Implementation of physical fitness learning model through play approach: how does it impact on Islamic school students of Madrasah Tsanawiyah?

Aplicación del modelo de aprendizaje de la condición física mediante el juego: ¿cómo repercute en los alumnos de la escuela islámica de Madrasah Tsanawiyah?

Abstract. Physical education has relatively the same interests as other educational programs, namely developing three main domains: psychomotor, affective, and cognitive (Aziz, Okilanda, Fmary, et al., 2023; Aziz, Okilanda, Rozi, et al., 2023; Suryadi, Okilanda, Nofrizal, et al., 2024). Physical education is a medium for the development of motor skills, physical abilities, knowledge and reasoning, appreciation of social values, and habituation of healthy lifestyles in order to stimulate balanced growth and development (Damian Puling, 2022). Physical education directs students to learn movements, these movements are related to basic movements such as jumping, throwing, running, and other movements carried out by games, gymnastics, martial arts, and swimming (Juni Samodra et al., 2024; Samodra et al., 2023; Suryadi, Nasruloh, Yanti, et al., 2024). Physical education is an overall approach through physical activity to encourage healthy living habits and form movement skills towards harmonious and balanced physical, spiritual, mental, social intellectual and emotional growth and development (Mashud et al., 2023; Yanti et al., 2024).

Based on the above opinion, physical education can be interpreted as an education unit that also organizes physical education, namely Madrasah. Ministry of Religious Affairs of the Republic of Indonesia (2013) through Regulation of the Minister of Religious Affairs Number 90 of 2013 concerning the Implementation of Madrasah Education, Article 24 Paragraph 1 "Curriculum Structure of Madrasah Ibtidaiyah (MI)", Article 25 Paragraph 1 "Curriculum Structure
of Madrasah Tsanawiyah (MTs)" and Article 26 Paragraph 1 "Curriculum Structure of Madrasah Aliyah (MA)", includes physical education and sports in its curriculum content. The process of learning physical education and sports in Madrasah education units also has its own problems.

These problems are illustrated by various studies conducted in madrasah education units (education under the auspices of Islam) in relation to physical education. Student fitness levels are still low (one of the MTs in South Parigi district) (Murtono et al., 2022). Student learning motivation (MAN) in the "sufficient" category (Islamamin et al., 2022). The majority of learning outcomes are in the "sufficient" category (one of the Bekasi city MANs) (Alabba et al., 2021). Teachers have several problems in developing media and teaching materials (Taopiqurohman et al., 2022). The level of teacher activeness during the Covid 19 pandemic has not run optimally (Tanri et al., 2023). Implementation of learning in the moderate category (Hidayat et al., 2020). Various problems with physical fitness levels, student learning motivation, teaching media and materials, teacher activity levels, and the implementation of physical education learning have not gone well.

Physical fitness is of course always related to the various conceptions that have been described by experts in various literatures, the following are the various conceptions of physical fitness by experts contained in various literatures. The term physical fitness is defined based on the study; is a set of attributes to perform physical activities (Kokkinos, 2010; Lubis, 2018; Vancampfort et al., 2019), being able to go through daily life without fatigue and still be able to do other activities (Hoeger & Hoeger, 2018; Pan et al., 2022; Waluyo, 2023; Widiastuti, 2011). It is the ability of the body system to work efficiently and be healthy in daily activities (Corbin, 2014). Physical fitness is the physical ability to work optimally and reduce the risk of health problems (Howley & Franks, 2019).

This fitness is related to exercise (Suryadi, Komaini, Suganda, et al., 2024; Suryadi, Nasruloh, Haryanto, et al., 2024; Suryadi, Susanto, Faridah, et al., 2024) physical education and sport professions (Siedentop & Mars, 2012), related to health and movement skills (Jeng et al., 2017; Siedentop & Mars, 2012), related to biomotor (Bloemen et al., 2017) (Nabilah & Ardyanto, 2020) (Bompa & Buzzichelli, 2019), coordination (Mashud et al., 2024). Furthermore, physical fitness, cardio, biomotor, and body composition (Liguori & Medicine, 2017), sport skills (Indrayana & Yuliawan, 2019). Experimental studies by providing physical activity before breakfast and studying provide evidence that this has a positive effect on fitness and reading ability (Kulp & Zhu, 2021).Daily physical activity has been shown to improve fitness as well as academic achievement (Chabibi Arif et al., 2019). (Chabibi Arif et al., 2021). Students with high activity and low BMI tend to have high academic grades (Pellicer-Chenoll et al., 2015).

