ASSESSMENT OF INTERACTIVE LEARNING OBJECTS (ILOs) FOR CARPENTRY AMONG BTLED STUDENTS IN A STATE UNIVERSITY IN CAGAYAN DE ORO CITY

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ABSTRACT *- Carpentry is a skill-oriented vocational trade and one of the mandatory major courses offered in the Bachelor of Technology and Livelihood Education major in Industrial Arts (BTLED-IA). The flexible learning program observed that the Learning Management System (LMS) used in a state university in northern Mindanao has limitations in its functions based on the nine events of instructions as proposed by Robert Gagne. The functionality of the LMS used limits the events of an instructional design process that focuses on the outcomes or behaviors of instruction. In order to maximize the potential of the LMS used, a series of events that follow a systematic instructional design process be addressed as proposed by Robert Gagne. To address the identified problem on the full potential of the LMS used, the researcher developed Interactive Learning Objects (ILO's) using Wix as a platform as supplementary learning materials for the Carpentry students. The ILO developed follows the nine instructional design events that focus on the outcomes or behaviors of instruction or training. This study focuses on evaluating the level of acceptability of the ILO in terms of Manipulability, Clarity and Comprehensibility, Interactivity, Multimedia design, Applicability, Data entry by User, and Overall Interface. Fifty-three junior and senior students of BTLED-IA responded to the online survey. The questionnaire was adapted from two sources and was tested for reliability. Overall, the results of the data analysis revealed that the ILO was Totally Acceptable. Discussions and recommendations for future studies are described in this study.*

Keywords: BTLED, Carpentry, Flexible learning, Interactive Learning Objects, Learning Management System

INTRODUCTION

The BTLED program is an undergraduate teacher education program that equips learners with adequate and relevant competencies in the area of Technology and Livelihood Education (TLE) for exploratory courses. It aims to develop highly competent and motivated teachers who will teach TLE for Grades 4-8 in basic education [1]. One of the major courses offered in BTLED-IA is Carpentry [1]. The course deals with the acquisition of knowledge and skills based on the training regulations prescribed by the Technical Education Skills and Development Authority (TESDA). These include the different units of competencies categorized as Basic, Common, and Core competencies.

With the onset of the COVID-19 pandemic, the mode of instruction in the education sector, including higher education institutions, shifted from traditional face-to-face to flexible learning [2]. This has brought great obstacles for both educators and students alike, where different problems arise in the conduct of the new teaching mode [3]. Because of this shift, the teaching and learning environment is embracing a number of innovations, and one of these innovations includes the use of technology through flexible learning. This innovative pedagogical approach has been embraced rapidly though it goes through a process [4]. In the Philippine context, the paradigm shifts in its educational system's teaching and learning process necessitate collaboration among stakeholders and strengthening the culture of sharing knowledge, resources, and best practices. Everyone is called to be part of this transition and transformation toward the new normal [5]. With the implementation of the flexible learning modality, the students in Carpentry were heavily affected because the course requires students with various physical hands-on activities that are otherwise not feasible in the flexible learning modality. In the flexible learning modality, it was observed that the LMS used in a state university in northern Mindanao has limitations in its functions based on the nine events of instructions as proposed by Robert Gagne. Such as weekly schedules of Learning outcomes, Topics, Learning Materials /Resources, and Activities/Assessments [6] where the instructor uploads the topics and links the videos into the LMS, and the assessment is given either embedded in the module or given in a separate link. The LMS lacks the important steps in teaching, such as motivation, presenting the topic, interactive assessment, or the complete lesson presentation.

In the last two years of implementation of the LMS, the instructor's absence creates confusion because students are not guided by the proper flow of the events of instruction. The functionalities of the LMS limit the events of the instructional design process that focus on the outcomes or behaviors of instruction or pieces of training [7]. So to maximize the potential of the LMS, a series of events that follow a systematic instructional design process be addressed as proposed by Robert Gagne.

To address the identified problem on the full potential of the LMS used, the researcher developed an ILO using Wix as a platform for supplementary learning materials for the Carpentry students. The ILO developed follows the nine events of an instructional design process that focuses on the outcomes or behaviors of instruction or pieces of training [7]. Each weekly topic was presented based on the systematic instructional design process by Gagne using various interactive learning tools such as Screencast-O-matic, Quizziz, Quizalize, Quizwhizzer, Google class, and YouTube.

