Development and Utilization of Online Applications in Science Website

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Abstract

The study aimed to utilize online applications in crafting and embedding Most Essential Learning Competency (MELC) based Science 7 lessons, activities, and quizzes on a website. The researcher followed the Analysis, Design, Development, Implement, Evaluate (ADDIE) model, a systematic approach to instructional development. The quasi-experimental method was employed; the dependent variable was measured once before the treatment was implemented and once after the treatment was implemented. Through the developmental and quasi-experimental methods, the clarity, adequacy, suitability, and user-friendliness of the Science website were determined. Pre-test and post-test were administered to determine whether the utilization of developed online applications on the Science website influenced the performance of students.

The findings showed that the developed online applications on the Science website had very clear adequate content, attaining a very high remark on the overall mean based on the ratings of Science teachers and TLE/ICT teachers. Likewise, a very high remark was also obtained for the suitability and user-friendliness of the instructional design of the Science website. Meanwhile, the data also showed that the grade 7 online distance learners' mean performance increased after using the website. No significant difference in the ratings of Science teachers and ICT/TLE teachers on clarity, adequacy, suitability, and user-friendliness of the developed online applications on the Science website was found. However, regarding the pre-test and post-test results, the test scores of the grade 7 ODL learners have a significant difference.

To further improve the study, it is recommended to use the experimental method rather than the quasi-experimental to test the effectiveness of using the developed online applications on the Science website. Also, each quarter's pre-test and post-test be obtained to analyze comprehensively the specific website's subpage that needs to be improved. Furthermore, studies about online applications that are suitable to the demand of the lesson presented are recommended. This is to improve the website's instructional design in terms of suitability.

Keywords: online applications; website; ADDIE model

1. The Research Problem and its Background

This section introduces the problem, objectives sought to accomplish in this study, and the conceptual model.

1.1 Introduction

Students seeking academic knowledge face a different task now that the educational sector has rolled out its call to distance learning. Modern internet-based distance education is gradually progressing, demonstrating a rapid growth momentum (Nart & Altunusik, 2013). It is observed through the various online platforms emerging.

The internet has been used in teaching and learning because of its ability to communicate synchronously or asynchronously. Numerous studies address the benefits of using the internet. Its use has

become the main subject of interest among researchers, particularly in designing and developing new educational aids that cater to the learning needs of 21st-century learners. Therefore, the use of computers in the education process is one of the latest educational methods that should not be ignored and must be fully utilized as a modern teaching and learning technology. Among the numerous students" internet-based resources, the use of educational websites suits distance learning.

Web-based learning tools such as educational websites can help deepen science knowledge among middle school students and ease the science literacy gap for underachieving students (Taylor & Francis, 2018). However, in online distance learning, one of the major challenges is in verifying the accuracy of the information gathered. Learners struggle to obtain relevant facts among the massive volume of online data available. Misleading information is widespread. This opted the learners to verify and assess the authenticity of the data acquired.

Intending to create an additional learning resource for science 7 learners, this research study aimed to develop and utilize online applications on the Science website. The grade 7 learners used validated content. Whether the usage of the content affects the students" performance will also be a subject of this study.

1.2 Background of the Study

Due to the sudden outbreak of the Covid-19 pandemic, the means and ways of learning had been affected. As a result, countermeasures were taken to continue educating the students despite the situation (Toquero, 2020). From conventional face-to-face classes, distance education was practiced all over the country. The Department of Education had imposed different learning modalities. One of which is practicing online distance learning with technologically capacitated students. With its implementation in 2020, the researcher met difficulties while in the conduct and implementation of online distance learning. This include (1) provision of activities to be used in science that is specifically designed for online distance learners, (2) online delivery of the lesson based on the ICT skills and maturity level of learners and (3) alignment of the ODL's lessons and activities to the Most Essential Learning Competencies (MELCs) stipulated in the budget of work enforced by the educational sector.

Aiming to address the mentioned dilemma upon the delivery of online distance learning, the researcher urges to supply an added learning resource that has valid content. The development and utilization of online applications on Science 7 website ensure that usage of technology is optimized, thereby assisting in the articulation of instruction.
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1.3. Objectives

This research study aimed to craft and embedded Most Essential Learning Competency (MELC) - based science 7 lessons, activities, and quizzes on a website. Specifically, the following objectives aimed to:

1. Determine the level of validity of developed online applications in Science 7 as rated by Science teachers and ICT / TLE teachers in terms of:
    1.1 Clarity;
    1.2 Adequacy;
    1.3 Suitability; and
    1.4 User-friendliness.
2. Identify the students' mean performance before and after using developed online application on Science 7 website in terms of:
    2.1 pre-test; and
    2.2 post test
3. Determine the significant difference in the ratings of science teachers and ICT /TLE teachers on the developed online applications in Science 7 website in terms of clarity, adequacy, suitability, and user-friendliness.

