H5P: Interactive Intervention in Teaching Grade7 Mathematics Through the Learning Management System

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ABSTRACT

There are numerous techniques to make online learning a realistic alternative in the current educational environment. The effectiveness of the H5P interactive intervention in teaching mathematics was investigated using a quasi-experimental design employing a purposive sampling in Grade 7 students. The experimental group used the intervention while the control group used the digital modules in the learning management system. The data were collected using an online synchronous timed pretest and posttest. The data were tabulated, presented, evaluated, and interpreted. The findings revealed that students had an average mastery level in the pretest, which leveled up to moving towards mastery in the posttest. When the mean difference of the pretest and posttest of the experimental group was tested, it was found out that the computed p-value of 0.0065 was lower than the 0.05 level of significance; thus, the intervention was successful. From the findings, it is suggested that utilization of H5P interactive learning material through learning management systems in teaching mathematics be continued by the learners, intensified through additional training of teachers, and maximized through adoption by online class teachers.

Keywords: H5P intervention, teaching mathematics, learning management system, experimental

INTRODUCTION

It is difficult to teach math online, which most teachers experience to some degree. Teachers had to adapt all their usual techniques (Loewus, 2020). In England, recent policy changes have focused on encouraging "interactive" teaching in classrooms with the firm intention of improving learning (Beauchamp et al., 2008). Math educators nationwide were alarmed by the result posted by the Program for International Student Assessment in December 2019. The Philippines ranked 77th for math and science among the 79 participating countries (Ciriaco, 2019). In Tagum City Division, school proficiency reports showed that the mean percentage of learners in mathematics for the fourth quarter of the school year 2020 are as follows: three junior high schools reported 47.70, 44.95, and 47.60, two senior high schools reported 64.81 and 53.13. Only 68.94% of Grade7 students achieved at least 75% proficiency level in School A.

The main thrust of this quasi-experimental study was to find out the effectiveness of utilizing H5P interactive intervention through the learning management system in teaching Grade 7 Mathematics. Specifically, the study was designed to determine the level of pretest and posttest scores, the significant difference in test results, and the success of the intervention. The null hypotheses asserted that there is no significant change between the pretest and posttest scores and the effect of the intervention.

METHODS

This section presents the design used in the conduct of the study, research participants, data gathering methods, statistical tools, and ethical considerations.

Research Design

This study used a quasi-experimental design administering the same pre-test and post-test to both groups. The experimental group used the H5P Interactive Intervention in Math 7 Quarter 1 through the school learning management

system (LMS), while the control group used the digital modules provided in the LMS without H5P.

Research Participants

The participants in the study were identified using a purposive sampling technique. These were the 60 Grade 7 students at School A enrolled in the School Year 2021-2022. Thirty learners were in the experimental group and thirty in the controlled group, as shown in table 1.

Table 1

Respondents of the Study

Section	Male	Female	Total
Section A (Experimental Group)	13	17	**30**
Section B (Control Group)	17	13	**30**
Total	**30**	**30**	**60**

Data Gathering Methods

The information was gathered through a pretest and posttest conducted in the learning management system while students were online using Google Meet. Validation, reliability, and pilot testing were all done during the development of the test. Exporting, encoding, analyzing, and interpreting scores were all done. Table 2 shows the mastery level descriptive equivalent:

Table 2

Mastery Level Descriptive Equivalent

Mean Per Score (MPS)	Descriptive Equivalent	Interpretation
96-100	Mastered	The learner has outstanding performance.
86-95	Closely Approximating Mastery	The learner has very satisfactory performance.
66-85	Moving Towards Mastery	The learner has satisfactory performance.
35-65	Average Mastery	The learner has fair performance.
16-34	Low Mastery	The learner has poor performance.
5-15	Very Low Mastery	The learner has very poor performance.
0-4	Absolutely No Mastery	The learner has no performance at all.

Data Analysis

For the quantitative analysis, the researcher employed mean, t-test for dependent sample means, and t-test for independent sample means as statistical methods.

Ethical Consideration

The three concepts stated in the Belmont Report (1979): respect for persons, beneficence, and justice, were followed with complete honesty throughout the study's duration. The Tagum City Schools Division Superintendent and School A Principal were sent letters asking for permission to conduct the study. The teacher involved in the implementation of the study was informed about her involvement in achieving its principal goal. The parents' agreement to have their child participate in the study was sought. Before deciding whether to provide their approval, the parents were given detailed information about the study in writing sent to them via messenger. The researcher made sure that the benefits to the research participants were maximized while the hazards were kept to a minimum. Right to privacy and freedom from damage and the fact that their involvement is entirely voluntary were treated with the utmost respect. Students were viewed regardless of their socioeconomic status or context.

RESULTS

This section presents analysis and interpretation of data organized in figural, tabular, and textual forms. Analysis and interpretation of data are carefully based on the main purpose to attain the study's research objectives.

Level of Pretest Mean Scores of Control and Experimental Groups

Shown in table 3 is the level of pretest scores of the control and experimental groups. The overall level of pretest scores of the respondents was 26.57. This has an equivalent mean percentage score of 53.14, which indicated that the respondents had an average mastery level before the intervention.

Table 3

Level of Pretest Mean Scores of Control and Experimental Groups

Groups	Mean	Mean Percentage Score	Descriptive Level
Section A (Control Group)	22.03	44.07	Average Mastery
Section B (Experimental Group)	31.10	62.20	Average Mastery
Over-all	26.57	53.14	Average Mastery

Level of Posttest Mean Scores of Control and Experimental Groups

Shown in table 4 is the level of posttest scores of the control and experimental groups. The overall level of posttest scores of the respondents is 33.45. This has an equivalent mean percentage score of 66.90, indicating that the respondents moved towards mastery level of mastery after the intervention was implemented.

