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Competitive Engagement in Mobile Legends and Physical Activity among Indonesian Lower Secondary Students

Ahmad Rohadiyanto[1], Arnaz Anggoro Saputro[1]

[1]Physical Education Study Program, Faculty of Teacher Training and Education, Universitas PGRI Jombang, Indonesia

Corresponding Author: arohadiyanto@gmail.com

Abstract

Objectives: To examine the association between competitive engagement in Mobile Legends: Bang Bang and self-reported physical activity among students participating in a school esports extracurricular program.

Materials and Methods: This cross-sectional correlational study included all 28 members of the Mobile Legends extracurricular program at SMP Negeri 1 Mojoagung, Jombang, Indonesia. All participants were boys in Grades VII–IX. Data were collected on 29 April 2026 using five-point Likert questionnaires covering competitive engagement and physical activity. The reported Cronbach's alpha coefficients were .826 and .807, respectively. Descriptive statistics and Shapiro–Wilk tests were followed by a two-tailed Spearman rank correlation at a significance level of .05.

Results: Mean competitive-engagement and physical-activity scores were 32.32 ± 4.02 and 18.39 ± 4.27, respectively. Competitive-engagement scores departed from normality ($p = .001$), whereas physical-activity scores did not ($p = .315$). The association was positive and weak but not statistically significant ($\rho = .287$, $p = .138$).

Conclusions: The study did not detect a statistically significant association between competitive engagement and self-reported physical activity in this small school-based sample. The result does not establish the absence of an association or the effects of gaming on activity. Future studies should clarify questionnaire scoring, use larger multisite samples, and assess activity objectively alongside gaming duration and school-related factors.

Keywords: esports; Mobile Legends; competitive engagement; physical activity; lower secondary students

Introduction

School esports programs create a setting in which digital competition becomes part of students' extracurricular lives. Mobile Legends: Bang Bang is a multiplayer online battle arena game in which players coordinate team actions, respond to opponents, and pursue competitive goals. For physical education teachers, the relevant question is how such engagement relates to students' activity outside the game. Competitive interest, time spent playing, and problematic gaming describe different aspects of participation and should not be treated as interchangeable exposures.

Physical activity remains an important consideration during adolescence. The World Health Organization guidelines recommend an average of at least 60 minutes per day of moderate-to-vigorous physical activity across the week for children and adolescents, together with limiting sedentary time, particularly recreational screen time (Bull et al., 2020). These recommendations concern movement duration and intensity. A general agreement-based questionnaire cannot establish compliance with them unless its scoring has been validated for that purpose.

Existing esports research does not support a single profile of physical activity among players. In an international survey of 1,772 players, Trotter et al. (2020) found that those

in the highest rank group reported more physical activity than other players, although many players did not meet activity recommendations. Giakoni-Ramírez et al. (2022) reported moderate or high self-reported activity among most of their professional-player sample. Conversely, Chan et al. (2022) identified associations between online gaming and unfavorable lifestyle outcomes across a broader research literature. Differences in player populations, exposure definitions, and measurement methods complicate direct comparison.

Measurement is especially important in this field. Nicholson et al. (2024) compared questionnaire reports with accelerometer data in an esports subsample and found overreporting of activity. Their findings caution against equating a favorable questionnaire score with objectively measured movement. School-based evidence also requires attention to context: participation in a supervised esports program differs from unsupervised leisure gaming and from the routines of professional players.

The present study focuses on competitive engagement, operationalized through achievement motivation, orientation toward winning, intensity of competitive involvement, and participation in competition. This composite differs from an objective in-game rank and does not measure a gaming-disorder diagnosis. Bányai et al. (2019) demonstrated that esports and recreational players can differ in gaming motivations, supporting the need to specify which aspect of gaming is being studied. Evidence about gaming addiction therefore cannot directly answer whether students with stronger competitive engagement are more or less physically active.

