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Enhancing Student Engagement in Online Physical Education: A Comparative Study of Game-Based Videos and Traditional Exercise

Drisya S
Research Scholar, School of Physical Education and Sports Sciences, Mahatma Gandhi University, Kottayam, Kerala, drisyasivadas2@gmail.com

Prof. (Dr.) Suma Joseph (Research Supervisor)
Principal, Mount Carmel College of Teacher Education for Women, Kottayam, Kerala

Abstract

This study discovers the outcome of an interactive digital, game-based learning model on the engagement levels of Grade 1 students aged 6 to 7 years in online physical education classes at CBSE affiliated private international school in Qatar. A quasi-experimental design was applied with two sessions: one involving traditional online exercise instruction and another using YouTube-based interactive video games. A total of 50 students (25 boys and 25 girls) participated in a within-subjects design, viewing both types of online exercise lessons and rating their engagement on a 5-point Likert scale. Paired-sample t-test results indicated that game-based videos (M = 3.84, SD = 0.87) received significantly higher engagement ratings than traditional demonstrations (M = 2.99, SD = 0.78), t(49) = 13.51, p < .001, Cohen's d = 1.91. Gender analyses showed no significant difference in engagement improvements between boys and girls. These findings suggest that gamification strategies effectively increase engagement in online physical education learning environments.

Keywords: Physical education, interactive digital learning, game-based learning, YouTube, online classes

Introduction

The integration of digital learning technologies in education has transformed how students participate with academic and co-curricular content. Physical education mainly focuses on direct demonstration of the skills or the exercises followed by imitation from the students and then correction. The new technologies available has opened lots of possibilities in teaching physical education and sports.

The students aged from 6 to 7 years as they begin their classes its mandatory that they get equal opportunities to be part of the curriculum along with having lots of fun which then develops into lifelong healthy habits (Garn & Cothran, 2020). Physical education which aims at overall health as taught in the right way in the early age makes the difference of well-being in each individual as they tend to follow all the way through their life.

This study aims to explore how the interactive game based online classes using YouTube based physical activity videos shape the involvement of the students compared to the traditional demonstration and imitation method.

Literature Review

Digital learning tools in physical education have become more relevant in during and post-pandemic era. Full lockdown made the students to learn from their respective homes through the online platforms available. Teaching theory through the interactive online platforms seemed flawless but doing physical activity was still seemed difficult ,but as the time progressed giving priority to health was mandatory .And that's how the idea of physical education through the digital platforms emerged. According to Casey, Goodyear, and Armour (2017), interactive

technologies permit students to join in physical activities remotely, preserving engagement and physical literacy even outside the traditional gymnasium. Interactive video lessons, wearable fitness trackers, and game applications all helps to boost student motivation.

Game-based learning, as spotted by Plass et al. (2015), integrates crucial motivational features such as challenge, reward, and feedback. These elements are predominantly effective for children who respond well to immediate reinforcement and visual stimuli. In PE, gamified activities convert routine exercises into engaging adventures (Sun, 2021).

Early childhood research highlights the role of digital interactivity in sustaining attention (Wang, 2020). For students as they begin to proper schooling system , educational games offer multisensory learning experiences that stimulate both cognitive and physical development. However, there remains limited evidence of classes of physical education being conducted online mode and how such interventions specifically influence and increase the engagement levels of small kids in PE online classes. This study bridges that gap.

Methodology

Data Selection

A quasi-experimental design was implemented, using a within-subject comparison between two instructional modes: a traditional online session and a game-fed digital session. Fifty Grade 1 students (25 boys and 25 girls) from CBSE affiliated private international school in Qatar participated with parental consent.

Data Analysis Procedure

In the traditional session, the Physical education teacher demonstrated aerobic and stretching exercises through a live online class. In the game-fed session, students followed YouTube videos featuring animated characters performing interactive movements. After each session, students rated their engagement using a five-point Likert scale (1 = Very Disliked to 5 = Loved). Teachers assisted in interpreting the scale using visual smiley cues.

Descriptive statistics, paired-samples t-tests, and subgroup analyses were conducted to examine differences between the two instructional method . Data were analysed using IBM SPSS Statistics. The effect size *(cohens's d)* was calculated based on SPSS output.

Ethical Considerations and Study Limitations

All the participants voluntary participated in the study with their parents' consent. For the purpose of confidentiality Student identities and name of the school are kept anonymously. Age appropriate, safe physical activities were chosen to ensure no physical and psychological harm.