In Taiwan, fitness is an issue, and efforts are being made to reduce student obesity (Shih, 2016). In relation to this problem associated with student fitness, many studies have been conducted that prove how this fitness can be achieved. It is proven that games are better in efforts to improve student fitness (Khairuddin et al., 2023; Khairuddin et al., 2023), modified games (Khairuddin, 2014), as well as traditional games (Kusuma et al., 2021), sports activities (Lo et al., 2017). The more activities that are carried out have a high intensity, the more it will improve cardio and muscle fitness in adolescent students (Rubiyatno et al., 2023; Sato et al., 2021), the more active students are, the better their fitness level will be (Rizqika Rizal et al., 2022; Suratmin et al., 2024).

Physical activity (walking, running, exercising, playing) in the built environment or in this case city parks, urban forests, and other green open spaces, can significantly improve physical fitness (Lu et al., 2022). The novelty above is also reinforced based on a summary analysis of previous research relevant to this study: Physical education learning models through the play approach are: (1) whose game is fast, (2) cloth volleyball circuit game, (3) soccer circuit game, (4) basketball circuit game) circuit (Susilawati & Nur Moh Kusuma Atmaja, 2023). Traditional game-based learning development model to improve physical fitness (Lestari, 2021) & (Bile et al., 2021), increasing student activeness with the play method (Hardinata et al., 2024; Harianto et al., 2023), pole circuit games to improve fitness (Sitompul & Shoilihania, 2020), low organized games on fitness (R. A. Hidayat et al., 2020).

What is the importance of fitness for students? Studies have shown some very surprising things. Fitness and weight status were found to be associated with grade 7 student learning outcomes (Sardinha et al., 2014), with low fitness levels at risk of low academic grades (Cumilla et al., 2015), as well as the risk of failing in school (Shaw et al., 2015), male or female students with high fitness will have low stress and good academic grades (Ushijima et al., 2016). Fitness contributes positively to academic achievement (Alvarez-Bueno et al., 2017), students (Bara Crystina L. B. P et al., 2019; Hafshah et al., 2018; Han, 2018; Matejek & Planišec, 2022).

Other research evidence states, It is important to improve physical fitness in female students, this can contribute to academic achievement especially junior secondary school students. (Kyan et al., 2018)(Kyan et al., 2018), which is also the case in Taiwan (Hsieh et al., 2018). Meanwhile, a study conducted in Japan stated that physical fitness is strongly influenced by physical activity (Kyan et al., 2019; Mashud et al., 2024; Septianto et al., 2024; Suryadi et al., 2023). Likewise, a study conducted in Malaysia found that cardio fitness and flexibility have an effect on academic achievement (Ismail et al., 2020). These studies prove that fitness has an important impact on students' academic achievement. This study has piloted a number of games that are suitable for junior high school students, especially in schools that are under the auspices of the Ministry of Religious Affairs. Schools that specifically adhere to the Islamic religion in conducting the education process.
The innovation in this research lies in the Physical Fitness Learning Model through the Play Approach specifically designed for Madrasah Tsanawiyah (MTs) students, utilizing the built environment. Traditionally, play-based learning models have relied on traditional games or adaptations of existing games. However, there has been no prior research or effort to develop learning models that leverage the built environment to enhance the learning process, particularly to improve students' physical fitness. This approach not only supports the research goals but also serves as an alternative method for physical education, especially in educational settings with limited facilities and infrastructure, such as in Indonesia. Additionally, it aims to raise students' environmental awareness by integrating environmental learning into the curriculum.

Research Methodology

Participants
The population in this study were students from 5 MTS schools in the Jakarta area. Determination of the sample using purposive sampling so that a sample of 40 students was obtained which was divided into two groups. Experiments on 40 students consisting of 20 control group students and 20 experimental groups.