4. Determine the significant difference in the students', mean level of performance in terms of pre-test and post-test.

1.4. Conceptual Framework

For a better understanding of the research, it is presented in an input-process-output model. Input consists of personal computers or laptops, and android cellular phones. The process is presented through a 5-phase ADDIE model (analysis, design, develop, implement, evaluate). The analysis phase consists of selecting the Science 7 MELCS to be included or MELC mapping. Under the design phase, it consists of planning for lessons, activities, and quizzes to be covered and drafting the overall design. The development phase consists of crafting and embedding the lessons, activities, and quizzes by using online applications. It also includes validating the website's content in terms of clarity and adequacy, instructional design suitability, and user-friendliness. Under the implementation phase, it consists of learners" use of the website's content. Lastly, for the evaluating phase, it is determining the students" performance before and after using the Science 7 website
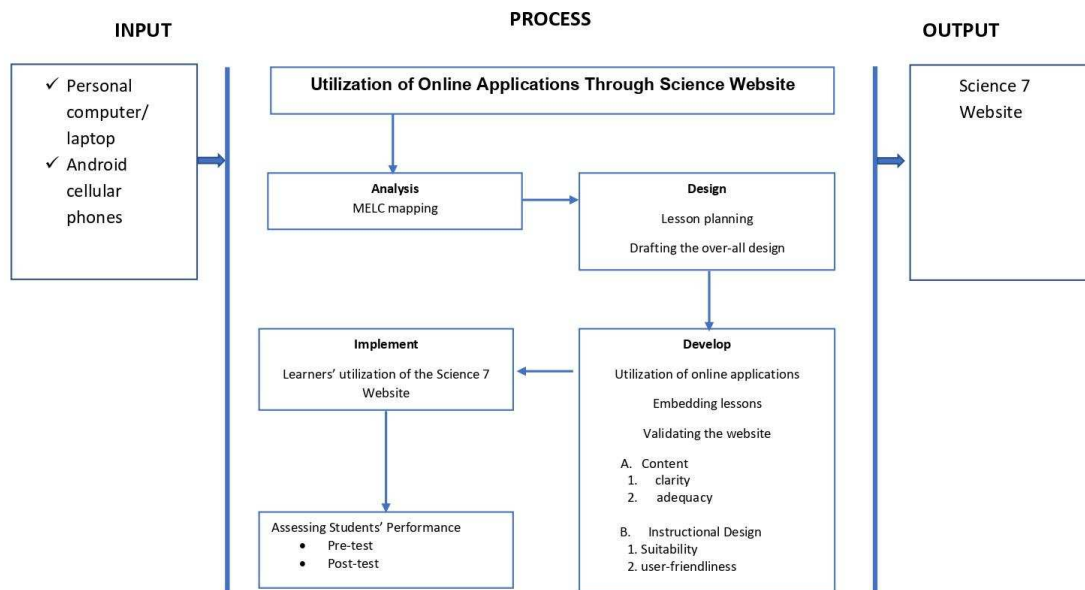
INPUT

- ✓ Personal computer/ laptop
- ✓ Android cellular phones

PROCESS

Utilization of Online Applications Through Science Website

Analysis
MELC mapping

Design
Lesson planning
Drafting the over-all design

Implement
Learners' utilization of the Science 7 Website

Develop
Utilization of online applications
Embedding lessons
Validating the website

A. Content
   1. clarity
   2. adequacy

B. Instructional Design
   1. Suitability
   2. user-friendliness

Assessing Students' Performance
- Pre-test
- Post-test

OUTPUT

Science 7 Website

Figure 1. The Research Paradigm of the Study

2.Literature Review

The pandemic generated changes in the teaching-learning process and influenced the interaction between teachers and learners (Coman, et al. 2020). Teachers and parents play a fundamental role in supporting students to maximize the potential of online schooling when regular face-to-face instruction cannot take place. Therefore, interventions were designed to reduce the burden on parents and help teachers and schools maximize digital learning. (OECD, 2020).

Optimizing the use of technology in digital learning is supported by an E-learning method. E-learning should be present in the teaching and learning modalities in all institutions (Micabalo et. Al, 2021). This is to increase students' perceived satisfaction with E-learning. The rate of the respondents' agreement on the perceived usefulness, perceived ease of use, and acceptance of use were high (Zalat et, Al., 2021). It

encouraged the development of the strategic plan for the conduct of e-learning that will view technology as a positive step.

Devices such as laptops, personal computers, smartphones, and tablets are used for online learning and access and various multimedia platforms (Dello Stritto and Linder, 2018). With internet connectivity, conducting the instruction will be made possible. Its use should not be ignored and must be fully used as a modern teaching technology (Ghani and Daud, 2018).

While in the conduct of distance learning using technology, proper instructional materials must be provided. With regards to the present study, it was anchored on the recommendation on the need to develop more instructional materials for science and technology (Selga, 2013). It was advised that instructional materials must be properly distributed and be made suitable for the user. This could be obtained by deciding the validity of the learning materials developed.

Web-based learning is used nowadays as an alternative to face-to-face education. This made educators exert efforts in creating interactive media as it was proven to have a significant effect on the learning process. Thus, educational websites along with other online software gained popularity.

A website is a system on the internet that allows anyone to be able to supply information that can be accessed all day (Musa, et. Al, 2018). It can serve a variety of purposes (Godelski, et al., 2013), but the main purpose of creating websites is to deliver the content in the most efficient way to the targeted user group (Mutlu et. Al, 2018). For the educational website, the goal is to supply new avenues for learning.

