

Designing E- Learning Materials for Tailoring Education

Loveliemay A. Tecson, MAHET¹, Daisy E. Salas, MST²

¹Northeastern Mindanao State University-San Miguel Campus, Surigao del Sur, Region XIII, Philippines, 8300

²Northeastern Mindanao State University-San Miguel Campus, Surigao del Sur Region XIII, Philippines, 8300

Abstract— The rapid shift to technology-mediated instruction, particularly in the Philippine education sector [8][12], has made the development of effective e-learning materials a necessity [14][5]. While e-learning offers substantial potential for personalized and efficient learning experiences [9][10], challenges persist in developing materials for practical, skill-based vocational subjects like tailoring, especially given the difficulties faced by students in remote learning environments [13]. This study addressed this gap by designing and evaluating e-learning materials for tailoring education, aiming to optimize learning outcomes. The materials were systematically developed using the Input-Process-Output (IPO) model and underpinned by principles from the Constructivist Learning Theory, Cognitive Load Theory, and the Technology Acceptance Model (TAM), the latter being critical for successful technology adoption in the Philippine context [4]. A quasi-experimental research design was employed with 20 female tailoring students (mean age 18) from Sagbayan National High School. The experimental group used the e-learning materials, including multimedia tools, while the control group continued with traditional methods. Results indicate a high level of e-learning effectiveness [11][16], with participants reporting the platform was user-friendly, visually appealing, and helpful—critical factors for successful alternative education [3]. Learning outcomes were significantly superior in the experimental group (70% achieved a perfect score) compared to the control group (90% passed), demonstrating that the integrated multimedia materials substantially enhanced mastery of tailoring concepts. Furthermore, no challenges in material usage were reported, supporting the successful application of the underlying instructional design theories. The findings confirm the potential of well-designed e-learning to personalize vocational training and significantly improve student performance. The study recommends focusing e-learning material development on young adults and females and prioritizing user-friendly design and engaging multimedia content to enhance learning experiences in vocational technology education.

Keywords— E-learning materials, Tailoring Education, Multimedia tools, Instructional Design, Cognitive Load Theory, Constructivist Learning Theory, Technology Acceptance Model (TAM).

I. INTRODUCTION

The global education landscape is undergoing a profound transformation, accelerated by technological advancements and the necessity for flexible, accessible learning modalities. This shift has firmly established e-learning not merely as an alternative, but as a crucial component of modern educational delivery [14][5]. Particularly in the wake of global crises like the COVID-19 pandemic, the ability of institutions to pivot to remote and blended learning has become paramount, highlighting the critical role of technology in maintaining educational continuity and quality [8][6][12]. E-learning is

widely recognized for its potential to deliver personalized learning experiences, cater to diverse student learning styles, and make education more accessible and efficient[9][10].

However, the efficacy of e-learning materials is not uniform across all disciplines, particularly in vocational and skill-based fields. While digital platforms excel at knowledge transfer, subjects like Tailoring Education, which demand intricate manual skills and hands-on practice, present unique challenges. The transition of these practical subjects to a digital format often results in difficulties for students who rely on tactile learning and direct supervision [13]. Therefore, there is a compelling need for instructional materials that are not only technologically advanced but also pedagogically sound and specifically tailored to the requirements of vocational skills development [3].

To address this challenge, the design and development of e-learning resources must be guided by robust educational and cognitive theories. Successful technology integration, particularly in the Philippine context, depends heavily on factors influencing user acceptance and learning optimization [4]. This study, therefore, aimed to develop and evaluate e-learning materials for tailoring education by integrating three critical theoretical frameworks: Constructivist Learning Theory (to promote active knowledge construction), Cognitive Load Theory (to minimize extraneous mental effort and maximize schema acquisition), and the Technology Acceptance Model (TAM) (to ensure usability and perceived usefulness). By anchoring the design process in these theories, the research sought to move beyond mere digitization toward effective instructional design.

