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Enhancing Students' Learning Performance in Physical Education Through the Use of a Mobile Application with Game-Based Learning Approach

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Abstract

Background: In response to the transition of learning from confinement at home and now having in-person classes, being flexible to the needs of students must be innovative and creative to slowly get their attention and motivation to learn. For this study, it aims to assess the effect of the developed mobile application on the learning of students in physical education.

Objectives: The objective of the study is to determine the effect of the developed mobile application to students learning performance in Physical Education. Specifically, the study sought to assess the following purpose: (1) to assess the mean scores of pre-tests and post test in the before and after intervention, and (2) to identify the significant difference of the before and after utilization of the intervention.

Methods: The researcher used quasi-experimental research design utilizing pre-test and post test. Purposive sampling was used to determine the participants consisting of 25 students under control group and 25 students under experimental group which were Grade 10 students in one of the secondary schools in the Philippines. JASP Software was used to analyze the data used in the study. The research instrument was validated by the Head Teacher and Master Teacher.

Results: Data revealed that the developed mobile application has a tremendous effect on students learning performance in Physical Education. It shows that the mean scores in the before utilization on the group using the developed mobile application in the students' learning performance has a little knowledge on the lesson, while the mean scores of the two groups after utilization shows that it has a significant effect on the learning performances. It shows that the developed mobiled application has a substantial effect on students learning performance in Physical education.

Conclusion: The developed mobile application has a significant impact to the learning of the students in Physical education. This implies that the utilization of the technology in the teaching and learning process in physical education enhances the performance and ability of an individual.

Keywords: google sites, innovation, functionality, learning experience, physical education.

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INTRODUCTION

Along with the changes faced in the delivery of instruction to students, being innovative and creative in providing effective and efficient teaching and learning process is one of the concerns of every teacher, especially physical education teachers. Making some digital copies of modules and providing free access to educational resources are some of the things they give time and committed to reaching students in different learning modalities. Due to the changing methodologies in the time, one of the alternative ways to deliver instruction is to use Google sites because they are free, accessible, and can be used repeatedly by teachers and students to deliver instruction.

In response to the transition of learning from confinement at home and now having in-person classes, being flexible to the needs of students must be innovative and creative to slowly get their attention and motivation to learn.

Students learn from the integration of games (Tobias, Fletcher, & Wind, 2014), specifically, games should be consist of holistic domains that captures students learning (Plass, Homer, & Kinzer, 2015). The study aims to assess the effect of the developed mobile application on the learning of students in physical education. The promotion of 21st-century skills in the teaching and learning process is one of the challenges faced by educators (Tindowen, Bassig, & Cagurangan, 2017) but with one vision and unified action, adoption of the change in the system will be possible. The development of mobile app is widespread and relatively new phenomena (Joorabchi, Mesbah, & Kruchten, 2013). The game-based approach was a tool for enhancing students' engagement in learning while still having fun (Miguel et al., 2015). Game-based learning is an approach used to enhance the students' learning by employing games in their learning and it has a tremendous effect on enhancing their student's performance. This is also stated by Liu, Liu, Shaikh, & Gazizova (2020) game-based learning are efficient ways to acquire certain skills. As a teacher, we should become a bridge to learning performances that are more absorbed and take an active role in the learning of the students (Culajara, 2022). Teachers must offer varied ways of delivering instructions (Estrellan, Ferrariz, Lazona, Madres, & Estrellan, 2021) and by asserting a game-based approach, students' engagement will be present in the learning process (Papa, 2020).