The study examined this association among members of the Mobile Legends extracurricular program at SMP Negeri 1 Mojoagung. Its contribution is a context-specific examination of a competitive-engagement questionnaire alongside self-reported activity in lower secondary education. The objective was to estimate the direction and strength of the association, without assuming that gaming necessarily displaces movement or that competitive involvement promotes it.

Materials and Methods

Study Design

A quantitative, nonexperimental, cross-sectional correlational design was used. Competitive engagement in Mobile Legends and self-reported physical activity were measured at the same assessment. No intervention was administered, and the design did not establish temporal ordering or causal effects.

Study Participants

The study was conducted at SMP Negeri 1 Mojoagung, Jombang Regency, East Java, Indonesia, on 29 April 2026. All 28 students enrolled in the school's Mobile Legends extracurricular program were included through total-population sampling. All participants were boys from Grades VII, VIII, and IX, with Grade IX constituting the largest group. Exact ages and grade-specific frequencies were not available in the reported dataset. The sample represents this extracurricular group rather than all students at the school.

Study Organization

Research permission was arranged with Universitas PGRI Jombang and the school, followed by coordination with the principal and the extracurricular supervisor. The questionnaires were reviewed by two experts and piloted with students outside the main sample who had similar characteristics. Participants subsequently completed the

questionnaires independently. Responses were coded and tabulated for analysis in IBM SPSS; the software version was not specified in the source report.

Both questionnaires used five response categories: strongly agree, agree, undecided, disagree, and strongly disagree. Competitive engagement covered achievement motivation, orientation toward winning, intensity of competitive involvement, and competitive participation. The physical-activity questionnaire covered frequency, duration, and intensity. Each instrument initially contained 15 items. The source reported 13 valid competitive-engagement items and 10 valid physical-activity items, with Cronbach's alpha coefficients of .826 and .807, respectively. These coefficients indicate internal consistency in the reported testing context; they do not establish criterion validity against measured gaming behavior or physical activity.

Institutional and school permission were reported. The ethics-review status and the procedures for parental or guardian consent and student assent require completion before submission: [insert the reviewing body, approval or exemption details as applicable, and the consent and assent procedures actually followed].

Statistical Analysis

Descriptive statistics comprised sample size, observed minimum and maximum, mean, and standard deviation. Shapiro–Wilk tests were used to examine score distributions. Because competitive-engagement scores departed from normality and the scores arose from Likert-type responses, the association was evaluated using Spearman's rank correlation. This coefficient describes a monotonic association between ranked observations; its magnitude should be interpreted separately from statistical significance (Schober et al., 2018). A two-tailed p value below .05 was the threshold for statistical significance.

The reported analysis was bivariate and did not adjust for potential confounding variables. No regression model was fitted. Raw participant-level data were unavailable for reanalysis, confidence-interval estimation, or examination of the score coding. The numerical results below reproduce the source output. Category labels such as low physical activity or moderate competitiveness are not applied because reproducible cutoffs and a verified scoring scheme were not supplied.

Results

Participant and Instrument Characteristics

The analytical sample comprised 28 boys participating in the school's Mobile Legends extracurricular program. Both variables had 28 observations in the supplied SPSS tables. Table 1 summarizes the reported instrument-testing results.

Table 1. Reported questionnaire testing results

Questionnaire	Initial items	Items reported valid	Cronbach's α
Competitive engagement	15	13	.826
Physical activity	15	10	.807

The instruments had similar reported internal-consistency coefficients, while the physical-activity scale had more items excluded during validity testing. The validity procedure, pilot sample size, and relationship between the retained items and final score totals remain insufficiently documented. These limitations affect the interpretation of the scores rather than supplying evidence about the amount of activity performed.