Use of Interactive Learning Objects (ILOs)

One of the advantages of using ILO as teaching material is that it is able to increase students' interest in learning [9]. In addition, it helps teachers manage the learning material and develop it in an interesting and easily understood form [8]. This is surely helpful for teachers in improving the quality of education. As for students, this module eases them in the learning process since it can be easily accessed. With ILO, teachers are able to provide teaching material not only in the form of text but also in the form of animation, audio, and video [9].

Students learn more powerfully and remember over a longer

period, and thus can apply the concepts constructively when actively engaged in a self-driven learning activity than when they are in a face-to-face classroom setup [10]. Moreover, students' independence is highlighted in the use of ILOs. Thus, one subject that requires independence is productive subjects.

Additionally, compared to conventional books, using ILO's as teaching material is more interactive due to its flexibility. LOs offer a wide range of advantages for both educators and learners. Among the advantages is the ease of use, reusability, interactivity, and visual support [11]. LOs can be presented in a class, but their true power comes when individual students utilize the materials to support their current learning needs [12]. Moreover, learners who are using ILOs get support from their peers, which indicates that using ILOs allows them to communicate and learn collaboratively, and these skills are vital in the 21st century [13].

Statement of the Problem

Based on the discussion above, it was known that the delivery of Carpentry as a course in BTLED requires face-to-face instruction because the instructor needs to demonstrate and the students perform the task, which is not feasible when using LMS. To address the problem, the researcher innovated an ILO using Wix as a platform wherein all the nine events of instruction by Robert Gagne are integrated. In line with the problem stated above, this study aims to assess the level of acceptability of the ILO in terms of manipulability, clarity, and comprehensibility, interactivity, multimedia design, applicability, data entry by the user and overall interface.

METHODOLOGY

This study employed the survey research design. Survey research involves the collection of information from a sample of individuals through their responses to questions. Researchers used survey methods to investigate areas of understanding about any educational issue [14]. This type of research allows for various methods to recruit participants, collect data, and utilize various instrumentation methods [15].

Development and Implementation of Interactive Learning Objects (ILO's).

In developing the ILO in this study, Gagnes' nine events of instruction were followed [7]. Wix was used as the learning platform because it is a powerful and user-friendly tool [10]. Using Wix as a learning platform bears advantages for instruction designers. These advantages include a collection of excellent designer templates that the instruction designer can choose from, the innovative drag-and-drop website builder, its multilingual feature allows the designer to translate the content in just a few clicks, and it automatically creates a mobile-friendly version of the site which can be edited separately thereby allowing the designer to create an optimized mobile experience. Finally, Wix had available help and support online [16]. Lessons and topics were developed into videos using Screencast-O-Matic and were uploaded to YouTube. The videos developed were hyperlinked to the Wix platform. Videos from other channels which are related to the topic were borrowed and hyperlinked to the Wix platform. Lessons available on the internet were also hyperlinked.

The ILO was implemented through Facebook groups as well as thru emails. Facebook was deemed the most feasible avenue to implement the ILO because it is the most widely used social media in the Philippines [10]. In the Philippines, as of January 2022, about 92.05 million social media users were making the country 2nd in the world that was most active on social media. There were 83.85 million Facebook users, and studies revealed that 59.6% of the social media users are 18 to 34 years old and have visited social networking sites such as Facebook [17].

Respondents of the study

The respondents of this study, as presented in Table 1, were 53 3rd and 4th-year BTLED IA students who are currently taking Carpentry at a State University located in Northern Mindanao, Philippines.

Table 1. Demographic profile of the respondents (n=53)

Profile		Frequency	Percentage
Age	20 & below	7	13.21
	21	8	15.09
	22	9	16.98
	23	7	13.21
	24	7	13.21
	25	3	5.66
	26 above	12	22.64
Sex	Male	16	30.19
	Female	37	69.81
	Total	53	100.00

Research Instrument

The research instrument used in this study was a modification from the questionnaire used by Namoco and Zaharudin [10], and some are adapted from DepEd Guidelines and Processes for LRMDS Assessment and Evaluation [18]. The research instrument is composed of two main parts. The first part covered the respondents' socio-demographic and academic profiles. The second part consisted of questions about the respondents' acceptability of ILO. There are seven parameters that were employed to assess the level of acceptability in terms of; Manipulability, Clarity and Comprehensibility, Interactivity, Multimedia design, Applicability, Data entry by User, and Overall Interface with a total of 37 items. Each item was measured using a 5-point Likert scale [19] with (1) Totally Unacceptable; (2) Unacceptable; (3) Neither Unacceptable nor Acceptable; (4) Acceptable; (5) Totally Acceptable.

