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The Effectiveness of the Module-Based Approach in Physical Education toward Enjoyment among Primary School

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Abstract

This study assessed the efficiency of a module-based approach (MBA), incorporating Project-Based Learning (PBL), Cooperative Learning (CL) and Teaching Games for Understanding (TGfU), on enjoyment in physical education. A quasi-experimental study design was used and 108 primary school students from Perak, Malaysia were selected using fishbowl draw sampling. Participants were randomly assigned to an experimental group (N = 53, Weight = 30.56 ± 3.76 kg/m², Age = 11.24 ± 0.5 years) or a control group (N = 55, Weight = 32.52 ± 3.67 kg/m², Age = 11.24 ± 0.5 years). The experimental group underwent the MBA for 12 weeks (two 60-minute sessions weekly), while the control group followed a traditional instructional approach. Enjoyment was measured using the Physical Activity Enjoyment Scale (PACES) during pre- and post-tests. Data were analysed using descriptive statistics and multivariate analysis of variance (MANOVA). Results revealed a significant increase in enjoyment in the experimental group (M = 69.94, SD = 0.321) compared to the control group (M = 31.69, SD = 0.315). The findings suggest that the 12-week MBA intervention significantly enhanced enjoyment among fifth-grade students, indicating its potential as an effective pedagogical approach in physical education.

Keywords: Model-Based Approach, Project-based Learning (PBL), Cooperative Learning, and Teaching Games for Understanding (TGfU), Enjoyment Level

Introduction

Physical education is regarded as one of the key pillars of child development, promoting physical activity, cognitive development and emotional well-being (Botagariyev et al., 2016; Mahindru et al., 2023). In the Malaysian Education System, physical education is a compulsory subject in primary and secondary levels as it introduces the students to various types of physical activities which will enable them to develop holistically (Watson et al., 2017).

Effective teaching strategies in physical education are essential is considered be necessary for student engagement and enjoyment, which significantly influences participation and learning outcomes (Opstoel et al., 2020). However, traditional teacher-centered approaches, where learning and knowledge sharing is the focus, tend to deny students the chance to work as a group and learn new knowledge (Dong et al., 2019). These approaches have been criticized as they fail to provide an active and effective learning environment (Serin, 2018). The Malaysia Education Blueprint (2013–2025) has advocated shifting towards student-centered learning to prepare the students for 21st-century challenges. This is considered as a reform on education that focuses on critical thinking, collaboration and cognitive skills, which is in accordance with global standards that prepare students to face the real-life challenges (Borhan et al., 2020). Pedagogies that are student-centered pedagogies encourage active participation, therefore promotes holistic development and also allows the student to own their learning experiences (Bhardwaj et al., 2025). This change is vital especially in the sphere of physical education, as enjoyment and engagement are key drivers of sustained participation (Watson et al., 2017).

Literature Review

Consequently, TGfU is a developmental model that was developed by Bunker and Thorpe (1982), and is a game-based learning model for helping students to be physically active (Jani et al., 2018). Furthermore, TGfU is related to the enjoyment and the confidence, directed to the understanding of the game tactics, the game tactics and strategies (Alcala & Garijo, 2017). Studies have indicated that TGfU can be used to support enjoyment of physical education (PE), especially in the teaching of games (Rahman et al., 2020). Similarly, PBL promotes individual learning as it provides students with an opportunity to engage in projects that are of interest to them, as well as their abilities (Aldabbus 2018). Besides, PBL improve students' sense of fun as well, and develops their personal values and it is one of the mandatory models for physical education (Ginanjar & Tarigan, 2018; Ramirez et al., 2017). Cooperative Learning, on the hindsight, helps to implement these strategies by providing a positive and cooperative learning environment. In addition, cooperative PE activities are related to cognitive, social, and motor skills and dictate a sense of safety, fun, and good physical performance among students (Bores-Garcia et al., 2021; Casey & Quennerstedt, 2020). Based on a systematic review, it was found that cooperative learning had a positive effect on the results of primary and secondary physical education students (Bores-Garcia et al., 2021) and that there was an increase in the enjoyment of students' cooperative games in grade 6-9 (Engels & Freund, 2020). Therefore, in order to meet these needs, the aim of this study is to suggest a module-based approach (MBA) that combines three evidence-based student-centered approaches such as Teaching Games for Understanding (TGfU), Project-Based Learning (PBL) and Cooperative Learning. The MBA employs TGfU, PBL and Cooperative Learning to deliver a fun and student-centered learning environment that is equally engaging and enjoyable to participate in.

