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# The Relationship Between Mobile Legends Online Game Habits And Student's Physical Fitness

**Gunawan[1], Kurnia Dyah Anggorowati[2]**
[12]Pendidikan Jasmani, Sekolah Tinggi Keguruan dan Ilmu Pendidikan Melawi, Kalimantan Barat, Indonesia

Author's Email: nawan301000@gmail.com, kurniastkipmelawi@gmail.com

Correspondent Author: nawan301000@gmail.com

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## Abstrac

This study aims to analyze the relationship between the habit of playing Mobile Legends online games and the physical fitness of STKIP Melawi students. The research hypothesis states that there is a significant relationship between Mobile Legends playing habits and students' physical fitness levels. This research is motivated by the increasing intensity of online game use among college students which is often associated with sedentary behavior, but at the same time competitive games such as Mobile Legends also demand concentration, eye-hand coordination, reaction speed, decision-making, and team strategy involvement. The study used a quantitative approach with an ex post facto correlational design. The research sample amounted to 30 active STKIP Melawi students from the PGSD, PENJAS, and Mathematics Study Programs for the 2022–2024 batch who were selected through purposive sampling techniques with the criteria of actively playing Mobile Legends for at least three months. Gambling habit data was collected using a 20-item Guttman Scale questionnaire that included the dimensions of playing intensity, play patterns, physical impact, and physical activity. Physical fitness data was obtained through six tests, namely eye-hand coordination, vertical jump, T-Test agility, reaction speed, muscle endurance, and Bip Test/$VO_2$Max. Data analysis was conducted using Spearman Rank correlation. The results showed that the majority of students were in the category of high playing habits of 56.7%, with an average score of 14.27 out of a maximum score of 20. The average physical fitness score is 15.90 out of a maximum score of 30. The results of the correlation test showed a very strong and significant positive relationship between Mobile Legends playing habits and students' physical fitness ($r = 0.969$; $p < 0.001$). Thus, the research hypothesis is accepted. These findings suggest that students with higher play habits tend to have better physical fitness in this sample, although the results need to be interpreted as a correlational relationship, not causality.

**Keywords:** Mobile Legends; Physical Fitness; Students.

## PENDAHULUAN

The development of digital technology has changed the pattern of student activities, especially through the increasing use of mobile devices for entertainment, communication, and online games. One of the games that is very popular among the younger generation is Mobile Legends: Bang Bang, a multiplayer online battle arena (MOBA) game that demands teamwork, strategy, concentration, quick decision-making, and visual-motor coordination. In Indonesia, Mobile Legends is not only an entertainment medium, but also part of the growing e-sports ecosystem, including among students and students (Hafidz & Fakhriza, 2024; Kristanto & Andono, 2024; Lestari et al., 2023; Ong et al., 2023). This popularity shows that online gaming activities have become a social and digital cultural phenomenon that is difficult to separate from student life.

On the other hand, students are in the phase of productive age that requires optimal physical fitness to support academic activities, lecture practices, social life, and readiness to face future job demands. Physical fitness includes the body's ability to perform daily activities effectively without experiencing excessive fatigue, as well as related to the components of cardiorespiratory endurance, muscle strength and endurance, agility, reaction speed, coordination, and body composition. Studies in college students show that physical activity, sedentary behavior, nutritional status, physical

literacy, and daily movement habits have an important relationship with student fitness and health (Guo et al., 2022; Jiang et al., 2023; Król et al., 2022; J. Li et al., 2025; Redondo-Flórez et al., 2022; Sampaio et al., 2026; C. Zhang et al., 2022; Zhu et al., 2024).

The phenomenon of increasing Mobile Legends gaming habits raises an interesting scientific problem. On the one hand, playing online games is often associated with the risk of a sedentary lifestyle, reduced physical activity time, sleep disturbances, fatigue, musculoskeletal problems, and the potential for a decline in fitness if done excessively (Jaspe et al., 2026; Machfiroh et al., 2021; Martínez-Murciano et al., 2026; Pradnyadewi et al., 2024). On the other hand, MOBA games demand attention focus, eye-hand coordination, reaction speed, decision-making skills, and emotional regulation in competitive situations. These aspects have the potential to relate to several components of fitness that are skills, especially coordination, agility, and reaction.