This study employs a quasi-experimental approach to test the effectiveness of these newly developed e-learning materials on the learning outcomes of high school tailoring students. It hypothesizes that a theoretically-informed, multimedia-rich e-learning module, particularly one utilizing video content, can significantly enhance student mastery and performance in vocational tailoring compared to traditional instruction, thereby contributing essential data to the broader discussion on the effectiveness of e-learning in skill-based disciplines [11][16]. The ultimate goal is to provide a validated model for instructional designers and educators to develop effective digital resources that optimize learning for practical vocational skills.

Statement of the Problem

In response to the growing demand for flexible, technology-driven education, e-learning has become an

essential platform for delivering vocational and technical instruction such as tailoring. Despite its potential to enhance access and learning outcomes, the effectiveness of e-learning materials largely depends on how well they align with learners' demographic characteristics, learning styles, prior experiences, and contextual needs. This study seeks to examine the profile and learning preferences of tailoring students to inform the development of enhanced e-learning materials that foster engagement, skill acquisition, and competency in the field. Specifically, this research aims to answer the following questions:

1. What is the demographic profile of the respondents in terms of:
 - 1.1 Age;
 - 1.2 Sex?
2. What are the essential characteristics and learning needs of the respondents in terms of learning styles, previous exposure to e-learning tools, and content?
3. How can educational theories be effectively applied in the instructional design of e-learning materials?
 - a. 100%
 - b. 75%
 - c. 50%
 - d. 25%
 - e. None
4. What challenges are encountered in the use of e-learning materials for tailoring education?
5. Based on the findings of the study, what are the proposed enhanced e-learning materials for tailoring education?

II. MATERIALS AND METHOD

The study utilized a quasi-experimental research design to compare the learning outcomes of students who were exposed to e-learning materials with those who received traditional instruction. This approach enabled the researcher to evaluate both academic performance and learner satisfaction. The research was conducted at Sagbayan National High School in San Miguel, Surigao del Sur, Philippines, and involved twenty female students aged 17 to 24 years who were enrolled in the tailoring strand. The instruments used in the study included a video-based e-learning module, an evaluation checklist to assess usability and design, and a post-test questionnaire to measure learning effectiveness and user experience. Data were gathered through surveys and achievement tests. Descriptive statistics were employed to summarize the data, while t-tests and chi-square analyses were used to identify significant differences in performance between the two groups. In addition, qualitative feedback from participants was analyzed to provide deeper insights and context to the quantitative findings.

III. RESULTS AND DISCUSSION

Demographic Profile of the Respondents

The study revealed that the majority of the respondents were young adults aged 18 years old (50%), followed by those aged 19 (30%), with a few at 17 and 24 years old (10% each). All participants (100%) were female, reflecting the gender

distribution of the tailoring strand at Sagbayan National High School. This demographic indicates that tailoring education in the TVL track is female-dominated and primarily composed of young adult learners who are typically more receptive to technology-based instruction. This finding aligns with [7], who noted that young learners often appreciate the flexibility and accessibility of e-learning environments. Given their familiarity with digital tools, these learners adapt easily to online platforms, enhancing the effectiveness of digital-based learning approaches. The predominance of female participants also supports the notion that gender-sensitive instructional design can improve engagement and satisfaction in vocational training environments.

TABLE 1. Demographic Profile of the Respondents

Indicators	Frequency	Percent (%)	Rank
AGE			
17 years old	1	10%	3.5
18 years old	5	50%	1
19 years old	3	30%	2
24 years old	1	10%	3.5
SEX			
Female	10	100%	1

The essential characteristics and learning needs of the respondents in terms of learning styles, previous exposure to e-learning tools and content.