The global quality evaluation of a website has three dimensions namely, content, service, and technical quality (Rocha, 2012). The general content and appearance of a website are most important for users (Kholoud et Al 2014). This implied that improvements to the appearance of a website is a must to enhance the overall evaluation of the site. Concerning the content and user interface of the interactive module, clarity was induced through its relevance, accuracy, usefulness, authenticity, and attractiveness (Bermude, 2018).

Content must be organized and accessible as far as the web design is concerned (Godelski et al., 2013). Formats and overall appearance are also considered to show clarity. A unified format among the pages enhances the organization and accessibility of the content.

The design elements of a website mentioned most often were navigation, graphical representation, organization, content utility, purpose, simplicity, and readability (Garett, et, Al., 2016). These were to be considered into a concise list of website design elements to operationalize an effective website design. The structure of the website needs to be improved, especially the distribution of the links, to enhance its usability by the users and that must be changed to a pleasant appearance (Mori, 2013).

3. Methodology

This study validated the content and instructional design of the science 7 website in terms of clarity, adequacy, suitability, and user-friendliness. The extent to which the website affects the performance of the learners was determined. This focused on the teachers and learners of Los Baños district.

3.1 Research Design

The researcher used the descriptive developmental method. Descriptive survey method is concerned with not only the characteristics of the individuals but also the entire sample. It offers details that are helpful for resolving local problems through survey. Such studies provide useful information because they are factual (Salaria, 2012). Developmental method pertains to instructional development, which means the output will be developed after conducting this research.

The survey method allowed the researcher to gather data on behavior without relying on respondents' honesty and accuracy. Since concerns of the online applications in Science 7 website was to craft lessons, activities, and quizzes to be embedded on a website, the same research design, the descriptive developmental

method, was used. The survey determined the validity level of the science website's content and instructional design.

Moreover, the quasi-experimental method was employed since the concern of this research study was to determine the effectiveness of using the utilized online applications through the science 7 website based on the pre-test and post-test results of the grade 7 ODL respondents. In this type of quasi-experimental method, the dependent variable is measured once before the treatment is implemented and once after the treatment is implemented. Other variables that might influence any part of the study will not be considered.

Upon the conduct of the study, the researcher followed the Analysis, Design, Development, Implement, Evaluate (ADDIE) model. ADDIE model is systematic approach to instructional development. It does not have a strict linear progression across its steps. Each phase of the model is made up of different procedural steps (Ghani, 2018).

3.2 Respondents of the Study

The level of validity of developed online applications on the Science website was rated by two groups of respondents: twenty (20) Science teachers and twenty (20) ICT or TLE teachers from Los Baños district. Among the twenty science teachers, five (5) were from Los Baños National High School-Poblacion, six (6) from Los Baños Integrated School, eight (8) from Los baños National High School-Batong Malake and one (1) from other schools. Among the twenty ICT /TLE teachers, six (6) from Los Baños National High School-Poblacion, six (6) from Los Banos Integrated School, and four (4) from Los Baños National High School-Batong Malake, and four (4) from other schools.

Thirty grade 7 online distance learners from Los Baños, National High School-Poblacion, took the pre-test, utilized the Website, and took the post-test. Twenty (20) selected students were from STE- division initiated class, and ten (10) students from the regular section. The significant difference in the students' mean level of performance was determined.

3.3 Sampling Technique

In the study, purposive sampling was used to select Science teachers from the DepEd Los Baños district that validated the website's content and instructional design. Thirty (30) Grade 7 online distance learners (ODL) from Los Baños National High School-Poblacion utilized the activities and lessons embedded on a website in Science 7 and took the pre-test and post-test.

Purposive sampling is a non-probability sampling in which researchers rely on their own judgment when choosing members of the population to participate in their study. This entails the purpose of the study to properly choose and approach eligible or qualified participants (Foley 2017).

3.4 Research Procedure

The researcher conceptualized the study with the aim of utilizing online applications in the development of the Science 7 website. Therefore, this research study adapted the ADDIE model (Analysis, Design, Develop, Implement, Evaluate), Each phase of the model consisted of different procedural steps.

During the analysis phase, the problem was identified, defined, and a solution was recommended. In this research study, the most essential learning competencies from the PIVOT 4A budget of work (BOW) to be included were selected. This phase also determined the project goal before the instructional materials were designed. Then, the design phase used the information collected from the analysis and allowed for a plan and strategy. The purpose of this phase was to define the information from which the instruction was developed. During the design phase, the procedure was planning lessons, activities, and quizzes to be included on Science 7 website, deciding on the suitable online applications to be used, and checking on the alignment of contents to the MELC selected.

Table 1. ADDIE Steps and Procedure During the Conduct of the Study

Step	Procedure
Analysis	• MELC selection is based on the proposed competencies that learners must learn
Design	• Plan for lessons, activities, and quizzes to be included on Science 7 website
	• Decide on the suitable online applications to be used.
	• Check on the alignment of contents to the MELC selected
Develop	• Crafting lessons, activities, and quizzes by utilizing online applications
	• Embedding the crafted content
	• Formatting and unifying the content layout
	• Validating the content and instructional design of the Website
Implement	• Learners' use of the lesson, activities, and quizzes on the science website
Evaluate	• Determining students' performance before and after using the Utilized Online Applications in Science 7 website

During the development phase phase, lessons plan and materials were developed and uploaded into the instructional tool. As for the science 7 website, lessons, activities, and quizzes were crafted by utilizing online applications, embedded on the Website, formatted, and unified the content layout. Validation of the content and instructional design was done by the science and ICT /TLE teachers before the learners used it.