Previous literature shows that students' physical fitness can be improved through structured physical activity programs, physical education learning, moderate to high intensity training, circuit training, HIIT, app-based interventions, and digital health technology approaches. Physical activity programs have been shown to contribute to improving students' fitness, movement motivation, mental health, and quality of life (Casimiro-Andújar et al., 2023; El-Ashker & Al-Hariri, 2023; Geantă et al., 2025; Kv et al., 2024; Pocaan, 2024; Srisuk, 2024; Suwannakul et al., 2025; Yang et al., 2026; N. Zhang & Su, 2026). In addition, technology-based physical learning, fitness apps, mHealth, and virtual reality interventions have begun to be developed to encourage student physical activity participation in a more engaging and adaptive manner (Ahumada-Newhart et al., 2024; Godoy-Cumillaf et al., 2026; Kristiyandaru et al., 2023; Suherman & Sultoni, 2021; Wittmar et al., 2025).

In the context of digital gaming, several studies have shown that games can affect players' behavior, motivation, playing loyalty, time management, and social experience (Cabiles et al., 2025; Ibda et al., 2023; Jahrir et al., 2025; Kishimoto et al., 2021; Lestari et al., 2023; Ong et al., 2023). However, the relationship between Mobile Legends playing habits and physical fitness has not been studied specifically, especially in students in regional universities. Most studies still focus on aspects of player behavior, motivation, in-app purchases, communication, addiction, or game performance, while their relationship to physical fitness components such as coordination, agility, reaction, muscle endurance, and $VO_2$Max still requires more targeted empirical studies.

This study offers an approach to understand the relationship between Mobile Legends gaming habits and students' physical fitness through the measurement of two main variables, namely gaming habits as variable X and physical fitness as variable Y. The main gap in this study lies in the limited studies that directly link Mobile Legends playing habits to students' physical fitness profiles using a combination of questionnaire instruments and physical tests. In addition, many previous studies have tended to place online gaming as a risk factor for sedentary behavior, but not many have examined the possible positive association with skill-based fitness components, such as coordination and reaction. Therefore, it is important to provide more balanced empirical evidence, without ignoring the possibility of confounding factors such as regular physical activity, curriculum background, exercise habits, and sample characteristics.

This study aims to analyze the relationship between the habit of playing Mobile Legends online games and the physical fitness level of STKIP Melawi students. This study examines the relationship between the score of playing habits and the total score of physical fitness as well as the relationship between the dimension of playing habits and the components of physical fitness. The novelty of this study lies in the analysis of the relationship between Mobile Legends playing habits

and students' physical fitness using a data-based correlational approach, questionnaires, and multicomponent physical tests. The study not only looked at play habits as digital behaviors but also linked them to physical fitness indicators that included coordination, agility, reaction, muscle endurance, leg power, and cardiorespiratory endurance. The scope of the research is limited to active STKIP Melawi students of the 2022–2024 batch from the PGSD, PENJAS, and Mathematics Study Programs who are actively playing Mobile Legends for at least three months. Thus, the results of this research are expected to be the basis for higher education institutions to design strategies for fostering student physical fitness that remain relevant to the reality of digital culture and gaming habits among students.

## METODE

### *Research Design*

This study uses a quantitative approach with an ex post facto correlational design. This design was chosen because the study did not provide treatment or intervention, but examined the relationship between Mobile Legends online game playing habits as a free variable and students' physical fitness as a bound variable based on the phenomenon that has occurred. The relevant correlational approach is used to determine the direction and strength of the relationship between variables, especially in the study of digital behavior, physical activity, and physical fitness of students who are influenced by various lifestyle factors. Previous studies on student fitness have also used quantitative approaches to test the relationship between physical activity, sedentary behavior, body mass index, and physical fitness components (Guo et al., 2022; Król et al., 2022; J. Li et al., 2025; Sampaio et al., 2026).

### *Location, Time, Population, and Sample*

The research was carried out at the STKIP Melawi Campus, Melawi Regency, West Kalimantan, in the odd semester of the 2025/2026 academic year. The research population is active STKIP Melawi students of the 2022–2024 batch from the PGSD, PENJAS, and Mathematics Study Programs. The sample amounted to 30 students who were selected using the purposive sampling technique. The inclusion criteria include: (1) active STKIP Melawi students, (2) from the 2022–2024 batch, (3) actively playing Mobile Legends for at least three months, and (4) willing to take part in questionnaires and physical fitness tests. The purposive sampling technique is used because the research requires subjects that are in accordance with the characteristics of the phenomenon, namely students who have direct experience as Mobile Legends players. The selection of a sample of gamers is relevant to the study of Mobile Legends playing behavior which emphasizes aspects of player intensity, motivation, satisfaction, loyalty, and involvement in a competitive gaming environment (Kishimoto et al., 2021; Lestari et al., 2023; Ong et al., 2023).