Research Design
The research method taken is a type of quantitative research, namely quasi-experimental design with a two-group pre-test-post-test control group design. In this study, the experimental group consisted of 20 students and a control group of 20 students. The experimental group received game-based physical education learning. The control group with physical education as usual. The research groups both received treatment 16 times a meeting. The experimental group with physical education treatment with games and the physical education control group followed the ongoing learning.

Data Analysis
Data were presented in the form of measures of central tendency. The next step is analyzing the data with a t-test and conducting a Parametric pre-test as a preliminary. The analysis of the experiment was carried out by testing the difference between the pre-test and post-test groups with the T test with the previous normality and homogeneity test, using SPSS 26 software.

Results
The following are the results of the data analysis obtained from the pre-test and post-test of the experimental group. The descriptive analysis results in Table 3 show that the average physical fitness score of students in the experimental group increased from the pre-test to the post-test. Similarly, the control group also showed an increase in their average physical fitness score from the pre-test to the post-test. However, there is a notable difference between the post-test average scores of the experimental group and the control group. The improvement in travel time is expressed in minutes, indicating that a lower value reflects better performance. The table demonstrates a decrease in time for the mean, minimum, and maximum values, suggesting an improvement in the ability to complete the running distance within a set time, which also indicates an increase in student fitness.

To determine the significance between the pre-test and post-test scores of the experimental group, the Paired Samples Test (paired t-test) was used, addressing the first hypothesis. To analyze the significance of the difference in impact between the post-test scores of the experimental and control groups, the Independent Samples Test (unpaired t-test) was used, addressing the second hypothesis. To evaluate the significance of the model, the N-Gain Score Test was used, addressing the third hypothesis. Before conducting these analytical tests, prerequisite tests were applied: the normality test using the Kolmogorov-Smirnov Test (with a sig value > 0.05) and the homogeneity test using the Levene statistic (with a sig value > 0.05). The results of the normality test indicate that the pre-test and post-test scores for both the experimental and control groups are normally distributed. Detailed results are shown in Table 4. The homogeneity test results in Table 5 show that the post-test scores of both the experimental and control groups are homogeneous, meaning all groups have the same variance.

The results of the Paired t-test in Table 5, it can be concluded that there is a significant effect on the physical fitness of students in the experimental group before treatment (pre-test) and after treatment (post-test), seen from the Sig value of 0.000 < α 0.05. Even so, the control group also experienced an increase between before and after treatment, as evidenced by the sig value. 0.032. Furthermore, between the control and experimental post-test groups, the free sample test was carried out, it turned out to have the

### Table 1.
Research Design two-group pre-test-post-test control group design

<table>
<thead>
<tr>
<th>Subject</th>
<th>Pres-Test</th>
<th>Treatment</th>
<th>Post-Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment Group</td>
<td>O₁</td>
<td>O₂</td>
<td>O₂</td>
</tr>
<tr>
<td>Control Group</td>
<td>O₂</td>
<td>K</td>
<td>O₂</td>
</tr>
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</table>

### Table 2.
Indonesian Physical Fitness Norms

<table>
<thead>
<tr>
<th>Value</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>1000 meter run</td>
<td>800 meter run</td>
</tr>
<tr>
<td>2</td>
<td>s.d. - 304°</td>
<td>s.d. - 306°</td>
</tr>
<tr>
<td>3</td>
<td>807° - 353°</td>
<td>807° - 355°</td>
</tr>
<tr>
<td>4</td>
<td>354° - 446°</td>
<td>354° - 458°</td>
</tr>
<tr>
<td>5</td>
<td>457° - 504°</td>
<td>459° - 640°</td>
</tr>
<tr>
<td>6</td>
<td>635° - etc.</td>
<td>641° - etc</td>
</tr>
</tbody>
</table>

### Table 3.

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same results with a sig value, 0.083> 0.05. Judging from this, it can be stated that the two groups both experienced an increase in fitness. The next analysis in the Model Effectiveness Test is the N-Gain Score Test to determine the meaningfulness of using the “Physical Fitness Learning Model Through the Play Approach for Madrasah Tsanawiyah (MTs) Students”.