Table 2. Description of the 5-point Likert scale questionnaire and basis for analysis of the data

Range of scores		Description
1.00 – 1.80	Totally Unacceptable	The ILO is totally not suitable and is not relevant
1.81 – 2.60	Unacceptable	Many features of and topics in the ILO cannot be utilized and are not relevant to the students
2.61 – 3.40	Neither Unacceptable nor Acceptable	The ILO is useful, but the student is not decided whether to use it or not
3.41 – 4.20	Acceptable	Many features of and topics in the ILO can be utilized and are relevant to the students
4.21 – 5.00	Totally Acceptable	The ILO is totally suitable and is relevant to the students

Reliability of the Research Instrument

The reliability of the research instrument used in this study was measured using the Cronbach Alpha. As presented in Table 3, the internal consistency of the acceptability of the ILO had the lowest value of 0.80 and the highest value of 0.95, which is within the acceptable value. This means that the research instrument had satisfactorily met the requirements to establish the internal consistency of the range of values as indicated in the study of Taber [20].

Table 3. Reliability test result (Cronbach alpha criterion)

Variable		Cronbach's Alpha
MAN	Manipulability	0.80
CLA	Clarity and Comprehensibility	0.93
INT	Interactivity	0.89
MMD	Multimedia Design	0.94
APP	Applicability	0.90
DEU	Data Entry by User	0.86
OVI	Overall Interface	0.95

Data Collection

After the pool of experts evaluated the ILO, the researcher sent a letter to the Dean as well as the chairman of the Department of Technical and Technology Education (DTTED) to seek permission to disseminate the survey questionnaire. The researcher coordinated with the instructors of the Carpentry classes. After permissions were granted, the researcher disseminated survey questionnaires through Google Form link to all the respondents via FB messenger as well as thru email. The data were collected at the end of the four-week implementation of the ILO, which was conducted from September 19 until October 10, 2022.

Data Analysis

The frequency and percentage were used to profile the respondents, as presented in Table 1. A range of values was used to interpret the mean and standard deviation presented in table 2. The mean and standard deviation were used to analyze data on the acceptability of the ILO. The results of the data analysis are presented in table 4.

Table 4. Mean, standard deviation and description of criteria for measuring the acceptability of the ILO.

Criteria / Items	Question Statements	MEAN	SD	Overall Mean	Overall SD	Description
Manipulability						
MAN 1	The website is compatible to my gadget.	4.04	1.06			
MAN 2	The website can be used without difficulty.	3.92	0.78	3.97	0.88	Acceptable
MAN 3	The speed of loading for the content is fast.	3.87	0.86			
MAN 4	Hyperlinked content to the website is easily accessible.	4.04	0.83			
Clarity and Comprehensibility						
CLA 1	The arrangement of the lesson content is well-organized	4.38	0.74			
CLA 2	The objectives of the lesson are clearly presented	4.40	0.69			
CLA 3	The discussion of the lesson in the video can be easily understood.	4.30	0.75	4.34	0.72	Totally Acceptable
CLA 4	The presentation of the lesson served for different learning styles.	4.30	0.70			
Interactivity						
INT 1	The website has search feature.	3.98	0.87			
INT 2	I can interact with the learning materials.	4.15	0.79			
INT 3	I can get all the learning and assessment materials in one website.	4.19	0.83	4.15	0.81	Acceptable
INT 4	The website contains all the information and materials needed to complete the activity.	4.32	0.75			
INT 5	I can use the website easily on my gadget.	4.09	0.81			
Multimedia Design						
MMD 1	Media elements are of sufficiently high quality.	4.23	0.78			
MMD 2	Clear and precise instructions are provided in accessing multimedia.	4.06	0.93			
MMD 3	Appropriate forms of media are used to enhance presentation.	4.23	0.78	4.22	0.79	Totally Acceptable
MMD 4	The multimedia presentations have a coherent layout, design and background.	4.25	0.78			
MMD 5	All images are accompanied by a detailed explanatory caption that the user can easily access.	4.32	0.67			
Applicability						
APP 1	The topic is significant to the carpentry competencies.	4.40	0.69			
APP 2	The assessment of learning was in line with the lesson objective.	4.40	0.84	4.41	0.76	Totally Acceptable
APP 3	The variation of the lesson presented helped me understand the topic well.	4.43	0.75			
Data Entry by User						
DEU 1	The user is explicitly told when he or she needs to provide input.	4.09	0.74			
DEU 2	The user can control the length of time required to submit the data on a data entry form	4.21	0.77			
DEU 3	The user is informed of exactly what is wrong with any erroneous data entries.	4.00	0.96	4.08	0.83	Acceptable
DEU 4	The user can correct erroneous data entries / supply missing entries without having to re-enter correct items on the same form.	3.98	0.89			
DEU 5	Mandatory fields are clearly marked as such.	4.09	0.79			
Overall Interface						