Study Limitations

The study was conducted on controlled environment such as online platform, real world variations may be different. Participants were exposed to the exercise for short duration which can neglect the long-term effect of exercise.

Results

Table 1

Descriptive Statistics: Number, Mean, Standard Deviation, Standard Error, Minimum and Maximum scores for traditional and game-based exercises

Variables	N	Mean	SD	SE	Min	Max
Traditional Exercise	50	2.993	0.775	0.110	1.55	4.72
Game-Based Exercise	50	3.843	0.867	0.123	1.87	5.00
Difference (Game - Traditional)	50	0.850	0.445	0.063	-0.43	1.66

Figure 1

Mean Engagement Ratings
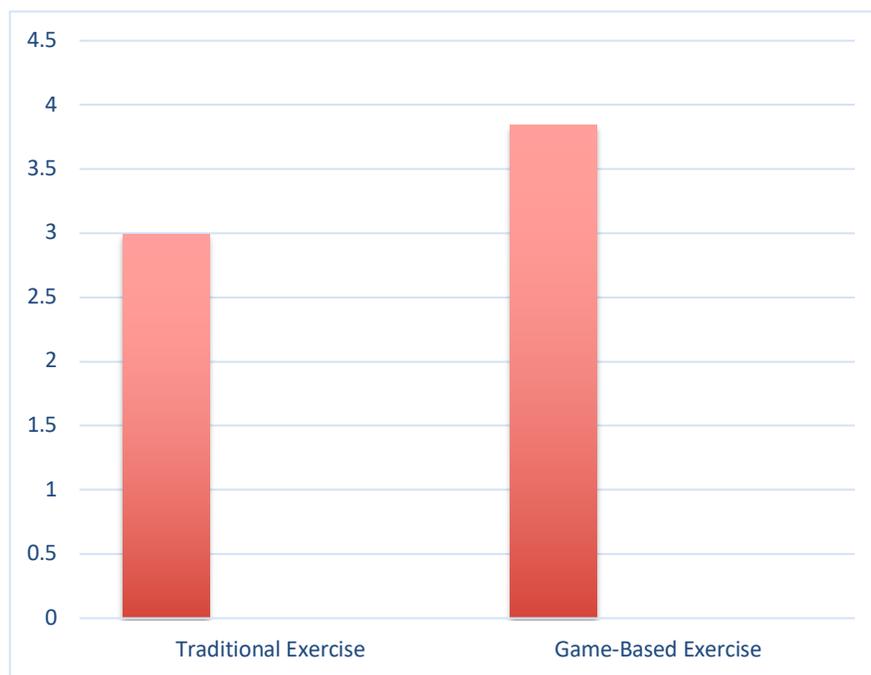
Table 2

Overall & Gender-Based Analysis

Variable	N	Mean (Traditional)	Mean (Game-Based)	Mean Difference	$t(49)$	p	Cohen's d	Interpretation
Overall Engagement	50	2.99	3.84	0.85	13.51	< .001	1.91	Significant increase in engagement
Boys	25	3.05	3.93	0.89	8.92	< .001	1.78	Higher engagement for game-based videos
Girls	25	2.94	3.75	0.81	10.38	< .001	2.08	Higher engagement for game-based videos
Gender Comparison (Diff)	—	—	—	0.08	0.60	.55	—	No significant gender difference

The results discovered a **significant difference** in student engagement ratings between traditional exercise demonstrations and game-based exercise videos in online classes. This large effect size (Cohen's $d > 0.8$) indicates a **strong practical significance** on game based video teachings of physical education. In case of gender analysis both boys and girls demonstrated significant improvement in engagement during game-based sessions.

Discussion

The results of this current study line up with the previous literatures underlying the benefits of game based learning environments (Plass et al., 2015; Sun, 2021).the practice of using YouTube based physical education activities during the online physical education classes

has transformed the interactive experience of students where they felt sense of accomplishment and excitement. In contrast, traditional instruction, though informative, lacked sensory engagement and visual stimulation during the online class sessions.

Self-Determination Theory (Deci & Ryan, 2000) backs these results, as gamified lessons augment intrinsic motivation by sustaining autonomy and competence needs. Teachers also conveyed improved classroom management during digital sessions, as students remained attentive and less distracted.

Conclusion and Future Recommendations

This study concludes that integrating game based physical education classes during online sessions can transform the classes into more exciting and motivational experience. Future recommendations of this study can include long term effect of these game-based exercise through online class sessions can be studied.

Acknowledgment

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