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Leah the Explorer: Utilization of Interactive Game-Based Presentation

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ABSTRACT

PowerPoint (or equivalent products like Google Slides) can enhance training when planned and used properly, according to Northern Illinois University Center for Innovative Teaching and Learning (2020). While some people applaud it, others regret its pervasive use. Regardless of your opinion, PowerPoint does provide amazing ways to enhance training when utilized and built appropriately. This study aimed at testing the effectiveness of integrating a game based learning in the form of an interactive game based presentation called Leah the Explorer in amplifying the scientific knowledge of students in ecological relationship. It described the performance of group of students in the topic under study before and after a series of using the interactive presentation using pre-test and post-test design and test whether there is significant difference between the pre-test and post-test scores of the subjects under study. This study was conducted to selected Grade 7 (10) students from private and public schools. The study used the pretest-posttest experimental design of research. This study utilized T-test for dependent sample to test whether there is a significant difference between the pre-test and post-test scores of the groups. Results showed that, it made enough statistical evidence to have concluded that There is a significant difference in the scientific knowledge of subjects in the pre-test and post-test of the group of subjects. Thus, this result implies that using Leah the Explorer in teaching ecological relationship is a great tool to master the said competency. Also, curriculum developers may consider integrating the use of modified games in teaching science.

Keywords: ecological relationship, interactive presentation, intervention, one group experimental research design, scientific knowledge.

1. INTRODUCTION

A generalized collection of laws and hypotheses developed using the scientific method and intended to explain a phenomenon or behaviour of interest is referred to as scientific knowledge. This covers all scientific concepts which generally aim to broaden the critical and analytical thinking of every individual [1].

However, according to a 2018 research, out of 79 countries, a sample of 15-year-old Filipino children came in last for reading comprehension. They came in at

number 78 in both math and science. This study suggests that most individuals examined attended public schools, which is a significant finding. As a result, the dilemma is also caused by the fact that many Filipinos are unable to read or perform basic math. This data possess a great problem in the acquisition of scientific knowledge among filipino students [2].

Moreover, the Philippines' educational problems have gotten worse as a result of COVID-19, which has also presented new difficulties. Due to the rapid events caused by the health crisis, online or TV distant learning options were required. A blended learning program that combines online classes, printouts, and lessons broadcast on TV and social media was also introduced in October 2020. Therefore, the internet access of both students and teachers is necessary for the new learning pathways. Specifically, the COVID-19's effects necessitated changes and adaptations in the educational system. The virus's unknowable dynamics have led to a number of initiatives, from school closures to greater autonomous learning. Traditional classes have often been closed, forcing people to become increasingly autonomous and self-reliant.

A key element of andragogy, self-directed learning (SDL), has been promoted as an effective and efficient technique for students and aspiring professionals. SDL is a process in which individuals take the initiative to diagnose their learning needs, formulate goals, identify human and material resources for learning, select and implement effective learning strategies, and assess learning outcomes. This can be done with or without the assistance of others[3]. Due to the fact that it is "a long-standing skill required especially for unpredictable times," the SDL hypothesis is still relevant today as it was then.

There is currently little information on SDL in relation to the COVID-19 pandemic and how this issue has impacted this method of teaching and learning. The need for SDL as a reaction to the new normal has been addressed by explaining the reasons why it is crucial during the COVID-19 pandemic, foregrounding critical problems about the significance of self-directed medical training. With the use of enhanced digital learning platforms and the new COVID-19 normal of remote learning, SDL "saves the academic year during the COVID-19 pandemic" by allowing students to contribute to the global knowledge production economy[4].

Interactive presentations were identified by different educational institution to gauged self – directed learning among individuals. It was claimed that PowerPoint (or comparable tools like Google Slides) can improve training when prepared and used properly. When it comes to PowerPoint's usefulness, opinions are divided. Some people praise it, while others lament its widespread use. Regardless of your position, PowerPoint does, when used and developed properly, offer excellent ways to improve training [5].

With all these information and ideas in mind, it can be deduced that a further investigation on the use of interactive presentation in a formed of game – based approach is encourage to determine if it can be a great help in improving self - directed learning among students in acquiring knowledge of selected scientific concepts.

2. METHOD AND MATERIALS

2.1. Research Method Used

This study employed the developmental method of This study utilized a quasi-experimental research design through one-group pretest-posttest design. The one-group pretest-posttest design is a quasi-experiment in

which the outcome of variable is measured twice: once before and once after a non-random set of participants is exposed to a specific intervention/treatment [6]. In this study, the subjects under study undergone a pre-test and then was exposed to the use of the interactive game – based presentation "Leah the Explorer" and then subjected to take the post test. Test of difference between the performance of the subjects before and after the experiment was tested to determine if there is a significant change in the performance after implementing the material under study, thus calls for the use of this research design.