This study aims to improve on the shortcomings of traditional pedagogy by introducing the MBA in physical education and hopes to make a contribution towards the current revolution in physical education pedagogy, in line with the aims of the Malaysia Education Blueprint and holistic student development.

Methodology

This research is a quasi-experimental design with pre- and post-test assessments focused on identifying the effectiveness of a module-based approach (MBA) in physical education to determine levels of enjoyment. The study involved an experimental group given the MBA intervention and a control group received the standard physical education curriculum, allowing for a comparison of outcomes.

A total of 108 fifth-grade pupils aged (*M*=11.24; *SD*=0.50 years) from three primary schools in the Bagan Datuk district of Perak, Malaysia (SJKT Barathi, SK Simpang Empat, and SJKC Keow Min), were purposively sampled using a fishbowl draw sampling technique. The participants were randomly assigned to either the experimental group (*N*=53) or the control group (*N*=55). Additionally, an informed consent was obtained from parents or guardians following prior approval from the board of school directors.

The experimental group underwent a 12-week MBA intervention, that comprised of 60-minute sessions per week. The MBA was developed based on the instructional design model by Dick and Carey (2001), that combined three student-centred pedagogical strategies: Teaching Games for Understanding (TGfU), Project-Based Learnings (PBL), and Cooperative Learning. TGfU focused on game-based learning for tactical understanding, PBL focused on projects where students focused on their interests and Cooperative Learning focus on collaboration to facilitate interaction. The control group followed the standard Malaysian physical education curriculum with the traditional teacher-centered approach in the same time period.

Baseline enjoyment levels were established through a pre-test using the PACES, administered to both groups before the intervention. The experimental group then engaged in the MBA intervention, while the control group continued with the standard curriculum. Trained physical education teachers delivered the intervention to ensure consistency. At the end of the 12-week period, a post-test using the PACES was administered to both groups to assess changes in enjoyment levels. Data were collected in a controlled classroom setting to minimize external influences.

The Physical Activity Enjoyment Scale (PACES) originally developed by Kendzierski and DeCarlo (1991) for college students and adapted by Motl et al. (2001) for younger children, were used to measure the pre-intervention levels of enjoyment levels before the intervention was implemented. The adapted PACES has 16 items of a 5-point Likert type scale (1 = disagree a lot, 5 = agree a lot) and is intended to be comprehensible for children 11 years of age. The questionnaire went through a back-to-back translation process to make sure that it was suitable on a cultural and linguistic level in the Malaysian context. In addition, the PACES had also been shown to have good reliability in previous studies (Motl et al., 2001).

Moreover, descriptive statistics were used to summarize demographic characteristics and PACES scores. Multivariate analysis of variance (MANOVA) was used to test for differences in the level of enjoyment between the experimental and control groups where pre- and post-test scores were the dependent variables. All analyses were performed by the help of suitable statistical software, with the alpha level determined to be .05.

Table 1
The demographic profile of the subjects (N=108)

Variables	Experimental Group (*N*= 53) (Mean±SD)	Control Group (*N*= 55) (Mean±SD)
Age (year)	11.24 ± 0.50	11.24 ± 0.50
Height (m)	1.23 ± 0.04	1.22 ± 0.04
Weight (kg)	30.56 ± 3.76	32.52 ± 3.67

Findings

Table 1 above, displays a total of 108 fifth-grade students from three primary schools in Perak, Malaysia (SJKT Barathi, SK Simpang Empat, and SJKC Keow Min), were purposively selected for this study using a fishbowl draw sampling method. The participants were randomly assigned to an experimental group (*N*=53) or a control group (*N*=55). Both groups had identical ages with (*M*=11.24; *SD*=0.50 years). The experimental group had a height of (*M*=1.23; *SD*=0.04 meters) and a weight of (*M*=30.56; *SD*=3.76 kg), while the control group had a height of (*M*=1.22; *SD*=0.04 meters) and a weight of (*M*=32.52; *SD*=3.67 kg). Additionally, prior to conducting the multivariate analysis of variance (MANOVA), statistical assumptions were verified. The sample size exceeded 30 per group, satisfying requirements for normality and variance equality. Multivariate normality was confirmed using Mahalanobis Distance (maximum = 19.275 < critical value of 22.46 for six dependent variables). Box's Test of Equality of Covariance Matrices indicated no violation (Box's M=39.313, *F*(21, 41203.400) = 1.759, *p*=.17). Levene's Test of Equality of Error Variances showed non-significant results for pre-test PACES (*F*(1, 106) = 1.353, p = .247) and post-test PACES (*F*(1, 106)=1.772, *p* =.186), confirming homogeneity of variances.

