LECTURE-DEMO VIDEO ON TEACHING RESIDENTIAL AND INDUSTRIAL WIRING SYSTEM CONCEPTS

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ABSTRACT:: *The study determined the acceptability and efficiency of the developed localized lecture-demo video as a learning material for Teaching Residential and Industrial Wiring System Concepts. The analysis sought to investigate the outcomes of the assessment rating of the prepared lecture demo video and the impact of implementation. Teacher experts, student experts, and regular students from North Eastern Mindanao State University were the study subjects. The study's tool was the adapted evaluation rating tool from Suartama 2016, Sari and Wisaya 2021, the developed lecture demo video, and the pretest and posttest questionnaires. The study employed a developmental-quasi-experimental design. The developed lecture-demo video was rated very satisfactory in learning activity design, content, and materials in multimedia and multimedia display. Analyses found that students who utilized the created lecture-demo video with learning activity sheets outperformed those who used the learning activity sheets on the posttest. The study concluded that the developed lecture-demo video has a positive learning outcome in learners' competency mastery. Likewise, it is widely accepted and recommended for learning purposes as experts evaluate learning activity design, content, and materials in multimedia and multimedia displays.*

Keywords: localized, lecture-demo video, wiring system, electrical, contextualized, video lesson.

1. INTRODUCTION

Digital videos have a strong impact on everyone's daily culture. Its value is truly triggered and valued in this time of crisis when everyone lives in their respective homes. As it gains popularity, it seems only natural that this familiar and widespread platform extends into the education setting. Teacher demonstration videos have become an area of great interest because they have the potential to improve student learning and knowledge [1, 2].

The teacher's demonstration video is also very interesting as a means of transmitting knowledge. Model learning cannot be called a mere imitation of a particular field of motor behavior, because it is a method in which the participant observes the actions of the model and changes it to its output as a result of interaction [3]. In addition, teacher demonstration video is not only useful to learners, but also to teachers and their associated organization. A 2015 study conducted by Kaltura [4] concluded that the use of educational videos improves the learning experience. They also serve to break down barriers, such as student and campus location, once insurmountable.

While studies suggest localized demonstration videos hold promise for teaching electrical wiring systems, their specific effectiveness remains unclear. We need a deeper understanding of how technology improves student comprehension and engagement in learning about electricity. Additionally, future research should explore the long-term impact of integrating technology on student learning outcomes and their preparation for electrical careers.

Traditional teaching methods can sometimes lack interactivity, clear visuals, and accessibility, especially for complex concepts or procedures. For instance, Kirk's research showed limitations in achieving diverse educational benefits through traditional physical education approaches [5]. Similarly, Castelli and Sarvary [6], identified shortcomings in traditional anatomy teaching, highlighting the need for alternative approaches like 3D virtual reality models. While traditional methods have limitations, transitioning from lectures to digital learning offers both advantages and disadvantages [7], making it crucial to evaluate different learning styles.

Incorporating lecture-demonstration videos into science education offers several potential benefits. These videos can cater to different learning styles by presenting information both visually and aurally. They can also improve accessibility by allowing students to revisit content at their own pace. Engaging demonstrations within the videos may also lead to a deeper understanding of the material. However, there is a critical need to investigate the effectiveness of lecture-demo videos specifically for teaching residential and industrial wiring systems, as recent studies haven't addressed this aspect.

This research aimed to bridge this gap by examining the effectiveness of lecture-demo videos in teaching residential and industrial wiring systems. The study will assess the quality of the developed videos through expert ratings on Learning Activity Design, Content, and Materials in Multimedia and the Multimedia Display. These findings will provide valuable insights into the potential of this technology to enhance electrical education at the North Eastern Mindanao State University – Cantilan Campus' Department of Industrial Technology. Additionally, the study's results will inform administrators and faculty about the importance of investing in tools to develop effective 21st-century learning materials, ultimately benefiting students by preparing them with industry-standard competencies.

Two theories served as the foundation for this research: constructivist learning theory and the theory of cognitive information processing.

Based on constructivism and theory in cognitive information processing, a video-based tool can be utilized for digital learning since video grabs the viewer's attention and enhances the learning environment with graphics, text, and voice.