The requirement for the application of the N-Gain Score Test is when the results of the Unpaired t-test between the Post-test of the experimental group and the Post-test of the control group have a significant difference in influence, while in this study these conditions have been achieved.

**Table 3.** Results of Pre-test and Post-test Descriptive Analysis of Experimental Group

<table>
<thead>
<tr>
<th>Result</th>
<th>N</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre_Experiment Group</td>
<td>20</td>
<td>4.48</td>
<td>6.24</td>
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<td>.50661</td>
</tr>
<tr>
<td>Pre_Control_group</td>
<td>20</td>
<td>4.41</td>
<td>6.29</td>
<td>5.4020</td>
<td>.50568</td>
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<tr>
<td>Post_Experiment Group</td>
<td>20</td>
<td>3.18</td>
<td>4.58</td>
<td>4.0335</td>
<td>.42193</td>
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<tr>
<td>Post_Control_group</td>
<td>20</td>
<td>3.11</td>
<td>5.23</td>
<td>4.3040</td>
<td>.55888</td>
</tr>
</tbody>
</table>

**Table 4.** Data Normality Test Results

<table>
<thead>
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<th>P</th>
<th>Significance</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>Pre-test</td>
<td>0.179</td>
<td>0.093</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>0.177</td>
<td>0.099</td>
<td>Normal</td>
</tr>
<tr>
<td>Control</td>
<td>Pre-test</td>
<td>0.178</td>
<td>0.098</td>
<td>Normal</td>
</tr>
<tr>
<td></td>
<td>Post-test</td>
<td>0.175</td>
<td>0.111</td>
<td>Normal</td>
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</table>

**Table 5.** Results of Data Homogeneity Test

<table>
<thead>
<tr>
<th>Variables</th>
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<th>df1</th>
<th>df2</th>
<th>Sig</th>
<th>Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Post-test of experimental group</td>
<td>0.180</td>
<td>1</td>
<td>38</td>
<td>0.674</td>
<td>Homogeneous</td>
</tr>
<tr>
<td>Post-test of control group</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Table 6.** Results of Paired t-test of Pre-test and Post-test of Experimental and Dick Groups

<table>
<thead>
<tr>
<th>Group</th>
<th>Variables</th>
<th>Df</th>
<th>Sig</th>
<th>α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Experiment</td>
<td>Pretest</td>
<td>19</td>
<td>0</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Control</td>
<td>Pretest</td>
<td>19</td>
<td>0.032</td>
<td>0.05</td>
</tr>
<tr>
<td></td>
<td>Posttest</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Figure 1 Percentage of N-Gain Score Test Results

The N-Gain Score Test results in Figure 1, show that the average N-gain score for the experimental group obtained a value of 62% including in the "moderately effective" category, with a minimum N-Gain Score value of 51% and a maximum N-Gain Score of 94%. Meanwhile, the average N-Gain Score for the control group is 51%, including in the "less effective" category, with a minimum N-Gain Score value of 32% and a maximum N-Gain Score value of 99%.

**Discussion**

This study aims to look at the implementation of game-based physical education learning for student fitness development. The results of the experiment found that it was also proven by the results of the experimental test which showed that there were differences in the research sample before and after the experiment with reference to the shorter travel time. It was proven stronger by the results of the difference test before and after the treatment given for 16 meetings. The results of the model effectiveness test in this study should be in line with various previous studies that also used the play approach to improve students' physical fitness. The physical education learning model through a play approach packaged in the form of a circuit has proven effective for improving students' physical fitness (Septianto et al., 2024).

The traditional game-based learning development model has been shown to be effective for improving students' integrated physical fitness (Bile et al., 2021; Lestari, 2021; Ma'rif, 2019; Septianto et al., 2024). Next Modification of basic movements through the application of pole circuit games in an effort to improve students' physical fitness (Sitompul & Sholihamia, 2020). The effect of low organized games on the degree of physical fitness of elementary school students (R. A. Hidayat et al., 2020).. Physical activity-based learning in tolerance character through traditional games (Putri, 2019).

