

Developing an Educational Website for Carpentry: Enhancing Industrial Arts Instruction

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Abstract - This study aimed to develop and evaluate an educational website for carpentry to enhance Industrial Arts instruction among Grade 10 Technology and Livelihood Education (TLE) teachers. A descriptive exploratory sequential mixed-methods design was employed. The qualitative phase involved five ($n = 5$) TLE-Industrial Arts teachers who participated in interviews and document analysis to identify instructional gaps. The quantitative phase included expert validation ($n = 5$) and teacher acceptability evaluation ($n = 20$) using standardized instruments. The developed website was assessed using the User Experience Questionnaire (UEQ) across the dimensions of clarity, efficiency, dependability, originality, and stimulation. Results revealed high mean scores across all dimensions, ranging from 3.61 to 3.92, interpreted as "Strongly Agree," with an overall mean of 3.75, indicating a very high level of acceptability of the developed website. The standard deviation values ($SD = 0.24-0.41$) indicate low variability among participants' responses, suggesting consistency in evaluations. The findings suggest that the integration of a user-centred digital platform improves accessibility, engagement, and instructional efficiency in carpentry education. The study highlights the importance of localized digital resources in vocational education, and the developed website serves as a practical instructional tool that supports teachers in delivering competency-based carpentry lessons aligned with curriculum standards.

Keywords - Carpentry Education, Educational Website, Industrial Arts, User Experience, Vocational Education.

I. INTRODUCTION

In the 21st century, teaching practices have evolved alongside rapid technological advancements, shifting from traditional methods toward digital and interactive approaches. In Technology and Livelihood Education (TLE) especially carpentry teachers are now more expected to incorporate digital tools in their teaching methods to enhance content delivery and fill instructional gaps. Multimedia materials like instructional videos, simulations and step-by-step demonstrations are easily accessed via digital platforms and help to simplify complex procedures and teach.

Despite these advancements, many public schools in the Philippines continue to face challenges such as limited resources, insufficient training, and a lack of updated teaching materials. These constraints result in incomplete coverage of competencies and decreased instructional effectiveness. Research highlights that successful technology integration improves the efficiency of teaching, learner interaction, and quality of instruction. Nevertheless, a gap in the creation of subject-specific digital tools tailored for Industrial Arts, particularly carpentry. This study addresses this gap by developing an educational website designed specifically for carpentry instruction. It evaluates the usability and acceptability of the platform by the help of the User Experience Questionnaire (UEQ) with the focus on such dimensions as attractiveness, efficiency, dependability, originality, and stimulation. The study will enhance instructional delivery by aligning the platform with the curriculum requirements and the needs of teachers to help in vocational education.

II. MATERIALS AND METHODS

A. Research Design

This study employed a descriptive exploratory sequential mixed-methods approach. The qualitative phase revealed the instructional requirements in the form of interviews and document analysis whereas the quantitative phase assessed the developed web site, using expert validation and teacher assessment.

B. Respondents of the Study

The study utilized a purposive sampling technique, selecting participants based on their direct involvement in carpentry instruction and relevant expertise. This non-probability sampling was used to ensure that the respondents had the required experience and qualification to give meaningful insights. Respondents included five (n = 5) TLE-Industrial Arts teachers for the qualitative phase, five (n = 5) experts for validation, and twenty (n = 20) Grade 10 TLE teachers from selected schools in Bulacan for the acceptability evaluation.

Criteria for teacher respondents included:

- 1) Currently teaching Grade 10 Carpentry under the TLE curriculum,
- 2) Preferably holding National Certificate II (NC II), and
- 3) Willingness to participate.

Expert validators were selected based on their professional background in Industrial Arts, educational technology, and curriculum development.

C. Research Instruments

Data were collected using a semi-structured interview guide and survey questionnaires adapted from established studies. The User Experience Questionnaire (UEQ) was used to measure usability dimensions such as clarity, efficiency, dependability, stimulation, and originality.

D. Data Gathering Procedure

Data collection followed a structured process, beginning with interviews and document analysis, followed by expert validation and teacher evaluation. Ethical considerations, including informed consent and confidentiality, were strictly observed throughout the study. The created site was tested by professionals with the help of a systematic assessment tool modified by Elling et al. (2012). Five (n = 5) professionals rated the site on the basis of the following criteria: the site usability, hyperlink functionality, relevance, completeness, and design. A Likert scale was used to rate each criterion to define the quality and instructional soundness of the platform.