The study aimed to determine the effectiveness of a lecture-demo video in Residential and Industrial Wiring Systems to

the BSIT Electrical students of North Eastern Mindanao State University-Cantilan Campus.

Specifically, this study sought to answer the following questions:

1. What is the evaluation rating on the developed Lecture-Demo Video in Residential and Industrial Wiring Systems by the:

1.1 Teachers-Experts and Students-Experts in terms of:

1.1.1 Learning Activity Design

1.1.2 Content and Materials in Multimedia

1.2 ICT Experts on the Multimedia Display

2. What is the performance of students in the Residential and Industrial Wiring System in the pre-test and post-test when the lecture-demo videos were utilized as supplementary instructional learning material?

3. Is there a significant difference in the evaluation rating on the developed lecture demo video as evaluated by teachers' and students' experts?

4. Is there a significant difference in pre-test and post-test scores of students in Residential and Industrial Wiring System when lecture-demo videos are used?

Hypotheses

At 0.05 level, it is hypothesized that:

HO_1: There is no significant difference between the pre-test and post-test scores of students in residential and industrial wiring systems when using the lecture-demo videos.

HO_2: There is no significant difference in the evaluation rating on the developed lecture-demo videos as evaluated by teachers and students.

2. MATERIALS AND METHODS

Research Design

This study employed a developmental-quasi-experimental design. It is said to be a developmental design because it concentrates on developing and evaluating the instructional material, a lecture-demo video. It is also a quasi-experimental design since it requires a pretest and posttest for a treated and comparison group. Then, the said instructional material has undergone evaluation and validity by the experts in terms of Learning Activity Design, Content, and Materials in Multimedia and Multimedia Display.

Research Locale

The development of the Lecture-Demo Video was done at North Eastern Mindanao State University – Cantilan Campus. Validation and utilization were conducted in the same institution school year 2022-2023.

Research Respondents

The chosen respondents in determining the acceptability and validity of the developed lecture-demo video were the 5 teacher experts including instructors, professors, and registered master electricians. Moreover, 5 student experts who hold National Certificate Level 2 (NC2) in On-the-Job Training (OJT) bring firsthand knowledge and practical understanding of the learning process from a student's perspective. Additionally, 3 Information and Communication Technology (ICT) experts contribute their specialized expertise in technology integration within educational settings. Furthermore, the research encompasses 26 respondents from the BSIT ELC 1Q, 26 respondents from the BSIT ELC 1R, and 26 respondents from the BSIT ELC 1L, providing a comprehensive representation of learners across different stages of their educational journey. Together, this diverse group of respondents offers a rich and multifaceted perspective on the subject under investigation, enriching the research findings with a broad range of insights and experiences.

Table 1 Respondents

Respondents	Total No.
Teacher experts (Instructors, Prof, RME)	5
Student experts (OJT NC2 Holders)	5
ICT experts	3
ELC 1Q	26
ELC 1R	26
ELC 1L	26
TOTAL	91

Consequently, the researcher utilized a purposive sampling technique, also known as selective sampling, to pick the subjects for the study. This purposive sampling technique focuses on the researcher's judgment when selecting study participants to participate, or may implicitly choose a "representative" sample to fit their goals or specific approach to individuals with certain qualities. The researcher selected the BSIT 1Q, 1R, and 1L students with subjects in Residential and industrial wiring systems as the respondents of the study.

Research Instruments

To determine the acceptance and validity of the developed lecture-demo video, the researcher used an adopted validation tool from Suartama [8], Sari, and Wisaya (2021) [9]. The instrument was adopted by the researchers because the produced learning material must be matched with curricular standards, and the respondents are students and teachers of the institution. The lecture-demo video itself was used as a research instrument since it is the highlight of the study that would help generate the result on how efficient instructional videos are in increasing the learners' performance. The researcher administered a pretest and posttest using the validated test questions in lined with Residential and Industrial Wiring Systems that are streamlined in a teacher-and-learner-friendly format.

Statistical Treatment

In the analysis and treatment of data, the researcher used the following statistical tools to answer:

Mean and Weighted Mean. This statistical technique was used to assess the teachers' evaluation rating on the produced Lecture-Demo Video in teaching residential and industrial wiring systems on Learning Activity Design, Content, and Materials in Multimedia and Multimedia Display.

