servicing (CSS) as one of its specializations. The school was selected for its appropriate context in developing and evaluating the instructional video, as it maintained well-equipped computer laboratories and basic multimedia facilities to support practical learning. Bonfal National High School has also demonstrated notable achievements in ICT and technical-vocational education, including consistent student

performance in regional competitions, successful implementation of TESDA-aligned programs, and progressive integration of digital learning tools in the curriculum.

Respondents

The study involved two groups of respondents. The first group were the instructional material (IM) experts. They were chosen based on accessibility, current teaching assignments in Computer Systems Servicing, and willingness to participate. These are curriculum specialists, and instructional media developers. On the other hand, the second group consisted of CSS teachers from selected public senior high schools in Nueva Vizcaya. They were selected based on their subject-matter expertise and prior experience in instructional material development and evaluation. Table 1 presents the research respondents of the study.

Respondents	Frequency	Percentage
IM Expert	7	41.18%
CSS Teachers	10	58.82%
Total	**17**	**100%**

Table 1: Frequency and Percent Distribution of the Respondents

Sampling Procedure

This study employed purposive sampling specifically convenience sampling methods. IM experts were selected conveniently, based on the recommendation of the district supervisor. They should possess expertise in ICT, curriculum development, and instructional material design. Teachers who were teaching CSS for at least three (3) years were also selected. Selection criteria for both groups included professional experience in teaching or developing instructional materials, familiarity with the CSS curriculum, and willingness to participate. These methods ensured that respondents possessed the relevant knowledge and skills to evaluate the video's content, instructional quality, and technical soundness, directly addressing the study's objective.

Research Instruments

Data were collected using an evaluation rating sheet adapted from the Department of Education's Learning Resources Management and Development System (LRMDS, 2009), which assessed the instructional video across four domains: content quality, instructional quality, technical quality, and accuracy. The instrument utilized a four-point scale (1 = very poor to 4 = very satisfactory).

Data Gathering Procedure

Prior to data collection, the researcher secured the necessary permissions and ethical clearances. A formal request was sent to the Schools Division Office (SDO) of Nueva Vizcaya to obtain approval for the use of the Evaluation Rating Sheet for Non-Print Materials, a standardized checklist adopted from the Department of Education's Learning Resources Management and Development System (LRMDS, 2009). Another letter was submitted to the Schools Division Superintendent (SDS) to request authorization to conduct the study within the division. Additionally, informed consent forms were distributed to all identified respondents to ensure their voluntary participation, anonymity, confidentiality and awareness of the purpose and procedures of the study. Prior to evaluation, the instructional video was pilot tested with Grade 11 learners, and revisions were incorporated based on feedback. The finalized instructional video was presented to respondents through scheduled viewing sessions or digital access, after which they completed the evaluation checklist.

Statistical Treatment

Data were coded and analyzed using descriptive statistics, including mean scores to determine overall quality ratings. To examine differences between expert and teacher evaluations, the nonparametric Mann–Whitney U test was applied due to non-normal data distribution, with significance set at $p < .05$. This analytical approach enabled objective assessment of the instructional material's quality and the consistency of evaluations across respondent groups.

Results and Discussion

Problem 1: Development of the Instructional Video

The researchers developed instructional videos using ADDIE model to address the least mastered competency in CSS 11. Table 2 presents the least mastered competency during the First Quarter.

Learning Competency	Test Item No.	No. of Learners with Correct Responses	Percentage of Correct Responses	Mastery Level
Assemble computer hardware	14	10	31%	Low Mastery
	15	11	34%	Low Mastery
	16	11	34%	Low Mastery
	17	10	31%	Low Mastery
	18	11	34%	Low Mastery
	21	10	31%	Low Mastery
	23	7	22%	Low Mastery

Table 2. Least Mastered Competency during First Quarter

Mastery data identified computer hardware assembly as the least mastered competency, with correct response rates ranging from 22% to 34%, all classified under low mastery. Guided by these results, an instructional video was developed using the ADDIE model. The material targeted cognitive, psychomotor, and affective domains and presented step-by-step procedures for system unit assembly and disassembly, supported by multimedia elements and structured sequencing. Implementation in a Grade 11 class (n = 30) positioned the video as a supplemental tool during lesson discussion, followed by hands-on activities.

These results suggest that grounding development in performance data ensured alignment between instructional design and learner needs. Consistent with multimedia learning principles, the integration of visual demonstration and guided narration supports procedural understanding. However, the absence of experimental outcome measures limits conclusions about direct learning gains, indicating the need for future controlled testing of effectiveness.

Problem 2: Evaluation of Instructional Video Quality

Factors	Instructional Material Experts	CSS Teachers	Overall mean
Content Quality	3.89	3.91	3.90
	Very Satisfactory	Very Satisfactory	Very Satisfactory
Instructional Quality	3.66	3.87	3.76
	Very Satisfactory	Very Satisfactory	Very Satisfactory
Technical Quality	3.80	3.85	3.83
	Very Satisfactory	Very Satisfactory	Very Satisfactory
Accuracy	3.75	3.93	3.84
	Very Satisfactory	Very Satisfactory	Very Satisfactory
Overall Mean	3.77	3.89	3.83
	Very Satisfactory	Very Satisfactory	Very Satisfactory

Table 3: Summary of Respondents Evaluation on the Developed Instructional Video

The instructional video obtained an overall mean rating of 3.83 (Very Satisfactory), with high scores across all domains: content quality (M = 3.90), accuracy (M = 3.84), technical quality (M = 3.83), and instructional quality (M = 3.76). CSS teachers rated the material slightly higher (M = 3.89) than instructional materials experts (M = 3.77). These findings indicate strong alignment with curriculum standards and high technical reliability, supporting its usability in classroom contexts. The slightly lower rating in instructional quality suggests opportunities to enhance pacing, interactivity, and feedback mechanisms. This pattern aligns with prior research showing that while instructional videos effectively convey procedural knowledge, their impact depends on active engagement features and cognitive load management.