Table 2
The estimated marginal means for PACES Scores by group.

Dependent Variable	GROUP	Mean	Std. Error	95% Confidence Interval	
				Lower Bound	Upper Bound
Pre-Test PACES	Control Group	36.56	.37	35.82	37.31
	Experimental Group	37.17	.38	36.41	37.93
Post-Test PACES	Control Group	31.62	.32	30.99	32.24
	Experimental Group	69.94	.32	69.31	70.58

A multivariate analysis of variance (MANOVA) was conducted to examine the effect of the module-based approach (MBA) on enjoyment levels, as measured by the Physical Activity Enjoyment Scale (PACES), between the experimental and control groups. The mean results revealed significant differences in enjoyment levels between the groups. The estimated marginal means (EMM) analysis further revealed these differences, as presented in Table 2 above. Based on the control group, PACES scores declined from pre-test (*M*=36.56, *SE*=0.37, 95% CI [35.82, 37.31]) to post-test (*M*=31.62, *SE*=0.32, 95% CI [30.99, 32.24]). In contrast, the experimental group showed substantial improvement from pre-test (*M* = 37.17, *SE* = 0.38, 95% CI [36.41, 37.93]) to post-test (*M*=69.94, *SE*=0.32, 95% CI [69.31, 70.58]). These findings

indicate that the 12-week MBA intervention significantly enhanced enjoyment levels among standard-5 students in the experimental group compared to the control group, demonstrating the effectiveness of the MBA in improving enjoyment in physical education.

Table 3
Test of Between-Subjects Effects for PACES

Source	Variables	df	Mean Square	F	Sig.	Partial Eta Squared
Group	Pre-Test PACES	1	9.918	1.287	.259	.012
	Post-Test PACES	1	39644.595	7247.741	.000	.986

Table 3 above, displays the tests of between-subjects effects, the results confirmed a highly significant group effect on post-test PACES scores ($F(1, 106)=7247.741$, $p< .001$, partial $\eta^2 = .986$), indicating the Module MBA substantially enhanced enjoyment.

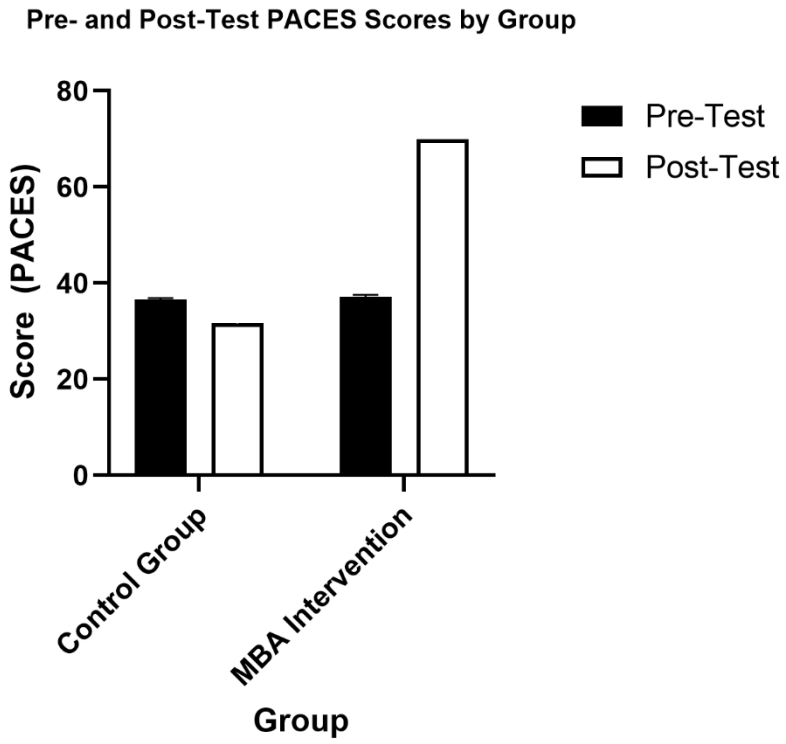

Figure 1: The bar graph illustrates the mean Physical Activity Enjoyment Scale (PACES) scores for the Control Group and Experimental Group during Pre-Test and Post-Test assessments. The Control Group exhibited a decreased of approximately -13.52% in the PACES score in contrast to the MBA intervention group which corresponded to an increase of 88.18%.