T-test. This statistical method was used to examine whether there was a significant difference between the pre-test and post-test scores of BSIT ELC 1 students who used the Lecture-Demo Video. Simultaneously, this instrument was used to calculate the significant difference in assessment ratings on the developed Lecture-Demo Video as evaluated by teachers and students' experts.

3. RESULTS AND DISCUSSION

This section examines and evaluates the data gathered from participants through questionnaires following the problem-solving framework outlined in this study.

In Table 2, the assessment ratings provided by teacher experts for the developed Lecture-Demo Video are presented, utilizing the adopted evaluation tool for non-print materials, focusing on Learning Activity Design and Content and Materials in Multimedia.

As shown in the table under Factor 1 Learning Activity Design, all indicators are deemed highly satisfactory. The average weighted mean score for the developed lecture-demo video, according to the evaluation tool for non-print materials concerning Learning Activity Design, is 3.96, corresponding to a verbal assessment of "very satisfactory." This indicates that the developed lecture-demo video promotes positive values conducive to formative growth. Furthermore, the learning material contributes to the enhancement, reinforcement, or mastery of the identified learning objectives, with contents logically developed, organized, and relevant to daily life.

Table 2:Evaluation Rating of Lecture-Demo Video in terms of Learning Activity Design and the Content and Materials in Multimedia as evaluated by teacher-experts

TEACHER EXPERTS		
Factor 1. Learning Activity Design	Weighted Mean	Verbal Description
1. Clear learning objectives ensure aligned content with grade-level Learning Competencies.	4	Very Satisfactory
2. Clear objectives guide concept development to meet learning goals, ensuring consistency across materials and assessments.	4	Very Satisfactory
3. Logically presented and accurate content	4	Very Satisfactory
4. Clear and engaging delivery of up-to-date content	4	Very Satisfactory
5. Logically developed and organized content accompanied by clear learning instruction	4	Very Satisfactory
6. Inclusive content that motivates students by representing diverse perspectives.	3.87	Very Satisfactory
7. Engaging content that stimulates critical thinking also aids student memory retention.	3.87	Very Satisfactory
8. Examples make content relevant and memorable.	4	Very Satisfactory
9. Clear, engaging language (appropriate level) grabs learners' attention	3.87	Very Satisfactory
10. Engaging content promotes values, growth, and independent learning through well-designed practice that measures understanding and retention.	4	Very Satisfactory
Average Weighted Mean	**3.96**	**Very Satisfactory**
Factor 2. Content and Materials in Multimedia	Weighted Mean	Verbal Description
1. The learning materials have a clearly defined purpose that aligns with the scope of the intended grade level.	4	Very Satisfactory
2. Material achieves its defined purpose.	4	Very Satisfactory
3. Clear, measurable objectives guide accurate materials for a defined learning path.	4	Very Satisfactory
4. Material depth matches the user level for an appropriate challenge and learning.	4	Very Satisfactory
5. Engaging visuals and sounds are used strategically to support instruction, considering the intended student's needs	4	Very Satisfactory
6. Engaging and stimulating materials, tailored to student characteristics, create an enjoyable and challenging learning experience	4	Very Satisfactory
7. Engaging materials spark creativity and align with students' developmental stage.	4	Very Satisfactory
8. Clear feedback and well-structured materials support independent learning.	3.87	Very Satisfactory
9. Engaging content with user control over pace and sequence fosters independent learning.	3.87	Very Satisfactory
10. Clear, adaptable materials grounded in prior knowledge, with diverse resources and well-crafted examples, cater to individual needs and learning goals	4	Very Satisfactory
Average Weighted Mean	**3.98**	**Very Satisfactory**

The findings align with the research conducted by A.D. Greenberg *et al.* [10] and Giannakos and Krogstie [11], emphasizing the efficacy of video usage in enhancing students' learning experiences. The evaluation of the video indicates significant encouragement for students to engage with the material and prepare for instructional activities in class. Furthermore, Moreno & Mayer highlighted the benefits of video-based learning, including heightened motivation, enjoyment, and enhanced retention [12].