2.2. Sampling Technique and Subjects of the Study

This study used purposive sampling technique in identifying ten (10) Grade 7 students to serve as the subjects of the study. The subjects of this study were identified based on these criteria: 1) the subjects are currently enrolled as Grade 7 either in Private or Public Educational Institution, 2) the mode of learning for the selected participants is modular mode of learning, and 3) the participation of the subjects in this study is upon the approval and consent of their parents/guardians.

2.3. The Research Instruments & Validation

This study made used of research instruments that served as a great tool towards the completion and success of this research. This study used the following instruments: i) Test in Ecological Relationships, and ii) Interactive Game – Based Presentation "Leah the Explorer".

2.4. Test in Ecological Relationships

Test in Ecological Relationships (TER) is a teacher-made test containing items about Grade 7 Science topic "Ecological Relationships". A table of specification for this test was prepared for this purpose. This test contains 40-item multiple choice test with four choices and underwent KR20 testing of reliability with a reliability index of 0.92. This instrument is validated by two (2) Junior High School Science Teachers and one (1) Biology instructor with content validity index of 1.0.

2.5. Interactive Game – Based Presentation "Leah the Explorer"

Interactive Game – Based Presentation "Leah the Explorer" is a teacher-made interactive audiovisual presentation to serve as an independent learning material for the topic "Ecological Relationships". This instrument is validated by two (2) Junior High School Science Teachers and one (1) Biology instructor with content validity index of 1.0.

2.6. Data Gathering Procedure

This study starts with the identification of the subjects to undergo the study. This identification comprises the process of determining the possible participants and seeking the permission, approval, and consent of their respective parents/guardians to be part of this study. After identifying the subjects of the study, the latter have taken their pre-test to determine their performance before the experiment. To assure that confidentiality of data was taken in consideration, subjects of the study were denoted by letters A to J. After administering and getting the result of the pre-test, the Interactive Game – Based Presentation "Leah the Explorer" was then implemented to the subjects under study. Their actions, experiences and challenges while using the presentation were all observed that served as the qualitative data of the study. Lastly, after using the Interactive Game – Based Presentation "Leah the Explorer" for two consecutive meetings, a post test was then administered to be followed by testing of difference to determine if the use of the material is effective in giving content about the topic ecological relationships.

2.7. Data Analysis

In interpreting, analyzing and discussing the data that were gathered in this study, the following statistical treatments were utilized. To describe the performance of the subjects before and after the experiment, mean score, standard deviation and frequency count were used. Also, the interval below was used for this purpose.

Interval	Verbal Interpretation
0 – 8	Poor
9 – 16	Needs Improvement
17 – 24	Satisfactory
25 – 32	Very Satisfactory
33 – 40	Excellent

1. To describe the experiences and challenges of the subjects in using the material, focal group discussion and thematic analysis were used.

2. To determine if there is a significant difference between the performance of the subjects before and after the experiment, t test for paired samples was used.

3. RESULT AND DISCUSSION

3.1. Performance of the Subjects Before the Experiment

Table 1 shows the performance of the subjects before the experiment based on the result of the administered pre-test. As shown in the table, it was revealed that subject B obtained the lowest score of 12 verbally interpreted as needs improvement followed by subject A with a score of 15 and verbal interpretation of needs improvement. Meanwhile, subject G obtained the highest score of 32 verbally interpreted as very satisfactory followed by subject F and subject H with scores of 30 and 26 respectively with verbal interpretation of very satisfactory.

In general, the ten subjects of the study obtained a mean score of 21.60 verbally interpreted as satisfactory. This result implies that majority of the subjects performed satisfactory or above in the pre-test. Moreover, the mean score of the group implies that there is a need for further improvement in the acquired knowledge about the topic since only three subjects out of ten participants performed very satisfactorily. Thus, the implementation of an intervention material in the form of interactive game-based presentation "Leah the Explorer" is needed.

The results discussed is in support to the findings [7] which claims that for a given data set, if students only showed poor to satisfactory performance on the pre-test, these scores are positively skewed and requires

Table 1. Pre – Test Results

Subject	Scores	Verbal Interpretation
A	15	Needs Improvement
B	12	Needs Improvement
C	21	Satisfactory
D	23	Satisfactory
E	20	Satisfactory
F	30	Very Satisfactory
G	32	Very Satisfactory
H	26	Very Satisfactory
I	18	Satisfactory
J	19	Satisfactory
Mean	21.60	Satisfactory
Standard Deviation	6.310	

Table 2. Post – Test Results

Subject	Scores	Verbal Interpretation
A	20	Satisfactory
B	23	Satisfactory
C	32	Very Satisfactory
D	29	Very Satisfactory
E	31	Very Satisfactory
F	36	Excellent
G	37	Excellent
H	32	Very Satisfactory
I	24	Satisfactory
J	25	Very Satisfactory
Mean	28.90	Very Satisfactory
Standard Deviation	5.705	

Table 3. Test of Difference between the Pre-Test and Post-Test Results

Paired Samples Test

		Paired Differences					t	df	Significance	
					95% Confidence Interval of the Difference					
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper			One-Sided p	Two-Sided p
Pair 1	PreTest - PostTest	-7.300	2.163	.684	-8.847	-5.753	-10.673	9	<.001	<.001

intervention to increase the level of performance for a specific topic or lesson.