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Descriptive Statistics

Table 2. Descriptive statistics for the reported questionnaire scores

Variable	n	Minimum	Maximum	Mean	SD
Competitive engagement	28	18.00	38.00	32.32	4.02
Physical activity	28	7.00	25.00	18.39	4.27

Note. Values reproduce the supplied SPSS output. Scores are questionnaire units, not minutes, steps, or energy expenditure. The physical-activity minimum requires reconciliation with the stated retained-item count and response scale.

Competitive-engagement scores averaged 32.32 (SD = 4.02), whereas physical-activity scores averaged 18.39 (SD = 4.27). Table 2 describes the distribution of the reported totals. It does not establish the proportion meeting physical-activity recommendations or support comparisons of the absolute magnitude of the two constructs, because their scoring ranges and meanings differ.

Distribution Checks and Correlation

Table 3. Shapiro–Wilk tests and Spearman correlation

Analysis	Variable or association	Statistic	p
Shapiro–Wilk	Competitive engagement	W not reported	.001
Shapiro–Wilk	Physical activity	W not reported	.315
Spearman correlation	Competitive engagement with physical activity	$\rho = .287$	.138

Competitive-engagement scores departed from normality, while the physical-activity distribution did not show a statistically significant departure. The Spearman coefficient was positive and weak ($\rho = .287$), but its two-tailed p value exceeded .05. The study therefore did not detect a statistically significant monotonic association. Failure to reject the null hypothesis should not be interpreted as demonstrating that the true association is zero. Neither the relative importance of other determinants nor the effect of school policies was tested.

Discussion

Interpretation of the Main Finding

The principal finding was a weak positive sample correlation that did not reach statistical significance. This result provides no evidence of a statistically significant association in the measured group, but it also does not justify concluding that competitive engagement is unrelated to activity in the wider student population. With 28 participants, a context-specific sample, and unresolved measurement details, the estimate should be treated as preliminary. The study did not test whether competitive engagement predicts future activity or whether esports participation changes movement behavior.

Competitive engagement is particularly important to distinguish from duration and disorder. A student may strongly value winning or improving performance without spending the same amount of time gaming as another equally motivated player. Conversely, prolonged play may occur for reasons unrelated to competition. Bányai et al. (2019) found different motivational profiles between esports and recreational players, including stronger competition and skill-development motives in esports participants. This supports conceptual differentiation, but does not establish that competitive motivation protects physical activity in adolescents.

Comparison with Previous Research

Trotter et al. (2020) found greater self-reported activity among players in the highest rank group in their international esports survey. The positive direction of the present estimate is compatible with the possibility that competitive involvement and activity coexist. However, the studies measured different exposures: reported in-game rank categories in the earlier survey versus a competitive-engagement composite here. Their populations and activity instruments also differed. The present nonsignificant result cannot be presented as a replication of a rank-related association.

Giakoni-Ramírez et al. (2022) reported that 92.7% of 260 male professional players had moderate or high self-reported activity. Their analysis also found inverse relationships between motivational orientations and energy expenditure. This combination illustrates why participation status, motivation, and activity should be examined separately. Professional players' schedules and support systems differ substantially from school extracurricular routines, preventing direct transfer of their activity prevalence to this sample.

School-based evidence offers a closer contextual comparison. Trotter et al. (2022) examined students in Australian high school esports programs and comparison groups. They reported no baseline or post-test differences in physical activity between groups, although activity declined over time in both during the pandemic period. Substantial attrition and pandemic disruption limited interpretation. Their findings nonetheless show why school esports participation should be examined within the wider educational environment rather than automatically treated as a marker of inactivity.

In Indonesia, Adistya et al. (2022) examined 143 students at SMPN 1 Srengat and reported an association between online-game addiction and physical activity. The study used the Game Addiction Scale and the short-form International Physical Activity Questionnaire. The outcome differs from the present result, but the exposure and measurement methods also differ. An association involving addiction scores does not imply that an equivalent association must occur for competitive engagement.