Additionally, it is important to acknowledge that student engagement has a big impact on learning and performance (Kahu, 2013) through game-based learning, students

can connect tangible and deeper understanding with the use of games in learning (Wasserman & Banks, 2017). Incorporating game-based learning in the learning process paved the way for strengthening the skills and capabilities of the students as well as their active participation and motivation in learning. The creation of digital learning games is worth considering (Shi & Shih, 2015) and this is strengthened by Qian & Clark (2016) that focus on developing educational games to enhance students' learning of 21st-century skills in schools. Thus, getting away from the conventional type of teaching makes its way in widening the horizons of learning performances and increasing the students' technological capabilities. Game-based approaches have been suggested as a method to improve performance, and participation as affirmed by Centeio et al. (2021). Game-based learning can improve involvement and encouragement (Perrotta, Featherstone, Aston, & Houghton, 2013) and it has become a cutting-edge educational strategy that can raise learner engagement, interest, and enthusiasm (Hartt, Hosseini, & Mostafapour, 2020). With the rapid change happening in the educational system, having a sense of adaptability should be possessed by the teachers and students. Adapting to 21st-century skills should be encouraged and implicitly involved in delivering instructions to continuously attain the addressed goals in the curriculum. As teachers created a mobile application that could be accessible and functional to the students learning, this would pave the way for nurturing the capabilities of the students to become globally ready. Furthermore, as stated by Pho & Dinscore (2015) game-based approach introduced concepts, real-life understanding, and guidance to achieve the objectives.

With Culajara, Paolo, Culajara, Portos, & Villapando (2022) emphasized that internet connection was one of the barriers that put hurdles in delivering instruction, the developed mobile application makes use of its convenient, accessibility, and functionality that can be used even without connection/wifi/mobile data. This developed mobile application addressed its accessibility to every student that can be used at their pace of time and performance. Thus, Ardies, De Maeyer, Gijbels, & van Keulen (2015) assert that awareness and acceptance should be positively incorporated particularly in using technology. The mobile application intends to provide teachers with more access to their students, help them understand the topic they are teaching, and improve their ability to use and incorporate technology in the classroom.

This study aims to show the effect of the game-based approach on the learning of students in Physical Education where the teacher made a developed mobile application that is accessible to the students. This study sought to determine the effect of the developed mobile application on the learning performances of Grade 10 students specifically to answer the following:

1. What is the pretest mean scores of Grades 10 students under the control and experimental group?
2. What is the posttest mean scores of Grades 10 students in the control and experimental group?
3. Is there a significant difference in the learning performance in physical education between the Grade 10 students before and after intervention?

METHOD

Study Design and Participants

The study employed a quasi-experimental design, specifically the Two-Group Pretest-Posttest design to establish the intervention's effectiveness in increasing the student's learning performance through the developed mobile application in enhancing students learning performance where two random groups were assigned: a control and experimental group. The study of Puspaningtyas & Marchamah Ulfa (2020) emphasized that the pretest and posttest were utilized to identify the learning outcomes before and after the intervention. The study was participated by 25 students in the control group and 25 students in the experimental group which came from the Grade 10 level in one of the secondary schools in the Philippines.

Data Analysis

To analyze the data, the JASP Software was employed. The following statistical treatment was performed to determine the effect of the developed mobile application in enhancing the student's learning performance in Physical Education to examine the pretest and posttest scores delivered before and after the implementation to the students' performance, mean and standard deviation were used; and to determine if there is a significant difference between the students' mean pretest and posttest scores, the researcher used paired t-test.

Method of Validation

Validation of the developed mobile application as well as the pretest and posttest and Table of Specification (TOS) was done by the Head Teacher and Master Teacher. The validated material was based on the learning competencies in the curriculum.

Ethical Considerations

This study ensures the confidentiality of responses and no forced response from students. This was done with the consent of the respondents and with parental consent.

RESULTS

Table 1. Mean scores of the pretest of the control and experiment group before the intervention

	Group	N	Mean	SD
Pretest	Control	25	23.92	1.038
	Experiment	25	23.68	1.108

Table 1 shows the pretest results of the two groups. The mean of the control group is 23.92 while the experimental group's is 23.68 with an SD of 1.038 and 1.108, respectively. It shows that the student under the control has a more knowledge on the lesson over the experiment group.