These findings are supported by Mayer's Cognitive Theory of Multimedia Learning (Mayer, 2024), which explains that meaningful learning occurs when learners process both verbal and visual information through separate channels, within the limits of their cognitive capacity, and engage in active processing. The strong performance in content and technical aspects suggests that the video effectively utilizes multimedia elements, but the lower instructional quality rating implies that these elements may not yet be fully optimized to guide learners through the learning process.

Problem 3: Differences in Evaluations Between Experts and Teachers

Table 4 presents the result of the statistical test conducted in determining the difference between the evaluations of IM experts and CSS teachers.

Factor	Evaluators	N	Mean Rank	Computed U-value	P-value	Decision	Remarks
Content Quality	IM experts	7	10.00	28.000	.396	Accept Null Hypothesis	Not Significant
	CSS teachers	10	8.30				
Instructional Quality	IM experts	7	6.43	17.000	.074	Accept Null Hypothesis	Not Significant
	CSS teachers	10	10.80				
Technical Quality	IM experts	7	9.50	31.500	.723	Accept Null Hypothesis	Not Significant
	CSS teachers	10	8.65				
Accuracy	IM experts	7	7.71	26.000	.275	Accept Null Hypothesis	Not Significant
	CSS teachers	10	9.90				
Overall	IM experts	7	8.29	30.000	0.624	Accept Null Hypothesis	Not Significant
	CSS Teachers	10	9.50				

Table 4: U test Results on the Difference Between the Evaluations of IM experts and CSS teachers on the instructional video

Mann–Whitney U test results revealed no significant differences between instructional materials experts and CSS teachers across all criteria ($p > .05$). Mean rank variations were minimal, with teachers rating instructional quality and accuracy slightly higher, while experts showed marginal preference for content and technical aspects.

This convergence suggests strong agreement in evaluating the material's quality, reinforcing its validity across both practitioner and expert perspectives. The findings imply that the instructional video meets both pedagogical and technical standards expected in competency-based education. Minor variations reflect differing evaluative lenses—practical usability versus design rigor—but do not affect overall acceptability.

Synthesis and Implications

Overall, the results demonstrate that the ADDIE-based instructional video is a high-quality, contextually appropriate learning resource for Computer Systems Servicing. The strong ratings across domains and consistent evaluator agreement support its potential for classroom integration. These findings contribute to evidence that systematically developed multimedia materials can address competency gaps in technical-vocational education.

However, the study is limited by its reliance on expert evaluation rather than direct measurement of learner performance outcomes. Future research should employ experimental or longitudinal designs to test the video's impact on skill acquisition and retention. Enhancing interactivity and embedding formative assessment features are recommended to further optimize instructional effectiveness.

Conclusion and Recommendations

Based on the significant findings of the study, the following conclusions were drawn. (1) The developed instructional video is a relevant instructional tool for addressing least mastered competencies in computer systems servicing. Its alignment with learning objectives, combined with clear demonstrations and accessible design, enhances both conceptual understanding and procedural skills. Thus, the integration of well-designed instructional videos can support teaching and learning in skills-based subjects. (2) The developed instructional video for Grade 11 learners in Computer Systems Servicing meets established standards for content accuracy, technical quality, and curriculum alignment. However, slightly lower ratings in instructional quality indicate that enhancing learner-centered strategies, such as interactivity and feedback. It is necessary to fully optimize its educational value. These results confirm that while the video is suitable for classroom use, continuous improvement is essential to maximize student engagement and learning outcomes. (3) The developed instructional video is well-designed, making it both effective for learning and appropriate in its technical aspects, as evidenced by the consistent evaluations from both experts and teachers. The results confirm that the material meets the objectives of quality instructional design and supports competency-based learning in Computer Systems Servicing. This

alignment suggests that the ADDIE based development process successfully produced an instructional resource that is relevant, reliable, and suitable for Grade 11 learners.

Recommendations

1. Teachers may incorporate similar instructional video resources into their lessons to strengthen demonstrations and offer more flexible learning opportunities.
2. Learners are encouraged to use the instructional video actively, especially when reviewing lessons or practicing complex procedures on their own. They can pause the video, revisit key steps, and apply the demonstrated techniques to deepen their understanding and improve their skills.
3. School administrators play an important role in ensuring the successful use of these resources. They can support both the adoption and continuous improvement of instructional video materials by providing appropriate training, sufficient technological tools, and necessary resources.
4. It is recommended that the instructional video be further improved by enhancing its clarity, pacing, and visual presentation, as well as incorporating more contextualized examples and interactive elements to better support learners' understanding and engagement.
5. The Department of Education (DepEd) support the development and integration of learner-centered instructional materials, such as instructional videos and Learner Activity Sheets (LAS), in computer systems servicing instruction.
6. The instructional video be subjected to quality assurance review by the Department of Education to ensure its accuracy, alignment with curriculum standards, and instructional effectiveness, and for possible adoption and utilization across the division.
7. Future researchers may examine the impact of instructional videos on student performance and engagement across various contexts.

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Competing Interests Statement

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this article.

Data Availability Statement

Data sharing is not applicable to this article as no new data were created or analyzed in this study; all data used were obtained from previously published sources as cited in the reference list.

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Appendices

No appendices are attached to this study.