### *Research Variables*

The free variable in this study is the habit of playing the Mobile Legends online game. This variable reflects the pattern of student involvement in playing games, which includes playing intensity, play patterns, physical impact, and physical activity. The bound variable is the physical fitness of students, which includes several components of physical condition, namely eye-hand coordination, limb power, agility, reaction speed, muscle endurance, and cardiorespiratory endurance. Multicomponent measurement is used because a student's physical fitness is not determined by just one aspect, but is a combination of neuromotor, muscular, and cardiorespiratory abilities. Previous research confirms that student fitness measurement needs to consider diverse indicators so that fitness profiles can be described more comprehensively (Duc, 2021; Jiang et al., 2023; Manh Nguyen & Tri

Nguyen, 2026; Zhu et al., 2024).

**Research Instruments**

The first instrument is the Guttman Scale questionnaire which is used to measure Mobile Legends playing habits. The questionnaire consists of 20 statements with a choice of "Yes" and "No" answers. The answer "Yes" is given a score of 1, while the answer "No" is given a score of 0. The maximum total score is 20. The questionnaire was prepared based on four dimensions, namely playing intensity, play pattern, physical impact, and physical activity. The score categories are set into three, namely high with a score range of 14–20, medium with a score range of 8–13, and low with a score range of 0–7. The use of questionnaires to identify gaming habits is in line with digital gaming research that measures player behavior through indicators of playing intensity, motivation, duration, and engagement (Kishimoto et al., 2021; Ong et al., 2023; Pradnyadewi et al., 2024).

**Table 1**. Mobile Legends Playing Habits Questionnaire Category Description

| Category | Score Range | Percentage Score | Description |
|---|---|---|---|
| High/Intensive | 14–20 | 70%–100% | Students have a high/intensive habit of playing Mobile Legends. |
| Medium | 8–13 | 40%–65% | Students have a habit of playing *Mobile Legends* at a moderate level |
| Low | 0–7 | 0%–35% | College students have low *Mobile Legends* playing habits |

The second instrument is a physical fitness test consisting of six items. Eye-hand coordination is used to measure visual coordination and hand gesture skills. Vertical jump test is used to measure leg power. T-Test agility is used to measure agility. Reaction time test is used to measure the speed of a reaction. Push-up and sit-up tests are used to measure muscle endurance. The Bip Test is used to measure aerobic endurance or $VO_2$Max estimation. The selection of this test item is adjusted to the need to obtain a comprehensive physical fitness profile of students. The student fitness literature shows that field tests such as agility, muscle strength/endurance, power, and aerobic capacity are often used to identify fitness status and the effectiveness of physical activity programs (Gómez-Campos et al., 2025; Kv et al., 2024; Srisuk, 2024; N. Zhang & Su, 2026).

***Data Collection Procedure***

Data collection is carried out through two stages. The first stage is the filling out of a questionnaire on Mobile Legends playing habits by respondents. At this stage, the researcher provides an explanation of the purpose of the research, how to fill the instrument, and the confidentiality of respondent data. The second stage is the implementation of a physical fitness test. Before the test was carried out, participants were given technical instructions and warmed up to reduce the risk of injury. The tests were carried out sequentially according to the components measured, paying attention to the rest time between items so that the test results were not too affected by fatigue. The data obtained from questionnaires and physical tests are then recapitulated in the form of scores to be statistically analyzed.

***Data Analysis Techniques***

Data analysis was carried out through descriptive and inferential analysis. Descriptive analysis was used to calculate minimum, maximum, average, standard deviation, frequency, and percentage, both on the variables of Mobile Legends playing habits and physical fitness. Inferential analysis uses the Spearman Rank correlation test because the research data is in the form of scores and categories, and aims to test the relationship between two variables. The Spearman test is used to determine the direction, strength, and significance of the relationship between Mobile Legends playing habits and

students' physical fitness. The significance criteria were set at $p < 0.05$. If the p value is less than 0.05, then the relationship between variables is declared significant. The interpretation of the correlation coefficient is carried out by looking at the magnitude of the value r, which is closer to 1, the stronger and more positive the relationship. All analyses were carried out using SPSS statistical software. The results of the analysis are then interpreted carefully because the correlational design cannot be used to conclude a cause-and-effect relationship, but only shows the existence or absence of a statistical relationship between variables.

## RESULTS

Mobile Legends play habit data was obtained through a Guttman Scale questionnaire consisting of 20 statements with four main dimensions, namely playing intensity, play pattern, physical impact, and physical activity. Based on the results of a descriptive analysis of 30 STKIP Melawi students, the total score of Mobile Legends playing habits has a minimum score of 5, a maximum score of 20, an average of 14.27, and a standard deviation of 4.49. The average score shows that in general, students' Mobile Legends playing habits are in the high category.