Table 2. Test of Nomality

	Group	W	p
Pretest	Control	0.798	0.001
	Experiment	0.888	0.01

Test of normality was conducted using Shapiro-Wilk Test (Table 2). The result pointed out that the scores were not normally distributed for both groups having $p<0.001$ for the control group and $p=0.01$ for the experimental gorup, so a nonparametric test should be used to test if there is a significant difference between the scores of the two groups.

Table 3. Mean scores of the post test of the control and experimental group after the intervention

	Group	N	Mean	SD
Posttest	Control	25	22.56	3.63
	Experiment	25	27.52	1.327

Table 3 shows the posttest results of the two groups. The mean of the control group is 22.56 while the experimental group's is 27.52 with an SD of 3.63 and 1.327, respectively. This means that the students under the experimental group increase their scores. As to the study of (Hamari et al., 2016) that game-based learning should encourage ongoing learning

and keep up with the students interest. Through mobile application, students likely to relate their technological skills into their learning and able to grasp authentic learning.

Table 4. Test of Nomality

	Group	W	p
Posttest	Control	0.954	0.314
	Experiment	0.943	0.173

Test of normality was conducted using Shapiro-Wilk Test (Table 4). The result pointed out that the scores were normally distributed for both groups having p=0.314 for the control group and p=0.173 for the experimental group, so a parametric test should be used to test if there is a significant difference between the scores of the two groups.

Table 5. Significant difference in the before and after intervention

Group	N	T	p
Control	25	335.5	.646
Experiment	25	-6.418	.001

Table 5 shows the results of the test of the difference between the scores of the experimental and the control group. Welch's T=Test was used because it is not affected by the differences of the variances. It resulted to p=0.646 which indicates that there is no significant difference between the scores of the pretest between the control and experimental groups. This result indicates that the two groups have a similar level of knowledge about the competencies before the implementation of the intervention. Thus, after intervention, it resulted to p<0.001 which indicates that there is a significant difference between the scores of the posttest between the control and experimental groups.

DISCUSSION

Research result indicates that the two groups have a significant difference in their level of knowledge about the competencies after the implementation of the intervention. The acceptability of mobile app with integration of game-based learning by teachers in the classroom will have a significant impact to students learning (Bourgonjon et al., 2013), the development of mobile application has its effect on the students learning performance. n order to increase involvement and performance, game-based methods have been proposed (Centeio et al., 2021). Game-based learning is a cutting-edge educational approach that can increase learner engagement, interest, and passion (Perrotta, Featherstone, Aston, & Houghton, 2013). It can also promote involvement and encouragement (Hartt et al., 2020). The results of this study demonstrate to teachers that to provide our students with a high-

quality education, we must adapt to current trends rather than lagging. Similalry, Zhou (2022), physical education has a pivotal role in developing one's capability.

CONCLUSION

The study revealed that the use of mobile applications integrating game-based approach in enhancing students learning performance has a tremendous effect on the student's achievement. This entails the adaptation of 21st-century skills and being able to grasp skills and knowledge on ensuring the students' technological capabilities in utilizing technology in their learning. It was evident that teachers as the sole driver of learning should implicitly encourage themselves in improving and retooling their competence as well as their drive to deliver instructions in the new approaches. Based on the findings, the conclusion were drawn: (1) Mean scores in the pretest of two groups show that students under the control and experimental group have little knowledge of the lesson; (2) Mean scores in the post-test of the two groups show that the experimental group increased their scores than the students in the control group and (3) pre-and post-tests indicate that the use of developed mobile apps integrating game-based approach in students learning performance has a significant effect on their achievement. There is a significant difference in students learning performance in Physical education.

In this study, it is shown that technology is an ideal tool to enhance the capabilities of students to understand the lesson in the new normal of education. With these, having the sense of adaptability and flexible is needed so that the students can be more successful in their leanring performances. Teachers need to upskill, retool, and relearn technological capabilities to keep up with the trends of each student.

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CONFLICT OF INTEREST

The researcher ensures that there is no conflict of interest in the study.

AUTHOR'S CONTRIBUTION

Culajara created the full paper and developed the mobile application.

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