Table 4

Level of Posttest Mean Scores of Control and Experimental Groups

Groups	Mean	Mean Percentage Score	Descriptive Level
Section A (Control Group)	28.70	57.40	Average Mastery
Section B (Experimental Group)	38.20	76.40	Moving Towards Mastery
Over-all	33.45	66.90	Moving Towards Mastery

Significance of the Difference Between Pretest Scores of Control and Experimental Groups

Table 5 shows the pretest scores of the control and experimental groups. The mean difference was tested, and the computed t-value was 4.89 with a p-value of 0.000034. Since the p-value of 0.000034 was lower than the 0.05 level of significance ($p<0.05$), the null hypothesis is rejected. This implies a statistically significant difference between the pretest scores of the control and experimental groups.

Table 5

Significance of the Difference Between Pretest Scores of Control and Experimental Groups

Groups	Mean	SD	t-value	p- value	Decision @0.05
Section A (Control Group)	22.03	7.48	4.89	0.000034	Ho is Rejected
Section B (Experimental Group)	31.10	9.64			

Significance of the Difference Between Posttest Mean Scores of Control and Experimental Groups

Table 6 shows the control and experimental groups' posttest data. The mean difference was tested, and the computed t-value was 3.14 with a p-value of 0.00385. Since the p-value of 0.00385 was lower than the 0.05 level of significance ($p<0.05$), the null hypothesis is rejected. This implies a statistically significant difference between the post-test scores of the control and experimental groups.

Table 6

Significance of the Difference Between Posttest Mean Scores of Control and Experimental Groups

Groups	Mean	SD	t- value	p- value	Decision @0.05
Section A (Control Group)	28.70	11.29	3.14	0.00385	Ho is Rejected
Section B (Experimental Group)	38.20	11.02			

Significance of the Difference Between Pretest and Posttest Scores of the Experimental Group

Results displayed in table 7 indicate mean scores of pretest and posttest of the experimental group. When the mean difference of the two tests was tested, it was found out that the computed p-value of 0.0065 was lower than the 0.05 level of significance. Thus, the null hypothesis was rejected in favor of the research

hypothesis, which claims that there is a significant difference between the pretest and posttest scores of the students in the control and experimental groups. This implies that overall, the H5P Interactive Learning Material effectively improves students' performance in mathematics 7.

Table 7

Significance of the Difference Between Pretest and Posttest Scores of the Experimental Group

Test	Mean	SD	t- value	p- value	Decision @ 0.05
Pretest	31.10	9.64			
			-2.9282	0.0065	Ho is Rejected
Posttest	38.20	11.02			

DISCUSSION

The discussions and conclusions gained from the study's findings are presented in this chapter. The suggestions for consideration are also included.

Level of Pretest Mean Scores of Control and Experimental Groups

The respondents have an average mastery level in the pretest. This can be attributed to the students' grade six math exposure considering the spiral context of the curriculum where learners, regardless of their groups, received the same learning experience. In terms of numerical comprehension, simple linguistic sentences, contextual information, mental visualization, number system knowledge, relevant information, number sense estimation, and procedural calculation, the grade six students' cognitive skills were below average, but their symbol comprehension skill was above average Culaste (2011).

Level of Posttest Mean Scores of Control and Experimental Groups

The students have a level of moving towards mastery in the posttest. Das (2019) claims that integrating ICT improves mathematics teaching and learning. Kosko and Ferdig (2016) emphasized in their finding that incorporating an app over a cycle was found to be a statistically significant and relevant indicator of math achievement, which further showed that a well-designed app might be used to promote math growth in general.

Significant Difference Between the Pretest Scores of Control and Experimental Groups

The pretest scores of the students were statistically significant. The grade7 learners of this school year are recipients of varied learning modalities in their previous school. Their prior learning modality contributed to their mathematics performance. The study results of Lin, Tseng, and Chiang (2016) have demonstrated that a blended learning environment can be beneficial. Students benefited from it since it had a good impact on their grades and behavior, not only on student learning achievements but also on their attitudes toward studying mathematics in a blended learning environment.

Significant Difference Between the Posttest Scores of Control and Experimental Groups

The post-test scores of the students were statistically significant. In a study by Llerena and Zamora (2021), which looked at the efficacy of H5P services used to build dynamic student assessments on a Moodle platform, it was discovered that using active learning techniques during assessment with H5P technology resulted in a 75 percent increase in retention of acquired information.

Significant Difference Between the Pretest & Posttest Scores of Experimental Group

The pretest and posttest scores of the students who utilized H5P as interactive learning material through learning management systems as an intervention in teaching mathematics were significant. This showed that the intervention was effective. The result of this study is supported by the study of Miller (2018), where a pre-test and post-test showed that children who used digital technology in the form of mathematics apps as part of a play-based learning

experience for mathematics made modest improvements in achievement.

Conclusion

The following are the conclusions of the study based on the findings: students have average mastery in the pretest and improved to moving towards mastery in the posttest. The effectiveness of the intervention in this study is supported by the findings of Llerena and Zamora (2021). Their study looked at the efficacy of H5P services used to build dynamic student assessments on a Moodle platform and discovered that using active learning techniques during assessment with H5P technology resulted in a 75 percent (75%) increase in retention of acquired information.

Reflection

Considering the research's findings and conclusions, the researcher has made the following suggestions for consideration: utilization of H5P interactive learning material through learning management system in teaching mathematics to be continued, intensified, and maximized, intensive training and workshops for math teachers, especially on utilization of added H5P features in the school learning management system, adoption of H5P interactive learning material in other subject areas/courses in the school learning management system, and use of H5P be introduced for adoption through series of training among online class teachers in the Division of Tagum City.

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