**Table 2**. Descriptive statistic

| | N | Range | Minimum | Maximum | Mean | Std. Deviation |
|---|---|---|---|---|---|---|
| Hand eye coordination | 30 | 2.00 | 2.00 | 4.00 | 3.0000 | .64327 |
| Vertical Jump | 30 | 3.00 | 1.00 | 4.00 | 2.5333 | .68145 |
| Agility | 30 | 2.00 | 2.00 | 4.00 | 3.0000 | .83045 |
| Speed Reaction | 30 | 2.00 | 2.00 | 4.00 | 2.9000 | .88474 |
| Muscle Endurance | 30 | 2.00 | 2.00 | 4.00 | 2.6000 | .56324 |
| Vo2 Max | 30 | 2.00 | 1.00 | 3.00 | 1.8000 | .55086 |
| Physical Fitness (Y) | 30 | 12.00 | 10.00 | 22.00 | 15.9000 | 3.72642 |
| Intensity of Play | 30 | 3.00 | 2.00 | 5.00 | 3.6000 | .89443 |
| Pattern | 30 | 4.00 | 1.00 | 5.00 | 3.5000 | 1.35824 |
| Physical Impact | 30 | 4.00 | 1.00 | 5.00 | 3.3333 | 1.34762 |
| Physical Activity | 30 | 4.00 | 1.00 | 5.00 | 3.7667 | 1.59056 |
| Playing Habits ML (X) | 30 | 15.00 | 5.00 | 20.00 | 14.2667 | 4.49470 |

In more detail, the physical activity dimension obtained the highest average, which was 3.77 out of a maximum score of 5, followed by playing intensity of 3.60, play pattern of 3.50, and physical impact of 3.33. These findings show that the students who were the research sample not only had relatively high Mobile Legends playing habits, but also still showed involvement in physical activity. This condition is important to note because previous studies have explained that online gaming behavior can be related to time management patterns, motivation, social interaction, and daily behavior of players (Jaspe et al., 2026; Kishimoto et al., 2021; Lestari et al., 2023; Machfiroh et al., 2021; Ong et al., 2023).

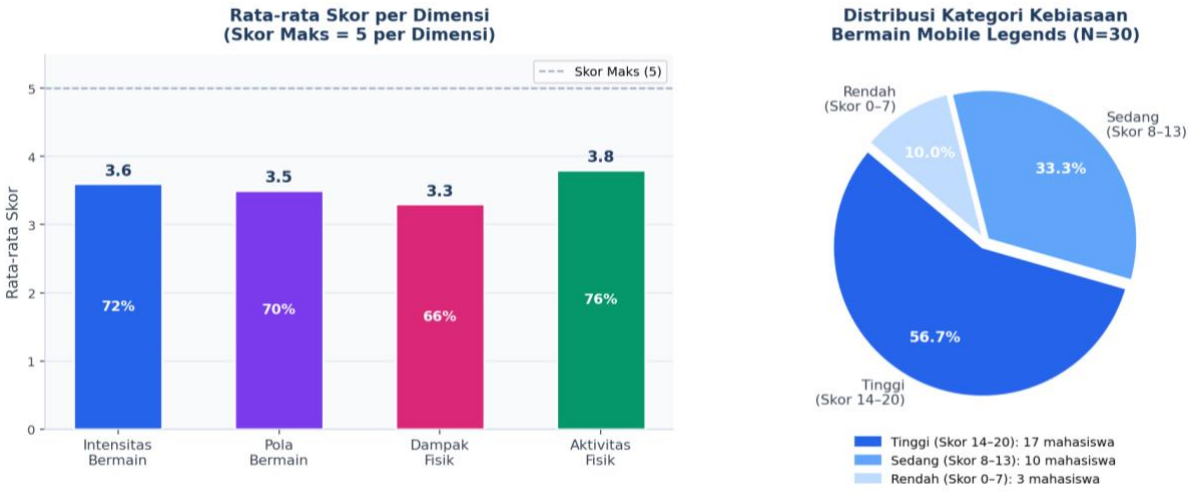


**Figure 1.** Mobile Legends Gaming Habits Questionnaire Results Recapitulation

The distribution of categories showed that 17 students or 56.7% were in the category of high playing habits, 10 students or 33.3% were in the medium category, and 3 students or 10.0% were in the low category. Thus, most respondents are students who have a habit of playing Mobile Legends intensively. In the context of e-sports and competitive games, the high frequency of play can be related to aspects of fun, loyalty, gaming satisfaction, team interaction, and competitive orientation of players (Kristanto & Andono, 2024).