The broader synthesis by Chan et al. (2022) documented associations between online gaming and unfavorable activity, dietary, and sleep outcomes. The present study does not overturn that evidence. It addresses one game, one extracurricular group, and one engagement construct using a small cross-sectional dataset. Differences in gaming definitions and social settings may contribute to variation across studies, but these explanations require direct testing.

School Context and Practical Implications

The source report described a school requirement to participate in at least three extracurricular activities, including compulsory scouting, and a supervisor's rule against Mobile Legends play after 21:00. It also described students walking or cycling to school and opportunities to join sports activities. These contextual observations suggest possible pathways through which gaming and movement may coexist. However, extracurricular participation, adherence to the gaming-time rule, travel mode, and daily movement were not quantified as covariates. They cannot be identified as the causes of the observed correlation or as stronger determinants than competitive engagement.

Gaasedal et al. (2024) examined opportunities and preferences for physical activity among young Danish esports players. Only one in five reported that their association offered activity, and many used the opportunity when it was available. Although this club setting differs from an Indonesian school, it suggests a useful practical question: what

accessible movement opportunities does an esports program provide? Schools could coordinate esports and sports schedules, offer active breaks, and monitor participation. These are proposed applications rather than interventions evaluated by the present study.

Physical education staff should assess students' actual movement opportunities rather than infer inactivity from esports membership or infer adequate activity from competitive motivation. Monitoring should distinguish gaming time, sitting time, active travel, organized sport, and physical education participation. The guidelines summarized by Bull et al. (2020) provide a health-oriented reference, but the present questionnaire cannot determine compliance. The nonsignificant correlation therefore provides no basis for relaxing support for an active daily routine.

Measurement Limitations and Future Research

Nicholson et al. (2024) provide a particularly relevant methodological comparison. Their study included 796 survey respondents and an 18-player accelerometer subsample, in which self-reported moderate-to-vigorous activity was higher than device-measured activity. This does not show that the same reporting error occurred here, but it demonstrates why questionnaire scores need external validation. Internal consistency alone does not resolve recall error, social desirability, or uncertainty about what respondents count as activity.

Several limitations constrain this study. The small, male-only sample from a single extracurricular program limits generalizability to girls, nonmembers, other schools, and other games. Including the whole program improves coverage of that group but does not ensure representation of adolescents more broadly. The cross-sectional design prevents causal or temporal conclusions. The bivariate analysis did not account for gaming duration, competitive rank, sport participation, active travel, sleep, or other potentially relevant characteristics. Exact ages, grade frequencies, and detailed questionnaire-development procedures were not reported.

A further limitation concerns score interpretation. The source reports ten valid physical-activity items with five response options but an observed minimum score of seven. This is incompatible with a simple sum if items are coded from one to five. An alternative coding or transformation may explain the total, but the available records do not specify one. This discrepancy should be resolved against the questionnaire and participant-level data before the inferential results are regarded as final. Until then, neither low-activity categories nor comparisons with guideline thresholds are warranted.

Future research should document item coding, scoring ranges, validity evidence, and the recall period, and should recruit larger multisite samples with broader participant representation. A combination of accelerometry, gaming logs, and clearly defined motivational measures would help separate movement from gaming exposure. Longitudinal data could establish temporal ordering, while appropriately planned adjusted analyses could examine school and family factors. Such designs would address questions that the present correlation cannot answer.

Conclusions

This study did not detect a statistically significant association between competitive engagement in Mobile Legends and self-reported physical activity among boys enrolled in one school esports program. Competitive engagement should be distinguished from playing duration, gaming disorder, and objective competitive rank. Schools should continue to provide movement opportunities and assess activity directly, without treating esports participation alone as evidence of inactivity. Clarification of questionnaire scoring

and further research using larger samples and objective activity assessment are needed before broader conclusions can be drawn.

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Conflict of Interest

The authors declare no conflicts of interest in the conduct of the research, data analysis, manuscript preparation, or publication of this article.

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