Although indicators 1.6, 1.7, and 1.9 received the lowest weighted mean of 3.875 or were deemed "very satisfactory," there is room for further improvement in content. Specifically, enhancements should focus on ensuring cultural, gender, racial, or ethnic neutrality, appropriateness of language to user level, and stimulation of critical thinking. These results underscore the opportunity for refinement to better tailor the developed material to the learners' context.

Kay and Kletskin [13], highlighted the advantages of lecture videos, including aiding in comprehension and memorization of topics, presenting diverse perspectives, sparking curiosity, motivating deeper research, and expanding knowledge. On the contrary, biased instructional materials, as noted by Zhang *et al.* [14], can lead to unfavorable perceptions among learners. This can result in diminished self-esteem, which hampers cognitive and learning processes and disrupts social interactions, eventually becoming a significant concern.

Utilizing impartial educational content, however, facilitates faster learning, as it positively influences learners' understanding of the subject matter. Additionally, it fosters positive motivation, which is integral to the teaching and learning processes.

Regarding Factor 2 Content and Materials in Multimedia, all indicators received very satisfactory ratings. Indicators 2.1 to 2.7 and 2.10 obtained the highest weighted mean of 4, while indicators 2.8 to 2.9 garnered a slightly lower weighted mean of 3.875, still interpreted as very satisfactory. These results indicate that the developed learning material effectively fulfilled its intended purpose, with clear and measurable learning objectives. The material also demonstrated appropriateness for the end-user's level of learning capacity, incorporating graphics, colors, and sounds tailored to instructional needs. Furthermore, the learning material provided an enjoyable yet challenging experience, stimulating and engaging learners by integrating creativity and leveraging their previous experiences.

Acedo and Robles [15] emphasized the importance of ensuring that videos represent concepts appropriate for students' comprehension levels. Given that the instructional video tutorials generated were authentic, relevant, and beneficial to both students and instructors, it is recommended that videos be recognized as valuable tools for supporting teaching efforts.

Table 3: Evaluation Rating of Lecture-Demo Video in terms of Learning Activity Design and the Content and Materials in Multimedia as evaluated by student experts

STUDENT EXPERTS

Factor 1. Learning Activity Design	Weighted Mean	Verbal Description
1. Clear learning objectives ensure aligned content with grade-level Learning Competencies.	3.7	Very Satisfactory
2. Clear objectives guide concept development to meet learning goals, ensuring consistency across materials and assessments.	3.6	Very Satisfactory
3. Logically presented and accurate content	3.55	Very Satisfactory
4. Clear and engaging delivery of up-to-date content	3.5	Very Satisfactory
5. Logically developed and organized content accompanied by clear learning instruction	3.85	Very Satisfactory
6. Inclusive content that motivates students by representing diverse perspectives.	3.65	Very Satisfactory
7. Engaging content that stimulates critical thinking also aids student memory retention.	3.7	Very Satisfactory
8. Examples make content relevant and memorable.	3.6	Very Satisfactory
9. Clear, engaging language (appropriate level) grabs learners' attention	3.75	Very Satisfactory
10. Engaging content promotes values, growth, and independent learning through well-designed practice that measures understanding and retention.	3.55	Very Satisfactory
Average Weighted Mean	**3.64**	**Very Satisfactory**
Factor 2. Content and Materials in Multimedia	Weighted Mean	Verbal Description
1. The learning materials have a clearly defined purpose that aligns with the scope of the intended grade level.	3.5	Very Satisfactory
2. Material achieves its defined purpose.	3.4	Very Satisfactory
3. Clear, measurable objectives guide accurate materials for a defined learning path.	3.6	Very Satisfactory
4. Material depth matches user level for an appropriate challenge and learning.	3.5	Very Satisfactory
5. Engaging visuals and sounds are used strategically to support instruction, considering the intended student's needs	3.5	Very Satisfactory
6. Engaging and stimulating materials, tailored to student characteristics, create an enjoyable and challenging learning experience	3.45	Very Satisfactory
7. Engaging materials spark creativity and align with students' developmental stages.	3.35	Very Satisfactory
8. Clear feedback and well-structured materials support independent learning.	3.25	Very Satisfactory
9. Engaging content with user control over pace and sequence fosters independent learning.	3.15	Very Satisfactory
10. Clear, adaptable materials grounded in prior knowledge, with diverse resources and well-crafted examples, cater to individual needs and learning goals	3.65	Very Satisfactory
Average Weighted Mean	**3.43**	**Very Satisfactory**

Table 3 presents the evaluation ratings provided by student experts for the developed lecture demo, focusing on Learning Activity Design and Content and Materials in Multimedia.