**Table 3.** Frequency Distribution of Mobile Legends Gaming Habits Category

| Category | Frequency (n) | Percentage (%) |
|---|---|---|
| High (Score 14–20) | **17** | **56,7%** |
| Medium (Score 8–13) | 10 | 33,3% |
| Low (score 0–7) | 3 | 10,0% |
| **Total** | **30** | **100%** |

Physical fitness data was obtained through six test components, namely eye-hand coordination, vertical jump, agility through T-Test agility, reaction speed, muscle endurance, and aerobic endurance through Bip Test/$VO_2$Max. The results of the analysis showed that the total physical fitness score of students had a minimum score of 10, a maximum score of 22, an average of 15.90, and a standard deviation of 3.73 from a maximum score of 30. These results show that the physical fitness of students is at a moderate level and still has room for improvement, especially in the aspect of aerobic endurance. The components with the highest average scores were eye-hand coordination and agility, each of 3.00. The reaction speed component obtained an average of 2.90, muscle endurance 2.60, *vertical jump* 2.53, and $VO_2$Max 1.80. The low $VO_2$Max value indicates that the cardiorespiratory capacity of students is still the most important component. This is in line with the literature that places regular physical activity, moderate to high intensity exercise, and control of sedentary behavior as important factors in improving students' cardiorespiratory fitness (Guo et al., 2022; J. Li et al., 2025; Sampaio et al., 2026; Srisuk, 2024; C. Zhang et al., 2022; N. Zhang & Su, 2026).

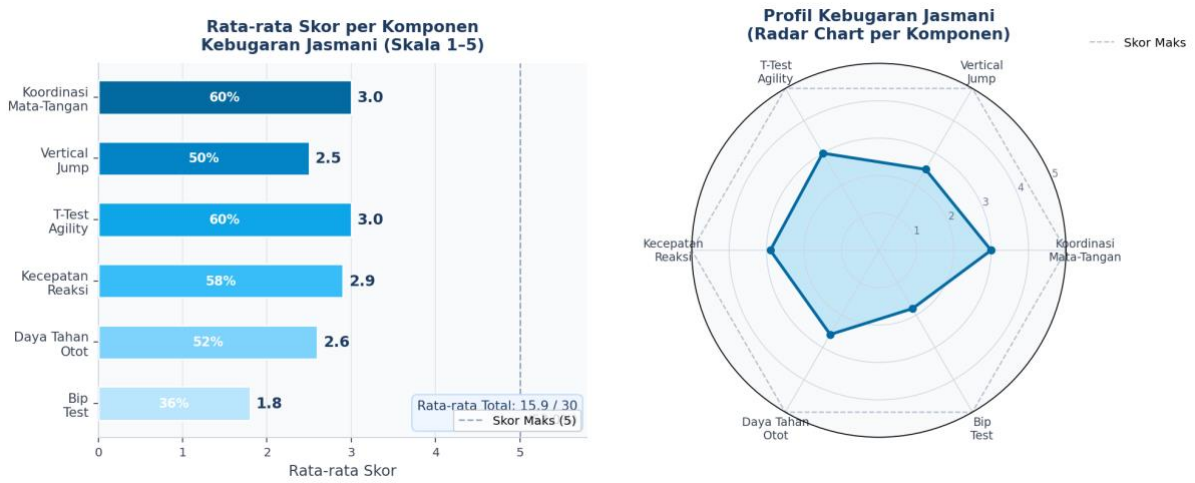


**Figure 2**. Recapitulation of Student Physical Fitness Test Data

The results of the Spearman correlation test showed that there was a very strong and significant positive relationship between the habit of playing Mobile Legends and the physical fitness of STKIP Melawi students. The value of the correlation coefficient obtained was r = 0.969 with a significance value of p < 0.001. Based on the correlation interpretation criteria, these values fall into the category of very strong. This means that the higher the score of Mobile Legends playing habits, the higher the physical fitness score of students in this study sample.

**Table 4**. The relationship of online gaming habits with physical fitness

| | | | Physical Fitness | Playing Habits GO |
|---|---|---|---|---|
| Spearman's rho | Physical Fitness | Correlation Coefficient | 1.000 | .969** |
| | | Sig. (2-tailed) | . | <.001 |
| | | N | 30 | 30 |
| | Playing Habits GO | Correlation Coefficient | .969** | 1.000 |
| | | Sig. (2-tailed) | <.001 | . |
| | | N | 30 | 30 |

**. Correlation is significant at the 0.01 level (2-tailed).

These findings show a consistent pattern of relationship between gaming habits and physical fitness in respondents. However, the interpretation of the results must be carried out proportionately because the research design is correlational and ex post facto. Thus, the results of the study cannot be used to state that playing Mobile Legends directly leads to an increase in physical fitness. Very strong correlations can be influenced by other factors, such as the background of the course of study, the involvement of students in physical education practices, exercise habits, daily physical activity, or the characteristics of the sample. In the student fitness literature, physical activity, sedentary behavior, body mass index, physical literacy, and daily movement habits have been reported as contributing factors to physical fitness variation (Jiang et al., 2023; Król et al., 2022).