The final phase is evaluation explored the effectiveness of instruction and the utilized online applications through Science 7 website.

3.5 Software used in Website development

During the development phase, online applications and various software were needed. Summarized in the table below are the software and its purpose of usage.

Table 2. Software Required in Website Development

Software	Purpose
Google site	The platform for website development.
Adobe Photoshop and Canva for Education	Image editing software
Audacity	Record audio/ sound
Google Slides and PowerPoint (office 365)	Presentation
Google Docs	Lecture notes and texts compiler
Quizizz, Wordwall, Google form	Online applications for activities and assessment

3.6 Statistical Treatment

The weighted mean and standard deviation were used to determine the validity of the content and instructional design of the embedded activities on the science 7 website in terms of clarity, adequacy, suitability, and user-friendliness. Paired T-test was used to compare the pre-test and post-test results of the Science 7 learners. Paired t-test is a statistical treatment used to compare mean differences between treatments when the observations have been obtained in pairs. The differences between the paired values were assumed to be normally distributed, and the null hypothesis is being tested (Hsu and Lachenbruch, 2014). Data gathered from the questionnaire about the development level of the online applications on the Science 7

website was treated with a parametric test called the independent sample T-test. This statistical treatment compares the means of two (2) independent groups: science teachers and ICT /TLE teachers.

4. Results and Discussion

This section includes the presentation, analysis, and interpretation of data. These are based on the statistical treatment of the results of survey questionnaire given to science and ICT/TLE teachers, as well as the results of the pretest and post-test of grade 7 learners. Both of whom were the concern of this study.

4.1 Level of Development of Online Application in Science 7 Website in terms of Clarity

Table 3 presents the level of validity of developed online application in Science 7 website in terms of clarity as rated by Science and TLE/ICT teachers. Clarity of the website's content was defined as the characteristic to be understood in a clear and exact way. This criterion can be expounded by the texts and choice of words in the notes, discussion and activities, the arrangement of elements in each subpage notably in pictures, audio and presentations, and the specificity of the instructions.

Table 3. Level of Development of Online Application in Science Website in terms of Clarity

STATEMENT	Science teachers			TLE/ICT teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
1.The texts present on the lecture notes of the topics on the website are legible.	4.75	0.44	Strongly Agree	4.90	0.31	Strongly Agree
2.The choice of words is simple and comprehensible.	4.95	0.22	Strongly Agree	4.90	0.31	Strongly Agree
3.Texts on the discussion sections are concise.	4.80	0.41	Strongly Agree	4.90	0.31	Strongly Agree
4.Features of the website are visible.	4.80	0.41	Strongly Agree	4.95	0.22	Strongly Agree
5.Each subpage is not congested.	4.80	0.41	Strongly Agree	4.80	0.41	Strongly Agree
6.The pictures clearly convey the goal of each subpage.	4.80	0.41	Strongly Agree	4.80	0.41	Strongly Agree
7.All the elements of each subpage correlate with its competency.	4.60	0.94	Strongly Agree	4.90	0.31	Strongly Agree
8.The content of each subpage is free from ambiguity.	4.60	0.94	Strongly Agree	4.90	0.31	Strongly Agree
9.Instructions are specific, logical, and consistent.	4.55	0.94	Strongly Agree	4.85	0.37	Strongly Agree
10.Discussions are free from vagueness.	4.60	0.94	Strongly Agree	4.80	0.41	Strongly Agree
Overall Mean	4.73			4.87		
SD	0.66			0.34		
Verbal Interpretation	Very High			Very High		

Legend:

Scale	Remark	Verbal Interpretation
4.20 – 5.00	Strongly Agree	Very High
3.40 – 4.19	Agree	High
2.60 – 3.39	Moderately Agree	Moderately High
1.80 – 2.59	Disagree	Low
1.0 – 1.79	Strongly Disagree	Ver Low

Science teachers' overall ratings (M=4.73, SD=0.66) on the level of validity of developed online applications in Science 7 website in terms of clarity was remarked as very high. Likewise, with TLE/ICT teachers' overall ratings (M=4.87, SD=0.34). Although each group of respondents had the same verbal interpretation of Very High, ICT/TLE teachers' ratings were greater than the ratings given by science teachers. Despite the difference in the numerical value of the ratings, both group of respondents have the same mean ratings about the statements "Each subpage is not congested" and "The pictures clearly convey the goal of each subpage." Therefore, it can be deduced that the utilized online application in science 7 website has clear and well formatted content.

Based on the result, the Science website's content was agreed upon to be clear. With regards to the texts and choice of words, it was visibly simple and comprehensible. Conciseness among the discussion sections were also clear. In addition, the elements specifically the pictures and presentations embedded correlated with the competency stated. Furthermore, the content was free from vagueness.