As indicated in the table under Factor 1 Learning Activity Design, indicators 1.3, 1.4, and 1.10 received the lowest weighted mean of 3.5 (interpreted as Very Satisfactory). This suggests a need for improvements in the accuracy and currency of the content, as well as the integration of positive values to support formative growth. The evaluation feedback from student experts serves as valuable input to further refine the learning material, ensuring that it effectively addresses their learning needs.

In line with the study by Cho *et al*. [16], the evaluation of instructional materials plays a crucial role in creating high-quality content for learners. It helps identify errors and enhances their effectiveness, while also providing practical design, layout, illustration, and content suggestions. Therefore, assessing instructional materials remains essential within every educational system.

Additionally, the logical development and organization of the content in the developed lecture-demo video received the highest weighted mean of 3.85, with the appropriateness of language following closely at a weighted mean of 3.75. Winters and Nathan [17] emphasized the criticality of using simple language in instructional material development. Complex language can hinder comprehension and consume valuable learning time. Language and illustrations used in materials must be relatable to learners' everyday lives and presented in a well-structured manner.

With a total weighted average of 3.645 (Very Satisfactory), the evaluation results indicate that the lecture demo video is relevant and well-received in terms of content quality, as assessed by student experts. This suggests that the developed instructional material holds potential for integration into the teaching-learning process.

In Factor 2 Content and Materials in Multimedia, indicator 2.10 achieved the highest weighted mean of 3.65 (Very Satisfactory). This indicates that the instruction within the developed material effectively integrates with the target users' previous experiences. Consequently, learners perceive the

instruction as relevant because the content of the developed learning material incorporates common learning experiences shared by students, which are also evident in their daily lives.

Supported by the research of Rasi and Poikela [18] and Schneps et al. [19], videos serve as effective tools for demonstrating real-life methods and visually emphasizing information that may be challenging to convey verbally or in written form. This capability can alleviate the cognitive load associated with attempting to conceptualize abstract ideas, thus enhancing the learning experience.

Moreover, the indicator "Target users can control the rate and sequence of presentation and review" received the lowest weighted mean of 3.15 (Very Satisfactory). Student-experts rated this indicator significantly lower compared to teacher-experts. It's worth noting that the developed lecture-demo video incorporated "Timestamps," intended to serve as a table of contents for learners, particularly when seeking specific information from the video. Additionally, the lecture demo video was designed in a format that allows for pausing and playing.

It seems that student experts may have been confused or unsure about how to utilize this feature effectively within the developed learning material. The evaluation outcome suggests room for improvement, indicating that teachers should provide clear instructions or text to guide students on how to utilize the timestamps feature effectively.

As emphasized by Kay and Kletskin [13], learners appreciate videos and enjoy the flexibility they offer, enabling them to decide when and where they learn, how quickly they progress, and what they explore. Therefore, enhancing the usability and clarity of features like timestamps can further enhance the learning experience for students.

Table 4: Evaluation Rating of the ICT Experts on the developed Lecture-Demo video in terms of Multimedia Display

	ICT EXPERTS	
Factor 1. Multimedia Display	Weighted Mean	Verbal Description
1. Clear and engaging narration and music enhance understanding of the concept.	4	Very Satisfactory
2. The narration, delivered with clear pacing, intonation, and pronunciation, ensures easy understanding	4	Very Satisfactory
3. Audio is in perfect sync with the visuals.	4	Very Satisfactory
4. Well-suited music and sound effects elevate the learning experience.	3.6	Very Satisfactory
5. Text on the screen is clear, easy to read, and visually appealing, with well-chosen font size and type.	4	Very Satisfactory
6. Clear and engaging animations effectively complement the material, making it easy to understand.	4	Very Satisfactory
7. High-quality visuals, with captivating design, typography, and color choices, sustain interest without distracting viewers.	4	Very Satisfactory
8. Visually accurate elements, including well-chosen backgrounds, ensure a clear representation of the discussed concept.	4	Very Satisfactory
9. User support materials are readily available and effectively guide users.	4	Very Satisfactory
10. The intuitive design empowers users to explore the material at their own pace.	4	Very Satisfactory
11. The well-chosen video content seamlessly integrates with the other materials, creating a cohesive learning experience that can be used	4	Very Satisfactory
Average Weighted Mean	**3.96**	**Very Satisfactory**