Further analysis shows that all dimensions of Mobile Legends playing habits have a positive and significant relationship with physical fitness. The physical impact dimension had the highest correlation with physical fitness, which was r = 0.897; p < 0.001. The physical activity dimension also showed a very strong relationship with physical fitness, namely r = 0.879; p < 0.001. Furthermore, playing patterns were strongly correlated with physical fitness by r = 0.780; p < 0.001, while playing intensity showed a correlation of r = 0.729; p < 0.001.

**Table 5**. The relationship between physical fitness and the components of online gaming habits

| Spearman's rho | | Physical Fitness | Intensity of Play | Pattern | Physical Impact | Physical Activity |
|---|---|---|---|---|---|---|
| Physical Fitness | Correlation Coefficient | 1.000 | .729** | .780** | .897** | .879** |
| | Sig. (2-tailed) | . | <.001 | <.001 | <.001 | <.001 |
| Intensity of Play | Correlation Coefficient | .729** | 1.000 | .672** | .574** | .498** |
| | Sig. (2-tailed) | <.001 | . | <.001 | <.001 | .005 |
| Pattern | Correlation Coefficient | .780** | .672** | 1.000 | .712** | .725** |
| | Sig. (2-tailed) | <.001 | <.001 | . | <.001 | <.001 |
| Physical Impact | Correlation Coefficient | .897** | .574** | .712** | 1.000 | .831** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | . | <.001 |
| Physical Activity | Correlation Coefficient | .879** | .498** | .725** | .831** | 1.000 |
| | Sig. (2-tailed) | <.001 | .005 | <.001 | <.001 | . |

**. Correlation is significant at the 0.01 level (2-tailed).

These results show that the relationship between playing habits and fitness does not only appear in the total score but also appears in the supporting dimensions. The high relationship with the physical activity dimension shows that students who actively play Mobile Legends in this sample are likely to still have adequate physical involvement outside of gaming activities. This is an important aspect because several studies confirm that adequate physical activity is an important determinant in maintaining or improving student fitness, while a high duration of device use can be a risk factor if it replaces physical activity time (W. Li et al., 2022; Sun & Hu, 2026).

The correlation between *Mobile Legends* playing habits and the physical fitness component shows that all fitness components have a positive and significant relationship with the playing habit score. The highest association was found on reaction speed ($r = 0.935$; $p < 0.001$), followed by agility ($r = 0.931$; $p < 0.001$), *vertical jump* ($r = 0.890$; $p < 0.001$), muscle endurance ($r = 0.865$; $p < 0.001$), eye-hand coordination ($r = 0.824$; $p < 0.001$), and $VO_2Max$ ($r = 0.775$; $p < 0.001$).

**Table 6**. The relationship of online gaming habits with the physical fitness component

| Spearman's rho | | Playing Habits ML | Hand eye coordination | | Agility | Speed Reaction | Muscle Endurance | Vo2Max |
|---|---|---|---|---|---|---|---|---|
| Playing Habits ML | Correlation Coefficient | 1.000 | .824** | .890** | .931** | .935** | .865** | .775** |
| | Sig. (2-tailed) | . | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 |
| Hand eye coordination | Correlation Coefficient | .824** | 1.000 | .697** | .775** | .725** | .664** | .780** |
| | Sig. (2-tailed) | <.001 | . | <.001 | <.001 | <.001 | <.001 | <.001 |
| Vertical Jump | Correlation Coefficient | .890** | .697** | 1.000 | .822** | .878** | .833** | .663** |
| | Sig. (2-tailed) | <.001 | <.001 | . | <.001 | <.001 | <.001 | <.001 |
| Agility | Correlation Coefficient | .931** | .775** | .822** | 1.000 | .893** | .826** | .764** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | . | <.001 | <.001 | <.001 |
| Speed Reaction | Correlation Coefficient | .935** | .725** | .878** | .893** | 1.000 | .919** | .675** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | . | <.001 | <.001 |
| Muscle Endurance | Correlation Coefficient | .865** | .664** | .833** | .826** | .919** | 1.000 | .722** |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | <.001 | . | <.001 |
| Vo2Max | Correlation Coefficient | .775** | .780** | .663** | .764** | .675** | .722** | 1.000 |
| | Sig. (2-tailed) | <.001 | <.001 | <.001 | <.001 | <.001 | <.001 | . |

**. Correlation is significant at the 0.01 level (2-tailed).

The highest correlation in reaction speed and agility is understandable because MOBA games like Mobile Legends require players to respond quickly to visual stimuli, determine strategies in a

short period of time, and perform repetitive coordination of finger movements and visual attention. Although gaming activities are not the same as conventional physical exercises, the cognitive-motor aspects of competitive play can relate to visual coordination, response speed, and attention abilities. Several studies on digital gaming and e-sports explain that the gaming experience is influenced by the interaction between fun, intensity, motivation, strategy, and player engagement in a digital competitive environment (Kishimoto et al., 2021; Ong et al., 2023).