TABLE 2. User Experience

Indicators	Frequency	Percent(%)	Rank
Navigation of the e-learning platform			
Neutral	1	10%	3
Easy	4	40%	2
Very Easy	5	50%	1
Visual appeal of the e-learning materials			
Neutral	1	10%	3
Appealing	3	30%	2
Very appealing	6	60%	1
Technical issues encountered while using the e-learning materials			
No	10	100%	1

The majority of respondents (50%) found the e-learning platform very easy to navigate, and 40% described it as easy. Additionally, 60% found the materials very appealing visually, and all participants (100%) reported no technical issues encountered. These results indicate a high level of usability and aesthetic satisfaction among the learners, highlighting the effectiveness of the e-learning materials' interface and design. According to [1], ease of navigation and visual appeal are critical determinants of user engagement in e-learning environments. The absence of technical issues further supports the importance of reliable technological infrastructure, as emphasized by [9], who argued that consistent access to functional learning management systems enhances learners' overall experience and participation.

A significant majority (60%) of the respondents stated that the e-learning materials significantly enhanced their understanding of the course content, while 50% found the materials extremely relevant to the coursework. The findings demonstrate the instructional value of e-learning materials in facilitating comprehension and aligning with curriculum goals. [10] found that students perceived e-learning as effective in

improving understanding and retention when materials were clearly structured and directly related to their coursework. Similarly, [11] emphasized that the relevance and contextual alignment of digital content are key predictors of e-learning success. Thus, the integration of well-designed modules directly contributed to learners' improved grasp of tailoring concepts.

TABLE 3. Learning Effectiveness

Indicators	Frequency	Percent (%)	Rank
Extent of the e-learning materials enhanced understanding the course content			
Moderately	2	20%	2.5
Significantly	6	60%	1
Extremely	2	20%	2.5
Level of relevance of the e-learning materials to the coursework			
Moderately Relevant	1	10%	3
Very relevant	4	40%	2
Extremely relevant	5	50%	1

TABLE 4. Engagement and Satisfaction

Indicators	Frequency	Percent(%)	Rank
Level of engagement of the e-learning materials			
Moderately engaging	4	40%	1
Very engaging	3	30%	2.5
Extremely engaging	3	30%	2.5
Level of satisfaction in the usage of e-learning materials			
Satisfied	4	40%	2
Very satisfied	6	60%	1
Level of recommendation of e-learning materials to other students			
Might or might not	2	20%	2.5
Probably would	2	20%	2.5
Definitely would	6	60%	1

Results showed that 60% of the respondents were very satisfied with the e-learning materials, and the same percentage indicated they would definitely recommend them to others. Additionally, 30% found the materials very engaging and 30% extremely engaging. These findings underscore the importance of interactivity and engagement in e-learning. [1] noted that learners' satisfaction levels increase when materials are interactive, accessible, and engaging. The high recommendation rate suggests that the materials not only met learners' expectations but also fostered intrinsic motivation—a key principle in Constructivist Learning Theory, which posits that meaningful engagement enhances knowledge construction through active participation [15]. *Educational theories be effectively applied in the instructional design of e-learning materials.*

TABLE 5. Ways That Educational Theories Be Effectively Applied In The Instructional Design Of E Learning Materials (Training)

Indicators	Frequency	Percent (%)	Rank
100%	1	10%	2
75%	9	90%	1

TABLE 5.1 Ways That Educational Theories Be Effectively Applied In The Instructional Design Of E Learning Materials (Using the E-learning Materials)

Indicators	Frequency	Percent (%)	Rank
100%	7	70%	1
75%	3	30%	2

In the control group (traditional instruction), 90% achieved a passing rate of 75%, while 10% scored 100%. In contrast, in the experimental group (using video-based e-learning materials), 70% achieved a perfect score of 100%, and 30% scored 75%. The notable improvement in the experimental group confirms that video-integrated e-learning significantly enhances learning performance compared to traditional methods. This result supports Cognitive Load Theory, as multimedia presentation reduces extraneous cognitive effort and improves comprehension Sweller,[2] . Similarly, [16] established that multimedia learning promotes motivation and cognitive engagement, thereby leading to higher academic achievement. These findings validate the effectiveness of applying educational theories—particularly Constructivism and Cognitive Load Theory—in e-learning design. *Challenges are encountered in the use of e-learning materials for tailoring education.*