In the published journal about evaluating website, Godelski, et. Al, (2013) mentioned that the content must be clearly organized and accessible as much as possible. To be able to achieve this, all the elements of each page should display a coherent and unified content. This means that clarity can be attained through considering the formats and overall appearance of the website. This supports the findings of the study that the developed online application in Science 7 website adheres to the must-have characteristic of a website which is clarity.

4.2 Level of Development of Online Applications in Science Website in terms of Adequacy

Table 4 show the level of validity of developed online application in Science 7 website in terms of adequacy as rated by Science and TLE/ICT teachers. Adequacy of the website's content pertains to the sufficiency of the information presented on the website based on the stated competency. This criterion can be delineated by the sufficiency of the elements that supports the goal of the website, ample activities and exercises that elicit students' prior knowledge, and adequate lessons and discussions grounded from the competency required to be learned.

The overall mean rated by ICT experts/TLE teachers (M=4.88, SD=0.33) in terms of adequacy is greater than the overall mean rated by the science teachers (M=4.80, SD=0.40), although group of respondents had a verbal interpretation of Very High. Also, there were same remarks about the statements "The subpage content provides adequate information needed based on the stated most essential learning competency (MELC), "There are enough online activities that elicits students' prior knowledge about the topic." Likewise, both groups rated the website's adequacy lowest at the statement "The activities and discussion can be done in the allotted time. In contrast, ICT experts rated the highest at the statement "The subpage has sufficient elements that support the goal of the website," where the science teachers rated the lowest.

Based on the established result, the website had presented adequate information based on the most essential learning competency. However, the researcher must take into consideration in revisiting the content with regards to the sufficiency of elements that supports the goal of the website since the ratings given by both respondents were contrasting. Overall, the website's content could be proven to present enough online activities and discussion that can be conducted in the allotted time.

Table 4. Level of Development of Online Applications in Science Website in terms of Adequacy

STATEMENT	Science teachers			TLE/ICT teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
1.The subpage content supplies adequate information needed based on the stated most essential learning competency (MELC).	4.90	0.31	Strongly Agree	4.90	0.31	Strongly Agree
2.The subpage has sufficient elements that support the goal of the website.	4.70	0.47	Strongly Agree	4.95	0.22	Strongly Agree
3.There are enough images that support the goal of each subpage.	4.85	0.37	Strongly Agree	4.85	0.37	Strongly Agree
4.Clear instructions and discussions are presented.	4.85	0.37	Strongly Agree	4.80	0.41	Strongly Agree
5.There are enough online activities that elicit students' prior knowledge about the topic.	4.80	0.41	Strongly Agree	4.80	0.41	Strongly Agree
6.The competencies can be practiced through sufficient online exercises.	4.75	0.44	Strongly Agree	4.90	0.31	Strongly Agree
7.The competencies are sufficiently supported by presentations and images.	4.85	0.37	Strongly Agree	4.90	0.31	Strongly Agree
8.The activities and discussion are simplified.	4.85	0.37	Strongly Agree	4.95	0.22	Strongly Agree
9.The online activities present on the website are sufficient in assessing the skill required from a student to learn or acquire.	4.70	0.47	Strongly Agree	4.90	0.31	Strongly Agree
10.The activities and discussion can be conducted in the allotted time.	4.70	0.47	Strongly Agree	4.80	0.41	Strongly Agree
Overall Mean	4.80			4.88		
SD	0.40			0.33		
Verbal Interpretation	Very High			Very High		

Legend:
Scale	Remark	Verbal Interpretation
4.20 – 5.00	Strongly Agree	Very High
3.40 – 4.19	Agree	High
2.60 – 3.39	Moderately Agree	Moderately High
1.80 – 2.59	Disagree	Low
1.0 – 1.79	Strongly Disagree	Ver Low

The findings were supported by the study about Instructional Materials development: A Worktext in Science and Technology in Society done by Selga (2013). It was shown that there is a need to develop more instructional materials for science and technology. It was recommended that instructional materials must be properly distributed. Likewise with the content being provided.

4.3 Level of Development of Online Applications in Science Website in terms of Suitability
Table 5 reveals the level of validity of developed online application in Science 7 website in terms of suitability as rated by Science and TLE/ICT teachers. Suitability was defined in this study as the applicability

to learners that are ICT skills, age, and maturity dependent.

Table 5. Level of Development of Online Applications in Science Website in terms of Suitability

STATEMENT	Science teachers			TLE/ICT teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
1.The websites' content is suitable to the learners' instructional needs.	4.90	0.31	Strongly Agree	4.85	0.37	Strongly Agree
2.The instructional design of the website is age appropriate.	4.90	0.31	Strongly Agree	4.75	0.55	Strongly Agree
3.The website's instructional design is suitable to the learners' maturity level.	4.75	0.44	Strongly Agree	4.70	0.57	Strongly Agree
4.The website's instructional design is appropriate to the learners' ICT skills.	4.65	0.49	Strongly Agree	4.75	0.55	Strongly Agree
5.The website's instructional design captures students' interests.	4.80	0.41	Strongly Agree	4.75	0.55	Strongly Agree
6.The website's online activities are suitable to the competency being assessed.	4.80	0.41	Strongly Agree	4.85	0.37	Strongly Agree
7.The tasks are flexible and suitable to the learners' instructional needs.	4.80	0.41	Strongly Agree	4.85	0.37	Strongly Agree
8.Assessment tasks are suitable to the competency being assessed.	4.85	0.37	Strongly Agree	4.90	0.31	Strongly Agree
9.Discussions and lessons are suitable to the target competency.	4.80	0.41	Strongly Agree	4.90	0.31	Strongly Agree
10.The online application used is suitable to the demand of the lesson being presented.	4.60	0.50	Strongly Agree	4.90	0.31	Strongly Agree
Overall Mean	4.79			4.82		
SD	0.41			0.43		
Verbal Interpretation	Very Much Suitable			Very Much Suitable		