However, the positive correlation on $VO_2$Max needs to be interpreted carefully. Although the statistical relationship shows strong values, the average $VO_2$Max value is the lowest compared to the other fitness components. This shows that the habit of playing Mobile Legends cannot be considered as enough activity to increase cardiorespiratory endurance. Increasing $VO_2$Max still requires structured, sustained, and adequately intensely intense aerobic physical activity, such as cardiorespiratory exercises, HIIT, game sports, or campus-based physical activity programs (Casimiro-Andújar et al., 2023; Manh Nguyen & Tri Nguyen, 2026; Srisuk, 2024).

The results showed that the habit of playing Mobile Legends had a very strong and significant positive relationship with the physical fitness of STKIP Melawi students ($r = 0.969$; $p < 0.001$), which means that students with higher playing habits scores tended to have better physical fitness scores in this study sample. Descriptively, most students are in the category of high playing habits (56.7%), while the average physical fitness reaches 15.90 out of a maximum score of 30. Positive associations were also seen in all dimensions of play habits, especially physical impact ($r = 0.897$) and physical activity ($r = 0.879$), as well as in all components of physical fitness, with the highest correlation on reaction speed ($r = 0.935$), agility ($r = 0.931$), and *vertical jump* ($r = 0.890$). These findings indicate that students who actively played *Mobile Legends* in this study were likely to have cognitive-motor involvement and supporting physical activity related to coordination, reaction, agility, and general fitness. However, the lowest average $VO_2$Max value (1.80) indicates that gaming habits cannot be positioned as a substitute for aerobic physical exercise. Therefore, these results need to be interpreted as a correlational relationship, not a cause-and-effect relationship, as a student's physical fitness can also be influenced by sports activities, program background, lifestyle, and physical activity habits outside of gaming.

## DISCUSSION

The findings of the study show that the habit of playing Mobile Legends is positively related to the physical fitness of STKIP Melawi students. Rationally, this result is understandable because the study respondents not only played the role of gamers but were also students who were in a college environment with certain academic activities and physical practices. In this context, the habit of playing Mobile Legends does not stand alone as a purely sedentary behavior, but rather interacts with physical activity patterns, program backgrounds, and student sports habits.

MOBA games like Mobile Legends require players to maintain visual attention, respond quickly to stimuli, coordinate finger and eye movements, and make decisions in competitive situations. Therefore, the association that arises with skill-based fitness components, such as coordination, reaction, and agility, can be explained by the presence of repetitive cognitive-motor stimulation during play. However, the relationship should not be interpreted as evidence that gaming directly improves physical fitness, as fitness remains influenced by actual physical activity, exercise intensity, daily movement habits, body composition, and sedentary behavior (Guo et al., 2022; Król et al., 2022; Sampaio et al., 2026).

The results of this study are supported by a study that explains that digital activities and competitive games can involve certain aspects of motivation, strategy, play loyalty, social interaction, and cognitive skills. Studies on Mobile Legends show that players engage with the game due to the elements of fun, experience value, satisfaction, intensity of play, and strong competitive interaction (Jahrir et al., 2025; Kristanto & Andono, 2024; Ong et al., 2023). These findings are in line with the understanding that competitive gaming is not only passive, but also demands focus, quick response, and decision-making. In addition, research on student physical activity confirms that individuals with better movement habits tend to have better physical fitness as well (Sampaio et al., 2026; Srisuk, 2024; C. Zhang et al., 2022).

However, the results of this study also need to be positioned critically because there are contradictions with several studies that highlight the negative impact of the duration of playing games or high use of gadgets on physical health. Excessive playing duration is reported to be associated with the risk of sedentary behavior, time management disorders, decreased physical activity, musculoskeletal complaints, and impaired hand function in e-sports players (Jaspe et al., 2026; Machfiroh et al., 2021; Pradnyadewi et al., 2024; Sun & Hu, 2026). Thus, these differences in results are likely influenced by sample characteristics, levels of physical activity outside of the game, and the context of physical education in a campus setting.

Theoretically, the results of this study can be explained through the relationship between cognitive-motor activity, skill-based fitness, and physical activity behavior. *Mobile Legends* as a MOBA game demands integration between visual perception, selective attention, eye-hand coordination, reaction speed, and decision control. These activities can be related to neuromotor components that are also part of physical fitness, especially coordination, agility, and reactions. Studies of open-skill sports show that activities that demand responses to variable stimuli may be related to executive function and adaptive motor abilities (Li et al., 2024).