Table 4 presents the evaluation ratings provided by ICT Experts on the developed lecture-demo video concerning Multimedia Display. The table indicates that all indicators in Multimedia Display are deemed very satisfactory, with a weighted mean of 4, except for indicator four, which received a rating of 3.6, signaling a need for improvement in sound effects. The average weighted mean for the developed lecture-demo video in terms of Multimedia Display is 3.96, described as very satisfactory.

These results suggest that the instructional video enhances understanding of the concept. Furthermore, they indicate that the visual presentations of the video are synchronized with the audio, screen displays are aesthetically understandable, sustain interest, provide an accurate representation of the concept, and are user-friendly.

Supported by the research of Schreiber *et al.* [20], it is emphasized that the visual and audio characteristics of video enhance dual processing systems, thereby improving comprehension. Additionally, the flexibility to pause, replay, and review video content alleviates mental processing constraints. Moreover, audiovisual materials aid learners in engaging with interesting content by allowing them to focus on media content that can be organized and linked to existing knowledge.

Furthermore, Gatbonton [21] highlighted that learning can be more easily personalized to students' unique learning styles through video compared to other technologies. This is because video integrates multiple sources of information—such as pictures, motion, sounds, and text—in a complementary manner, catering to various learning preferences and enhancing overall engagement.

Table 5: Performance of Students in Residential and industrial wiring systems in the pre-test and post-test when the lecture demo video was utilized

Group	N	Pretest	Posttest
		Mean	Mean
Control	39	15.92	18.2
Experimental	39	13.95	21.38

As demonstrated in the table, students in the experimental group who utilized the developed lecture-demo video alongside learning activity sheets achieved significantly higher scores on the post-test, with a mean value of 21.38, compared to students who solely utilized the learning activity sheets, with a mean value of 18.20. This difference in outcomes highlights the significant impact of the lecture-demo video on students' performance, suggesting that students benefited from the video component. They gained a deeper understanding of the concepts and skills necessary to master the learning competency.

These results align with the findings of Acedo and Robles [15], indicating that video tutorials led to a notable improvement in students' performance levels. The slight increase in their results may be attributed to students' enhanced attention and retention, allowing them to be more productive and engaged. This conclusion is further supported by the research of Llagas *et al*. [22], which suggests that integrating video into the teaching-learning process leads to more productive learners and ultimately enhances learner performance.

Table 6: Significant difference in the evaluation rating of the teacher-experts and students-experts on Learning Activity Design and the Content and Materials in Multimedia of the developed lecture-demo video

Group	Mean	t-value	p-value	Decision	Interpretation
Student experts	3.563	-10.63	0.000	Reject Null Hypothesis	There is a significant difference
Teacher experts	3.969				

Table 6 highlights a significant difference in the evaluation ratings provided by teacher experts and students regarding Learning Activity Design and Content and Materials in Multimedia of the developed lecture-demo video. The computed p-value is less than the critical value at the 0.05 level, leading to the rejection of the null hypothesis. This suggests that there is a significant disparity in the evaluation ratings between student-experts and teacher-experts using the adopted validation questionnaire.

This disparity may indicate that teachers possess greater proficiency, training, and familiarity with the learning competencies and content standards compared to students. Students' understanding of the evaluation tool and the material being evaluated influences how they rate a particular learning material. Parts of the evaluated material may go unnoticed by students as required in the evaluation tool, whereas they are evident to teachers, leading to differences in ratings. This underscores the need for students to be familiarized with the evaluation tool, particularly the meaning of each indicator, as they may have limited knowledge in evaluating content and instructional quality.

However, despite students' ratings being slightly lower than those of teachers, the results of the posttest indicate that the lecture-demo video positively impacts students' attitudes and comprehension. It appears that the slightly lower rating from students may stem from a lack of clear understanding of certain indicators in the evaluation tool, rather than a reflection of the video's effectiveness.