Legend:

Scale	Remark	Verbal Interpretation
4.20 – 5.00	Strongly Agree	Very High
3.40 – 4.19	Agree	High
2.60 – 3.39	Moderately Agree	Moderately High
1.80 – 2.59	Disagree	Low
1.0 – 1.79	Strongly Disagree	Ver Low

It was noted that each group of respondents' ratings was Very High level. Although, the overall mean rated by ICT /TLE teachers (M=4.82, SD=0.43) in terms of suitability of the developed online applications in science 7 website is greater than the overall mean rated by the Science teachers (M=4.79, SD=0.41). In addition, ICT/TLE teachers rated the highest at the statement "The online application used is

suitable to the demand of the lesson being presented," while the science teachers rated the same statement the lowest. Overall, no statements describing the suitability of the website's attained the same ratings from both respondents.

Based on the result, it proved that the developed science website although the ratings implied a Very High verbal interpretation, each aspect about being fitted to the age, ICT skills and maturity level of the learners must be examined comprehensively. It was also implied that the website's tasks instructional design as to appropriateness is valid. In addition, assessment fitted the competency being evaluated.

Discovering the purpose can help determine the suitability of the website to the user's need, according to Godelski et. Al, (2013). As for educational website such as in this study, grade 7 learners are the expected users. This supports the finding of the study since the results showed that the instructional design of the utilized online applications in Science 7 website is suitable to the instructional needs of the learners.

4.4 **Level of Development of Online Applications in Science Website in terms of User-friendliness**

Table 6 presents the level of validity of developed online application in Science 7 website in terms of user-friendliness as rated by Science and TLE/ICT teachers. In this study, user-friendliness was defined as the ease of using the website. This includes ease of navigating and accessing through the content's information links and presentations.

Table 6. Level of Development of Online Applications in Science Website in terms of User-friendliness

STATEMENT	Science teachers			TLE/ICT teachers		
	Mean	SD	Remarks	Mean	SD	Remarks
1.The websites' information is accessible.	4.85	0.37	Strongly Agree	4.90	0.31	Strongly Agree
2.The content of each subpage can be easily scanned.	4.80	0.41	Strongly Agree	4.80	0.41	Strongly Agree
3.Links embedded on the website are accessible and are up to date.	4.75	0.44	Strongly Agree	4.95	0.22	Strongly Agree
4.The information is presented in an organized manner.	4.85	0.37	Strongly Agree	4.95	0.22	Strongly Agree
5.The content is well-formatted.	4.75	0.44	Strongly Agree	4.75	0.55	Strongly Agree
6.The learners can navigate well in each subpage.	4.90	0.31	Strongly Agree	4.85	0.37	Strongly Agree
7.The contents of the website can be easily viewed.	4.90	0.31	Strongly Agree	4.85	0.37	Strongly Agree
8.The presentation of the topic follows a proper lesson-development sequence.	4.80	0.41	Strongly Agree	4.90	0.31	Strongly Agree
9.The website contains visual cues that aid learners navigating through the page.	4.80	0.41	Strongly Agree	4.90	0.31	Strongly Agree
10.Online activities embedded in the concept check are attainable and time bound.	4.85	0.37	Strongly Agree	4.80	0.41	Strongly Agree
Overall Mean	4.83			4.87		
SD	0.38			0.34		
Verbal Interpretation	Very High			Very High		

Legend:

Scale	Remark	Verbal Interpretation
4.20 – 5.00	Strongly Agree	Very High
3.40 – 4.19	Agree	High
2.60 – 3.39	Moderately Agree	Moderately High
1.80 – 2.59	Disagree	Low
1.0 – 1.79	Strongly Disagree	Ver Low

Table 6 summarized the mean level of development of online application in science 7 website as rated by science teachers and TLE/ICT experts in terms of user-friendliness. The overall mean rated by ICT experts/TLE teachers (M=4.87, SD=0.34) in terms of user-friendliness is greater than the overall mean rated by the science teachers (M=4.83, SD=0.38). Meanwhile, both group of respondents have the same mean ratings about the statements "The content of each subpage can be easily scanned" and "The content is well formatted". Also, both group of respondents validate the online applications in science 7 website as very high level in terms of user-friendliness. Therefore, it can be deduced that the utilized online application in Science 7 website is user-friendly.

The results showed that the information on the Science website is accessible and can be easily viewed. Through the well-formatted content, users can navigate easily. In addition, the use of visual cues also aids the learners in navigating through the page. Conciseness of the online activities embedded which made drills and practice test attainable and time bound is clear, which only proved that the Science website is user-friendly.