On the other hand, physical fitness that is cardiorespiratory and muscular still requires systematic, measurable, and repetitive physical exercise. Various studies show that physical activity programs, HIIT, intensive exercise, physical education learning models, fitness apps, and technology-based interventions can improve the fitness component of students more markedly than passive digital activities (Casimiro-Andújar et al., 2023; Kristiyandaru et al., 2023; Wittmar et al., 2025). Therefore, the development interpretation of this study is that the habit of playing *Mobile Legends* can be understood as a digital cultural phenomenon that is related to the cognitive-motor aspect, but it still needs to be balanced with a structured physical activity program so that cardiorespiratory fitness and student health fitness can develop optimally.

The practical implication of this study is the need for higher education institutions to view gaming habits more proportionally. Online games do not need to be positioned only as a threat to fitness but can be used as an entrance to design physical activity education that is close to students' digital culture. The campus can develop fitness coaching programs for the *Mobile Legends* or e-sports player community through regular fitness checks, playtime management education, stretching exercises to prevent musculoskeletal complaints, as well as aerobic and muscle-strengthening programs to improve long sitting durations. Physical education programs can also integrate digital approaches, fitness apps, community-based physical activity challenges, or hybrid learning models to make students more motivated to move (Ahumada-Newhart et al., 2024; Godoy-Cumillaf et al., 2026; Suherman & Sultoni, 2021).

For students, the results of this study confirm the importance of maintaining a balance between gaming and physical activities. Playing *Mobile Legends* can provide a competitive, social, and cognitive experience, but it cannot replace the physical exercise needed to improve cardiorespiratory endurance, muscle strength, and long-term health. Follow-up research needs to control for variables of sitting duration, sleep quality, nutritional status, study program, sports activities, and exercise intensity to better elucidate the relationship between gaming habits and physical fitness.

## CONCLUSION

These findings show that students who have higher play habits tend to have better physical fitness scores in this study sample. Descriptively, most students are in the category of high playing habits, while the level of physical fitness in general is in the medium category. Relatively prominent components of fitness are eye-hand coordination, agility, and reaction speed. This shows that the habit of playing Mobile Legends is related to fitness aspects related to cognitive-motor skills, quick response, and movement coordination. However, the $VO_2$Max component obtained the lowest average score, so the cardiorespiratory endurance of students still needs special attention. The results of this study confirm that the habit of playing Mobile Legends cannot be understood singularly as a behavior that always has a negative impact on physical fitness. In the context of STKIP Melawi students, the habit of playing games seems to be related to physical fitness, especially because of the possibility of involvement in physical activities, the background of the study program, and sports activities outside of games. However, these findings cannot be used to state a cause-and-effect relationship because the study used an ex post facto correlational design. Therefore, students still need to maintain a balance between playing games and structured physical activities. Higher education institutions are advised to develop physical fitness coaching programs that are relevant to students' digital cultures, including playtime management education, increased physical activity, aerobic exercise, and regular fitness monitoring. Further research needs to involve larger samples, longitudinal or experimental designs, as well as control of variables of physical activity, sleep quality, nutritional status, and duration of play.

## RECOMMENDATION

Based on the results of the research, several recommendations can be submitted. First, students need to maintain a balance between their habit of playing Mobile Legends online games and daily physical activity. Although the results show a positive relationship between gaming habits and physical fitness, gaming activities cannot replace structured physical exercise, especially to improve cardiorespiratory endurance. Second, students who actively play Mobile Legends are advised to adjust the duration of play, avoid the habit of sitting for too long, stretch regularly, maintain sleep quality, and continue to participate in sports activities regularly. Playing time is important so that digital activities do not interfere with physical health, academic activities, and lifestyle balance. Third, STKIP Melawi can develop a physical fitness coaching program that is more contextual with the digital culture of students. The program can be in the form of periodic fitness checks, sports time management education, aerobic exercises, muscle strengthening, and recreational sports activities involving the student community of gamers or campus e-sports. Fourth, physical education lecturers and study program managers can take advantage of the phenomenon of Mobile Legends' popularity as an educational approach to increase student awareness of the importance of physical fitness. This approach can be done through the integration of physical activity, fitness challenges, or simple

exercise programs associated with the student's digital community. Fifth, further research is recommended using a larger sample number, involving students from various universities, and using longitudinal or experimental designs. Follow-up research also needs to control for other variables such as play duration, daily physical activity, sleep quality, nutritional status, study program background, and exercise habits so that the relationship between gaming habits and physical fitness can be explained more deeply.

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