TABLE 6. Challenges Encountered in Using E-Learning Materials

Indicators	Frequency	Percent (%)	Rank
No	10	100%	1

Remarkably, 100% of respondents reported *no challenges* in using the e-learning materials for tailoring education. This finding suggests a smooth adoption of the e-learning platform and demonstrates that the design effectively addressed usability and accessibility concerns. However, it contrasts with [13], who found that Filipino university students faced significant challenges such as unstable internet connectivity and limited learning resources during online learning. The absence of such issues in this study indicates that localized and context-sensitive e-learning materials, when designed to fit learners' environments, can mitigate typical barriers to technology-based education.

The proposed enhanced e-learning materials for tailoring education.

The development of the e-learning material, specifically the instructional video on making patterns, was guided by key educational theories to ensure its effectiveness in tailoring education. The video integrated the Constructivist Learning Theory, emphasizing active learner engagement through visual and experiential learning and the Cognitive Load Theory, which focuses on managing information complexity to enhance understanding.

In line with the Technology Acceptance Model (TAM), the material was designed to be user-friendly and accessible, promoting positive learner perceptions of ease and usefulness [4]. The video utilized multimedia elements such as close-up demonstrations, narration, and visual highlights to simplify complex pattern-making tasks, enabling learners to follow procedures like measuring, drafting, and marking efficiently.

Evaluation results revealed that students found the material highly navigable and visually engaging, with no technical issues encountered. Quantitative data supported this outcome, showing that the experimental group using the e-learning video achieved superior results—70% with perfect scores and 30% passing—compared to those taught through traditional instruction. This finding aligns with [1], who emphasized that

e-learning enhances learner performance through accessible and interactive materials.

In summary, the instructional video on making patterns demonstrated that multimedia-based e-learning grounded in sound pedagogical theory can significantly improve comprehension and skill mastery. Consistent with [11], this innovation underscores the effectiveness of e-learning as a modern approach to technical-vocational education.

IV. CONCLUSIONS

The findings of this study demonstrate that well-designed e-learning materials can significantly enhance learning outcomes in technical-vocational disciplines such as tailoring. The integration of educational theories—Constructivist Learning Theory, Cognitive Load Theory, and the Technology Acceptance Model—proved instrumental in guiding the design of instructional materials that are both pedagogically sound and technologically accessible. Learners exposed to the e-learning modules exhibited higher performance, engagement, and satisfaction compared to those who received traditional instruction. The results affirm that interactive and visually appealing digital materials can effectively facilitate understanding of practical skills, reduce cognitive load, and promote learner autonomy. Moreover, the absence of reported technical difficulties highlights the importance of context-sensitive design tailored to local learning environments. Overall, the study underscores that e-learning, when aligned with appropriate instructional design principles, can transform technical-vocational education into a more flexible, inclusive, and effective mode of learning.

Recommendations

Based on the findings of the study, it is recommended that educators in technical-vocational education integrate multimedia-based instructional tools such as video demonstrations and interactive modules to enhance learner engagement and comprehension. Schools and training institutions should prioritize the development of localized e-learning platforms that address the specific needs of tailoring students and other skill-based learners, ensuring accessibility and usability even in areas with limited resources. Continuous professional development programs for teachers should also be implemented to strengthen their competence in digital pedagogy and instructional design. Moreover, curriculum developers are encouraged to adopt blended learning approaches that combine theoretical instruction with practical applications, thereby fostering a more holistic learning experience. Policymakers and administrators should support these initiatives by providing funding for e-learning infrastructure and incorporating digital literacy training into the curriculum. Finally, future researchers are encouraged to conduct longitudinal studies to evaluate the long-term effects of e-learning on skill acquisition, motivation, and employability in other technical and vocational fields.

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