Conclusion

This study examined the effectiveness of a module-based approach (MBA), combining Teaching Games for Understanding (TGfU), Project-Based Learning (PBL), and Cooperative Learning with 12 weeks, in increasing enjoyment levels for fifth grade physical education students. The results showed that there was a significant difference in the scores of Physical Activity Enjoyment Scale (PACES) between the experimental (M= 69.94) and control groups (M=31.62), whereby the experimental group showed significant improvement after the

intervention. These findings are compatible and in line with Malaysia Education Blueprint (2013-2025) regarding student centered learning to encourage engagement and critical thinking, and holistic development in learning environments. The remarkable enhancements in enjoyment levels of experimental group justifies the effectiveness of the MBA compared to traditional teacher-centered practices, that tend to focus on the transfer of knowledge in the activities as opposed to engaging students (Dong et al., 2019; Serin, 2018). TGfU, PBL and Cooperative Learning which was integrated in the MBA resulted in a dynamic and interactive learning experience that would have contributed to the observed outcomes. The game-based approach of TGfU, which is focused on tactical knowledge, is consistent with previous literature that it develops enjoyment and confidence in physical Education (Alcala & Garijo, 2017; Rahman et al., 2020). Likewise, the student-driven projects, as revealed by previous studies, probably may have contributed to individualized learning, enabling pupils to engage in activities aligned with their interests (Ginanjar & Tarigan, 2018; Ramirez et al., 2017). Additionally, Cooperative Learning, creates a supportive atmosphere, encouraging team work and reducing competitive pressures that can diminish enjoyment (Bores-Garcia et al., 2021; Engels & Freund, 2020).

These results are in line with previous studies, in which reported that an e-module approach in physical education is a method which significantly improves students' performance, indicating that organized, interactive modules augment the learning outcomes (Ariantesa et al., 2022). Similarly, another study observed that self-learning modules, with a significant effect on performance, facilitate self-reflection and self-regulated learning, which may have likely played a role in the MBA's success in increasing enjoyment (Elizabeth et al., 2021). The design of MBA's which is student-centered design encourages the students to be in charge of their own learning, aligning with the Malaysia Education Blueprint's goal of equipping students with the sufficient skill sets of navigating 21st-century challenges through active participation and skill development. Critically, the MBA also overcomes the shortcomings of conventional pedagogies, that usually do not provide engaging learning conditions (Serin, 2018). Furthermore, the significant drop in PACES scores among the control group (from M=36.56 to M=31.62) might indicate that the traditional techniques may diminish the student's engagement over time, potentially due to their absence in interactivity and student control. Conversely, the multi-method framework of MBA's likely established positive teacher-student interactions, supporting varying learning styles, and minimized disciplinary issues, as the interactive activities promote inclusivity and engagement. This is relevant especially in physical education, where enjoyment is one of the main key factors of sustained participation (Watson et al., 2017).

The findings are significant for the pedagogy of physical education. An MBA curriculum provides an expandable framework for curriculum development, on the one hand to preserve academic quality, and on the other, to ensure a student-centered environment for enjoyment and engagement. As a result, it may be concluded that the MBA may benefit educators' teaching practices, and help in professional development, as well as meet varying student needs. In addition, the MBA promotes physical, cognitive, and emotional development of students through innovation in curriculum. In accordance with the Malaysia Education Blueprint (2013-2025), these outcomes will contribute to the development of well-rounded students. However, there are several limitations that should be addressed. This study focuses exclusively on standard-5 pupils from Perak state, Malaysia, due to generalizability limitations

to other cultures and age groups. In spite of the fact that PACES scores are reliable (Motl et al., 2001), qualitative methods can reveal nuanced qualitative subjective experiences. Furthermore, the 12-week duration of the intervention may not be indicative of long-term enjoyment or adherence to physical activity. There are no specific data on specific MBA activities (like games or projects) that can be used to understand the factors that drove the observed effects in more depth. Future studies should examine the applicability of the MBA across populations and use mixed-method approaches to include student perspectives, and examine longitudinal impacts. Comparative studies of the MBA components (TGfU, PBL, Cooperative Learning) could provide further insights into their respective roles.

The MBA is a promising approach to transform physical education using interesting pedagogies based on student-centered methods. Its ability to increase enjoyment among fifth grade pupils indicates its potential to promote better curriculum design and teaching practices that are in support of the vision of holistic education as outlined in the Malaysia Education Blueprint. In conclusion, the making of this model-based module shows the possibilities to considerably increase the level of enjoyment of the student in the Physical Education. It may also affect the attitudes and views of the student in participating in their lessons, leading to better academic achievements.

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