3.2. Performance of the Subjects After the Experiment

Table 2 shows the performance of the subjects before the experiment based on the result of the administered pre-test. As shown in the table, it was revealed that subject A obtained the lowest score of 20 verbally interpreted as satisfactory followed by subject B with a score of 23 and verbal interpretation of satisfactory. Meanwhile, subject G obtained the highest score of 37 verbally interpreted as excellent followed by subject F with a score of 36 with verbal interpretation of excellent.

In general, the ten subjects of the study obtained a mean score of 28.90 verbally interpreted as very satisfactory. This mean is 7.30 units higher to the mean obtained during the pre-test. This result implies that majority of the subjects performed very satisfactory or above in the post-test. Moreover, the mean score of the group implies that there is a drastic and dramatic increase in the performance of the subjects after implementing the use of the material under study. Also, with a standard deviation of 5.705, the results of the post-test was revealed to be less spread compared to the pre-test results with a standard deviation of 6.310.

This result is in support with the study [7] which states that using an interventional material in the form of interactive presentation produced a significant increase in the performance level of students after the using the intervention material.

3.3. Experiences and Challenges in Using Leah the Explorer

Based on the focal group discussion and interview conducted among with the subjects, the students claimed and highly appreciated the use of Leah the Explorer in acquiring and learning concepts and

knowledge in the topic under study. The students commented that with the use of such intervention material, they got the opportunity to learn in the most convenient way without sacrificing the quality of learning. The students claimed that despite the complexity of some concepts, they were able to learn and understand Ecological Relationship in general with the use of Leah the Explorer. They stated that they do not experience any difficulty in utilizing the aforementioned intervention material due to the following reasons: 1) their teacher has given them the instructions regarding the easiest way of utilizing the interactive presentation, 2) they have a background in using the gadget/laptop and how to operate such, and 3) the aforementioned interactive presentation is well presented by the teachers and the material is user-friendly. Lastly, all of the students preferred using Leah the Explorer in learning Ecological Relationship, and they identified it as one of the best learning intervention material that suits their interests and resources.

3.4. Test of Difference between the Pre-Test and Post-Test Results

Table 3 shows the t test result for the test of difference between the pre-test and post-test results. Using paired sample t test, it was revealed that with a computed p value of less than 0.001, the data gathered in this study was enough to reject the null hypothesis and claim that *there is a significant difference between the performance of the subjects before and after the experiment.* It can be deduced using this result that using of Leah the Explorer as a teaching intervention to implement self-directed learning is effective since it resulted to a significant change in the performance of the subjects in the topic under study.

This result can be supported by the study [8] where it was claimed that using game-based intervention for certain topics were found to be more effective as compared to the traditional modes of intervention activities.

4. CONCLUSION

Based on the results of this study, the following conclusions were drawn:

- Prior to and during the use of Leah the Explorer, the study's participants fared satisfactorily on the issue of ecological relationships.
- The pupils' performance on the issue of Ecological Relationships before and after utilizing the intervention resource Leah The Explorer differs significantly. Following the sequence of interventions, the group's mean pre-test score increased.
- After using the intervention material "Leah the Explorer," there is a noticeable difference in the students' scientific knowledge of ecological relationships.
- Using Leah the Explorer as a tactical intervention tool to simplify radicals is seen as an effective intervention in this study.

5. RECOMMENDATIONS

These recommendations were made in light of the results and conclusions:

- Science teachers may investigate the potential for integrating game-based intervention tools in their curriculum courses to teach various scientific concepts and abilities.
- To further assess the efficacy of implementing the intervention material, comparable studies involving students from other schools may be carried out.

- Interactive presentations that are based on games may be considered by curriculum developers.
- This study only included a minimal number of participants. In light of this, the researcher strongly advised conducting this study with a bigger sample size to determine whether the findings are consistent.
- Both quantitative and qualitative studies on the application of modified interactive presentation games in the instruction of several branches of science can be done.

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7. CONFLICT OF INTEREST

The authors have declared that there is no conflict of interest.

8. SOURCE/S OF FUNDING

NA

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