Lanuza (2019) defines ease of usage of method makes up its usability. It is the attribute that assesses how easy user interface are to be used. If the website is difficult to use, people will not take so much time visiting the website. Thus, learners could easily navigate through the page with the aid of graphical representations and links. This supports the findings of the study on which the developed science website was found out to be user-friendly as rated by science and ICT/TLE teachers.

4.5 *Students' Me*an Performance

One of the aims of this study was to determine whether there is an effect on the learners' performance upon using the website. Therefore, students' mean performance was also evaluated. Table 7 presented the summarized result of respondents' pretest and posttest.

Table 7 Students' Mean Performance in terms of Pre-Test and Posttest

Range	Pre-test		Posttest		Remarks
	frequency	percentage	frequency	percentage	
49 to 60	5	16.67	12	40.00	Outstanding
37 to 48	9	30.00	10	33.33	Very Satisfactory
25 to 36	7	23.33	6	20.00	Satisfactory
13 to 24	9	30.00	2	6.67	Fairly Satisfactory
0 to 12	0	0.00	0	0.00	Did Not Meet Expectations
Total	30	100.00	30	100.00	
Overall Mean	35.00		43.43		
SD	13.30		11.40		
Verbal Interpretation	Satisfactory		Very Satisfactory		

The students' mean performance in terms of pre-test and post-test as per the pretest was satisfactory (M=35.00, SD=13.30). As per the posttest, the results were very satisfactory (M=43.43, SD=11.40). This implied that the post test result was higher compared to the pretest.

It showed that the Grade 7 learners already had the prerequisite information about the subject matter. This is due to the learned competencies included in quarter one to quarter three before the pretest was taken. Also, sixty six percent (66%) of the total grade 7 respondents were from STE class. The effect of such factor has not been measured. In addition to the actual effect of using the science 7 website, it could be an attributing factor as to why almost half of the respondents' score in pretest lies on outstanding and very satisfactory remarks. While seventy three percent (73%) of the learners' respondents scores for posttest were outstanding and very satisfactory. A difference of 8.43 on the overall mean between pretest and post test scores were noted.

In the study conducted by Abustan, S. D. (2018) about the "Development and Validation of E-Learning Package in Rhythmic Activities" showed that posttest scores were higher than pretest after the intervention of the e-learning package. The result was based on the computed mean of pretest and posttest. The same is observed in the present study wherein posttest scores' mean were higher than the mean of pretest 'scores. This implied that using the website affects the performance of the learners.

4.6 Test on Difference on the ratings given by Science teachers and ICT/TLE teachers

The characteristics of the Science website that was measured in this study were clarity, adequacy, suitability, and user-friendliness. The significant difference on the ratings given by Science teachers and ICT experts was shown on the next table.

Table 8. Significant Difference on the Ratings of the Respondents on the Development of Online Applications in Science Website in terms of Clarity, Adequacy, Suitability, and User-Friendliness

Online Applications' Acceptability	Mean	t statistic	t critical	p-value	Analysis
Clarity					
Science teachers	4.725	1.131	2.093	0.272	Not Significant
ICT teachers	4.870				
Adequacy					
Science teachers	4.795	0.775	2.093	0.448	Not Significant
ICT teachers	4.875				
Suitability					
Science teachers	4.785	0.306	2.093	0.763	Not Significant
ICT teachers	4.820				
User-Friendliness					
Science teachers	4.825	0.443	2.093	0.662	Not Significant
ICT teachers	4.865				

Science teachers and ICT /TLE teachers gave the same level of evaluation. Although, the mean from the ratings given by TLE/ICT teachers was a little bit higher than the ratings of the Science teachers for clarity, adequacy, suitability, and user-friendliness. It was noted that there was no significant difference among the areas of the developed online applications in Science 7 website. The incurred t statistic for all the tests were found to be less than the critical t value of 2.093. Furthermore, the computed p-value for all the tests were greater than the significance alpha 0.05. It is on these grounds that the notion was observed.

From the findings above, it was inferred that at 0.05 level of significance, the null hypothesis "There is no significant difference on the ratings given by the science teachers and ICT expert/ TLE teachers on the level of development of Online Applications in Science Website in terms of clarity, adequacy, suitability and user-

friendliness" is true. To which there is no difference found.

The results could be attributed to mode of delivery of instruction. An authentic assessment in the attainment of Science competency is through laboratory works whereas in ICT is in the maximum usage of technology especially computers. The difference in the expected procedure on how both subject is conducted in the delivery of instruction gave rise to the difference on the ratings given by both respondents.

The same was observed with the Worktext in Science and Technology developed by Selga (2013). As rated by the experts, the worktext was overall valid. This supported the findings of the present study about the developed online applications in Science 7 website as rated by science teachers and ICT /TLE teachers. This implied that though ICT / TLE teachers' ratings were greater compared to the ratings given by science teachers, no significant difference was found, and the validity of the science website in terms of being clear, adequate suitable and user friendly was established. These was based on the indicators sought in this study.

4.7 Test on Difference on the Level of Students' Mean Performance in terms of Pre-Test and Posttest

Whether there is an effect on using the Science website, a pretest and posttest was taken. The table on the next page summarized the significant difference on level of students' mean performance.