OVI 1	The design is visually appealing.	4.28	0.79			
OVI 2	The design is simple	4.25	0.78			
OVI 3	The design is consistent throughout successive displays.	4.38	0.74			
OVI 4	Contains sufficient information and directions for the user to use the resource.	4.15	0.74			
OVI 5	The ways to navigate through the material are clear.	4.23	0.82			
OVI 6	Labels, buttons, menus, text, and general layout of the resource are consistent and visually distinct	4.23	0.78			
OVI 7	Fonts are readable in terms of size, color and contrast between the background and the text	4.23	0.72	4.24	0.77	Totally Acceptable
OVI 8	The user is always made aware of what to do next.	4.19	0.88			
OVI 9	The resource provides feedback about the system status and the user's responses.	4.21	0.74			
OVI 10	The user is informed of their position in the resource relative to its beginning and end.	4.23	0.80			
OVI 11	The user is informed when a new window (such as a browser window, tab or pop up) will be displayed.	4.28	0.72			
	Over All			4.20	Totally Acceptable	

FINDINGS AND DISCUSSION

Level of Acceptability of the ILO

The summary of the findings of the data analysis is shown in Table 4. It can be observed that a majority of the respondents signify that the ILO was Acceptable in terms of Manipulability (*M=3.96, SD=0.89*), Interactivity (*M=4.16, SD=0.82*), and Data entry by the user (*M=4.07, SD=0.84*). Meanwhile, the results showed that the ILO is totally acceptable in terms of Clarity and comprehensibility (*M=4.37, SD=0.70*), Multimedia Design (*M=4.22, SD=0.79*), Applicability (*M=4.40, SD=0.78*), and Overall interface (*M=4.24, SD=0.79*). Overall, data findings signify that the ILO was totally acceptable (*M=4.20*).

The high level of acceptability, as indicated in the data analysis, could be attributed to the fact that among the advantages are ease of use, reusability, interactivity, and visual supports. Student independence is highlighted in the use of ILO [10] as well as students utilizing the materials to support their current learning needs [12]. The acceptability result also supports that majority of the students, based on the studies, revealed that in the Philippines, out of 92.05 million social media users, 59.6% are aged 18 to 34 years old and are active online [17].

CONCLUSION

This study assessed the acceptability of ILO in terms of manipulability, clarity and comprehensibility, interactivity, multimedia design, applicability, data entry by user, and overall interface, as perceived by the BTLED Carpentry student in a Philippine state university. It was revealed that: i) The ILO was acceptable as supplemental interactive learning material, ii) it was manipulable in their gadget used, iii) it was visually appealing, although improvements can still be made with regards to its overall interface, iv) it was showing the clarity of purpose and learning outcomes, as well as on its iv) perceived applicability, and v) it was sufficiently interactive as a supplementary teaching tool. Overall, based on the weighted mean of each criterion, all values indicate that the ILO was a totally acceptable tool as supplementary teaching and learning for the BTLED Carpentry students. The findings implicate that ILOs have the potential to be remedial and backup learning objects for the BTLED Students that will serve them immediate learning lessons while they are in the flexible learning mode.

SCOPE AND LIMITATION OF THE STUDY

The focus of this study was to assess the acceptability of the ILO after its implementation. The study was conducted in the first semester of the academic year 2022 – 2023 to the BTLED Carpentry students. This study is quantitative therefore, in-depth explorations of students' experiences were not covered. The sample size was limited because there were only two sections offering Carpentry classes during the semester by which the course was offered and during the data collection. However, the number of respondents satisfies the statistical assumption for parametric assessment.

RECOMMENDATIONS

For future studies, it is suggested that the researcher conduct in-depth interviews to determine and understand why the ILO is acceptable to students for their hands-on classes. A larger sample size may be employed.

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