There is no contradiction between the findings of the model effectiveness test in this study and other studies that have similar themes. The significant increase in students' physical fitness after running the Physical Fitness Learning Model through the Play Approach for Madrasah Tsanawiyah (MTs) Students, cannot be separated from the utilization of the built environment. School-age children to adolescents are very interested and more likely to do physical activity, and achieve the highest level of physical activity, when using the built environment because it is located outdoors (Oreskovic et al., 2015). Characteristics of the built environment appear important for supporting physical activity participation and favoring increased physical activity duration (McCormack, 2017). Safe, walkable and aesthetically pleasing neighborhoods with access to destinations and services overall and specifically influence people's participation in PA (physical activity) (Barnett et al. 2017). The importance of access to places and opportunities for activity in the immediate neighborhood and in the larger community can increase participation in physical activity and social life in childhood (Nordbo et al., 2019). The presence and range of facilities in the built environment can influence children's physical activity behavior (Lambert et al., 2019). The built environment is highly recommended as a means to promote PA among children/adolescents, especially in the face of the...
global physical inactivity crisis (Prince et al., 2022).

Apart from being a vehicle for the success of the Physical Fitness Learning Model through the Play Approach for Madrasah Tsanawiyah (MTs) Students, the use of the built environment has other benefits, namely as an alternative in carrying out the physical education learning process, especially in educational units that are still very minimal in facilities and infrastructure, especially in Indonesia. This research is very important because based on previous studies, when children are active then fitness increases, it is proven to improve academic achievement. Among the research results evidence of this is according to (Asigbe et al., 2018). Physical activity is significantly associated with academic achievement, cardiorespiratory fitness is associated with academic achievement level (De Almeida Santana et al., 2017). That physical fitness correlates with students’ academic achievement (Bara Cristina L. B. P et al., 2019; Hafsh et al., 2018; Han, 2018; Matejek & Planinsec, 2022; Weemer & Ayodele, 2021). Specifically body strength is not correlated with academic achievement (Gima & Seki, 2019), student fitness was found to have an effect on cognitive health (Latino et al., 2021).

Physical activity has been found to relieve stress and release happy hormones, which is thought to improve academic performance (Alghadir et al., 2020) even a sizable experimental study was conducted to prove whether small exercise training activities performed for only 10-25 minutes have an effect on students’ academic achievement, and the results were positive (Li & Zhang, 2022; Takehara et al., 2021). Simple movements only had a low correlation with academic achievement, while complex movements were found to have a positive effect on academic achievement in female students, but not in male students. (Chung et al., 2021).

Subsequent studies have suggested that obesity has a sequential effect on fitness and academic (Morita et al., 2016) According to this study, by engaging in physical activity or exercise, obesity can be overcome. Furthermore, the intensity and frequency of exercise during motion learning helps to improve fitness, with this involvement significantly affecting academic achievement (Adi, 2023). Participation in sports positively improves children’s mental health, social skills and academics (A’mir et al., 2023). Other evidence suggests that active students are fitter and have better academic performance (Arboix-Alío et al., 2022). There is a positive relationship between physical activity and cognitive function of students (Amin et al., 2023). There is a relationship between physical fitness (especially strength) and academic achievement, but not aerobic ability (de Almeida Santana et al., 2023). Physical activity directly improves cardiovascular and pulmonary fitness, as well as coordination of movement, which also improves academic achievement (Tanineh & Halaweh, 2023). The results of this study enrich the results of development research oriented towards efforts to improve student fitness through a series of games. It is further hoped that with an increase in physical fitness, the ability to learn will increase and will result in improved academic learning outcomes in addition to movement fitness or body fitness.

**Conclusion**

The results of this study prove that in the experimental group there was an increase in fitness, as well as in the control group. The increase that occurred based on the N gain test was greater than the control group, so it can be understood that the game-based learning model is effective for improving fitness. The results of the study provide additional information and scientific treasures in the form of a Physical Fitness Learning Model through a Play Approach for Madrasah Tsanawiyah (MTs) Students to improve students’ physical fitness. For teachers, it has facilitated and expedited the learning process, for students to facilitate and accelerate the learning process. Provides a contribution to scientific thinking that can be accounted for the truth, so it is possible for scientists and other researchers to develop physical fitness learning models to be more specific, interesting, and useful. Further research recommendations can compare the physical fitness learning model through the play approach with other learning models and of course with a wider sample.

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