Table 9. Test on Difference on the Level of Students' Mean Performance in terms of Pre-Test and Posttest

Mean Performance	Mean	t statistic	t critical	p-value	Analysis
Pre-Test	35.00	-7.708	2.045	0.000	Significant
Posttest	43.43				

Based on the table above, there was a significant difference on the performance of the students as per the pre-test and posttest. The incurred t statistic of -7.708 was found to be beyond the critical t value of 2.045. Furthermore, the computed p-value for the test was less than the significance alpha 0.05. It is on these grounds that the notion was observed.

From the findings, it was inferred that at 0.05 level of significance, the null hypothesis "There is no significant difference on the Pre-test and Post-test result of the students' assessment in Science 7" is rejected. The result implied that using the Science website had an effect to grade 7 learners' performance. Based on the learners' feedback, the website had pleasing appearance. The plausible reason of positive response could be that the respondents were visual learners. The activities were simple and can be conducted in a timely manner. In addition, the directions of the activities can be easily followed.

The same result from the research study made by Abustan (2018) about the "Development and Validation of E-Learning Package in Rhythmic Activities" was concluded. The usage of the E-Learning Package had an effect. The same way that using the science 7 website influenced the students' performance in terms of post test result.

5. Summary of Findings

Based on the research study, the extent of development level of the online applications on science 7 website in terms of clarity for both groups of respondents agreed that the content of the Website is very clear with the remarks as very high. This means that the language used on the Website, the choice of words is simple and comprehensible, and the features of the Website are visible, as per science teachers and ICT/TLE teachers, respectively.

The verbal interpretation of both groups of respondents for the adequacy of the content was also remarkably high. This implies that the subpage content supplies adequate information based on the stated most essential learning competency (MELC) and has sufficient elements that support the Website's goal. The instructional design of the Website is suitable for the learners' instructional needs. Assessment tasks are suitable to the competency being assessed as perceived by both respondents. This was clearly exposed by an

exceedingly high rating given by the science teachers and ICT / TLE teachers.

As per user-friendliness, a remarkably high remark was gained from the ratings on the development level of the instructional design rated by both groups of respondents. 'The learners can navigate well in each subpage' and 'The links embedded on the website are accessible and up-to-date' are some observable characteristics based on user-friendliness that both groups agreed upon.

Through the developmental method and quasi-experimental method, the clarity, adequacy, suitability, and user-friendliness of the Science website were found. Based on the ratings from Science teachers and TLE/ICT teachers, it was found that the developed online applications on the Science website had very clear content, attaining very high remarks on the overall mean. Furthermore, with regards to the adequacy of the content, a remarkably high remark was attained, proving that the developed online applications on the Science website provided adequate information based on the stated Most Essential Learning Competency (MELC). Likewise, in terms of suitability. The remarkably high remark signified that the instructional design of the Science website was suitable for the learners' maturity level and ICT skills.

On the other hand, links embedded on the Website are accessible and are up to date. This had proven that the developed online applications in the Science website were user-friendly. This was supported by a remarkably high remark on the overall mean for the user-friendliness of the Website.

Pre-test and post-test were administered to determine whether the utilization of developed online applications on Science websites affected students' performance. Meanwhile, the results showed that the grade 7 online distance learners s' mean performance increased after using the Website. Other factors such as classifying learners as to STE or regular grade 7 students, prior knowledge about the topic, and learning style were discarded.

Based on the data gathered in this study, the researcher arrived at the following conclusion: There was no significant difference in the ratings given by Science teachers and ICT/TLE teachers on clarity, adequacy, suitability, and user-friendliness of the developed online applications in Science website. However, with regards to the pre-test and post-test results, the test scores of the grade 7 ODL learners have a significant difference.

6. Conclusion

After the data gathered had been statistically treated, it was concluded that there was no significant difference in the ratings of Science teachers and ICT expert / TLE teachers on the level of development of online applications in Science Websites in terms of clarity, adequacy, suitability, and user-friendliness of the Science website. This means that the ratings given by both respondents do not vary and the level of validity of the developed online applications in Science website was agreed to be very high. The content was agreed by the respondents to be clear and possessed adequate information based on competency required. Meanwhile, the instructional design of the science website was suitable to age, maturity and ICT-skill level of the learner, and is user-friendly. It can be attributed to the nature of the work of both respondents.

Regarding the pre-test and post-test result, it was found that the test scores of the grade 7 online distance learners taken had a significant difference. This means that using the science website influenced the performance of the grade 7 learners. The result could be attributed to the pleasing appearance of the website, based on the feedback of learners. Respondents were visual learners. The activities were simple and can be conducted in a timely manner. In addition, the directions of the activities can be easily followed.

7. Recommendations

The following were hereby recommended by the researcher based on the result of this study:
1.True experimental rather than the quasi-experimental method is recommended for evaluating the effectiveness of the developed learning material so that reliable results could be established.
2. Each quarter's pre-test and post-test be obtained to analyze comprehensively the specific Website's subpage that needs to be improved.

3. Further studies about online applications that are suitable to the demand of the lesson presented were recommended. Science tasks that need authentic activities and assessment can only be learned through experiments, so they must be applied. This is to improve the Website's instructional design in terms of suitability. Instructions must be changed to be more specific logical, and consistent with the content of the Website.

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