The findings mentioned above are in line with Nabayra's [23] research, which emphasizes the importance of instructors creating pre-recorded video lectures or modules that cater to the various forms of intelligence among today's diverse learners. This highlights the need to transform traditional educational approaches to meet the expectations of modern learners, who prefer to be active participants in the learning process rather than passive observers.

Additionally, Cho *et al.* [16] underscore the significance of evaluating instructional materials, as it plays a crucial role in ensuring the quality of materials provided to learners. Evaluation helps identify errors and enhances the effectiveness of instructional materials. This suggests that the development of instructional materials should involve evaluation by experts, enabling constructive feedback to be incorporated, thus ensuring that materials are polished and standardized to meet learners' needs effectively.

Table 7: Significant difference in pre-test and post-test scores of students in residential and industrial wiring systems when lecture-demo videos was used

Group	N	Pretest				
		Mean	t-value	p-value	Decision	Interpretation
Control	39	15.92	1.55	0.12	Accept Null Hypothesis	There is no significant difference
Experimental	39	13.95				

Group	N	Posttest				
		Mean	t-value	p-value	Decision	Interpretation
Control	39	18.2	-3.41	0.001	Reject Null Hypothesis	There is a significant difference
Experimental	39	21.38				

Table 7 reveals a significant difference in the pretest and post-test scores of students when lecture-demo videos were utilized. The computed p-value in the pretest is greater than the critical value at the 0.05 level, indicating acceptance of the null hypothesis. This implies that there is no significant difference in the students' pretest scores. Furthermore, based on Table 5, the evidence suggests that the mean scores in the pretest from the control group (15.92) and the experimental group (13.95) do not differ significantly. This could suggest that students in both groups possess similar prior knowledge regarding selecting electrical materials and supplies.

Table 7 also reveals that the computed p-value in the posttest is less than the critical value at the 0.05 level, leading to the

rejection of the null hypothesis. This indicates a significant difference in the students' post-test scores. Additionally, as shown in Table 5, the mean scores in the posttest from the control group (18.205) and the experimental group (21.385) differ significantly. This outcome suggests that the developed lecture-demo video aided learners in correctly understanding the concept.

Moreover, the results indicate that supplementing learning activity sheets with a lecture demo video is an effective instructional resource that may benefit learners in grasping the content compared to utilizing learning activity sheets alone. The supplemental video proved to be a valuable tool in enhancing students' understanding and comprehension of the subject matter because the learners' dual channels for learning, auditory and visual, were enhanced.

The outcome is supported by the study of Chang [24], which emphasizes that the combination of visuals and audio in video makes it an effective medium for conveying concepts and guiding learners with information that appeals to multiple senses. Additionally, Rasi and Poikela [18] demonstrate that video surpasses textual materials when teaching "how-to visually." It serves as a prompt in problem-based lessons by conveying realities, thereby enhancing learners' understanding and engagement with the content.

4. CONCLUSIONS

Based on the findings, it could be asserted that the developed lecture-demo video is widely accepted and recommended for learning purposes as evaluated by experts in terms of learning activity design, content and materials in multimedia, and multimedia display. In addition, the instructional material is very appropriate for learners since both teachers and learners showed a positive attitude towards the developed lecture demo video.

Moreover, both teachers, students, and ICT experts concluded that the instructional material is efficient & practical for students' consumption since both rated very satisfactory for the learning activity design, content and materials in multimedia, and the multimedia display.

Finally, students who used the developed lecture-demo video in conjunction with learning activity sheets performed better than those who used only the learning activity sheets.

5. RECOMMENDATIONS

In light of the study's findings, several recommendations were proposed to maximize the impact and utility of the lecture-demo video:

1. Further, promote the integration of lecture-demo videos into educational curricula to capitalize on their demonstrated effectiveness in enhancing learning outcomes.
2. Explore opportunities for collaborative learning and knowledge sharing among students by incorporating interactive elements into lecture-demo videos.
3. Continuously monitor and evaluate the implementation of lecture demo videos to identify areas for improvement and refinement based on user feedback and evolving educational needs.
4. Foster partnerships with industry stakeholders to ensure the relevance and applicability of instructional materials to real-world contexts, thereby enhancing students' readiness for professional practice

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