A total of five (n = 5) experts were involved, a number considered adequate for content validation in instructional material development studies. Feedback from experts was systematically analyzed and used to refine the website prior to the teacher acceptability evaluation. This procedure guaranteed content validity as well as technical reliability of the created instructional tool.

E. Statistical Treatment of Data

Descriptive statistics, including frequency, percentage, and mean, were used to analyze quantitative data and determine the level of acceptability of the website.

III. RESULTS AND DISCUSSION

As shown in Table 1, the findings indicate that the developed educational website was very much acceptable among TLE teachers. All the User Experience Questionnaire (UEQ) dimensions were rated high in terms of mean, which means that the platform was positively rated in terms of usability and instructional value.

Table 1. Overall Summary of Teachers' Perceptions of the Carpentry Website (UEQ Results)

Indicators	Mean	SD
1. Clarity	3.92	0.24
2. Efficiency	3.8	0.36
3. Dependability	3.74	0.36
4. Originality	3.61	0.37
5. Stimulation	3.67	0.41
Overall	3.75	0.35

Clarity obtained the highest mean score ($M = 3.92$, $SD = 0.24$), indicating that the website was clear, understandable, and easy to navigate for instructional use. This suggests that users experienced minimal difficulty in accessing and interpreting the content, which is essential for effective teaching and learning processes. Efficiency ($M = 3.80$, $SD = 0.36$) and Dependability ($M = 3.74$, $SD = 0.36$) were rated high as well, which means that the platform is convenient, trustworthy, and useful to integrate into the classroom. These findings suggest that the website can support teachers in delivering carpentry lessons efficiently without technical disruptions.

Meanwhile, Originality ($M = 3.61$, $SD = 0.37$) and Stimulation ($M = 3.67$, $SD = 0.41$) suggest that the website incorporates engaging and innovative features that enhance user experience. Although slightly lower compared to other indicators, these results still reflect a positive perception, indicating that the platform can stimulate interest and motivation in instructional delivery.

Overall, the computed mean score ($M = 3.75$) reflects a strong positive evaluation, interpreted as Very Much Acceptable. These findings suggest that the website meets usability standards in terms of clarity, efficiency, dependability, originality, and stimulation. The results further align with previous studies emphasizing the importance of usability and engagement in e-learning systems.

The high ratings imply that the platform is practical for classroom use and supports effective instructional delivery in carpentry education. Moreover, the integration of multimedia resources such as videos and simulations enhances comprehension and engagement, reinforcing the effectiveness of user-centered digital instructional tools in vocational education.

IV. CONCLUSION

The study concludes that the developed educational website for carpentry is a highly acceptable and effective instructional tool for Industrial Arts teachers. The findings indicate that the platform enhances teaching efficiency, supports curriculum delivery, and improves teaching engagement in carpentry instruction. The high evaluation results from teachers indicate that the website is clear, efficient, dependable, and engaging, making it a valuable supplementary instructional material for Technology and Livelihood Education (TLE), particularly in Carpentry.

In terms of practical implications, the developed website may be utilized as a supplementary teaching tool in TLE classrooms, especially in schools with limited access to instructional materials and laboratory resources. Moreover, the platform enhances teaching engagement. Furthermore, its multimedia capabilities, including videos and interactive presentations, can help teachers describe complicated skills and processes in a more efficient manner, thus enhancing the delivery of instruction and engagement of learners in vocational education.

Regarding limitations, the study was conducted only in selected schools in Bulacan and focused primarily on teacher evaluations of the developed website. It did not involve student respondents, it did not assess actual student learning outcomes, or long-term instructional effectiveness. Consequently, the results can be generalized to perceived usability and acceptability and not necessarily reflect the overall effect of the platform in a variety of educational contexts.

For future research directions, it is recommended that further studies examine the effectiveness of the website in improving student performance and skill acquisition in Carpentry. Future researchers may also consider expanding the application of the platform to other TLE specializations to determine its adaptability and scalability. Additionally, enhancements such as interactive assessments, gamified learning activities, and mobile-friendly optimization may be integrated to further improve user engagement and instructional effectiveness. Overall, this study contributes to the advancement of digital vocational education by providing a validated, teacher-centered instructional platform that supports modernized and technology-enhanced teaching in Carpentry.

Conflicts of Interest

The authors declare no conflicts of interest.

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