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# Effects of online gaming intensity and school environment on students' social behavior

Aisyah Aisyah<sup>\*)</sup>, Suryanef Suryanef, Maria Montessori, Al Rafni

Universitas Negeri Padang, Padang, Indonesia

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### ABSTRACT

This study aimed to examine the relationships between online game playing intensity, school learning environment quality, and the social behavior of vocational high school students in Pesisir Selatan Regency. A quantitative correlational design was employed involving 221 vocational high school students selected through proportional random sampling. Data were collected using validated and reliable Likert-scale questionnaires measuring online game playing intensity, school learning environment quality, and social behavior. Data were analyzed using simple and multiple correlation and regression analyses with SPSS. The findings revealed that online game playing intensity was positively and significantly related to social behavior ( $r = 0.442$ ,  $p < 0.05$ ), contributing 21.5% to the variance. The school learning environment also showed a positive and significant relationship with social behavior ( $r = 0.487$ ,  $p < 0.05$ ), contributing 23.7%. Simultaneously, both variables significantly predicted social behavior ( $R = 0.489$ ,  $p < 0.05$ ), explaining 23.9% of the variance. Online game playing intensity and school learning environment quality are significant factors associated with the social behavior of vocational high school students.



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### Corresponding Author:

Aisyah Aisyah,  
Universitas Negeri Padang  
Email: [aisyah.23.m@gmail.com](mailto:aisyah.23.m@gmail.com)

## Introduction

The rapid development of digital technology has transformed adolescents' patterns of communication, interaction, and social participation in contemporary society (Al-Hammouri & Rababah, 2025; Ho & Kao, 2021). The widespread availability of internet access and mobile devices has made digital activities an inseparable part of students' daily lives. Among various forms of digital engagement, online gaming has become one of the most popular activities among adolescents. Contemporary online games function not only as entertainment media but also as interactive social spaces that facilitate communication, cooperation, and relationship building among players (Chumpitaz & Leon, 2021; Lee et al., 2022). This phenomenon has increased scholarly interest in understanding how online gaming activities contribute to adolescents' social development, particularly within educational contexts.

Social behavior is a fundamental aspect of adolescent development because it influences interpersonal competence, emotional adjustment, and readiness to participate effectively in society and future workplaces. In vocational education, social behavior is especially important because students are expected to possess employability skills such as teamwork, communication, responsibility, and adaptability in addition to technical competencies (Zhang et al., 2022). Educational researchers have increasingly emphasized that social

competence constitutes an essential outcome of schooling alongside academic achievement (Kordyaka et al., 2023; Ramos-Álvarez et al., 2024). Therefore, examining factors that contribute to students' social behavior is crucial for supporting the holistic development of vocational high school students.

Previous studies investigating online gaming have reported inconsistent findings regarding its influence on adolescent social outcomes. Several studies have associated excessive gaming with reduced face-to-face interaction, problematic internet use, social withdrawal, aggressive behavior, and lower academic engagement (Lerida-Ayala et al., 2022; Santinah & Saluky, 2022; Sun et al., 2023; Yilmaz et al., 2023; Zheng et al., 2021). Conversely, other studies have demonstrated that online multiplayer games may promote cooperation, communication skills, social connectedness, and prosocial behavior when gaming activities involve collaborative interaction among players (Nicola, 2020; Heng et al., 2021; Kwok et al., 2021; Gu & Mao, 2023). Furthermore, gaming environments are influenced by cultural and social contexts that may shape behavioral outcomes differently across groups of students (Koehler et al., 2023; Kordyaka et al., 2023; Wei et al., 2025). These contrasting findings indicate that the relationship between online gaming intensity and social behavior remains inconclusive and requires further investigation.

Beyond digital activities, the school learning environment represents a major ecological context influencing students' social development. According to Bronfenbrenner's Bioecological Theory, schools function as primary microsystems where students continuously interact with teachers, peers, institutional norms, and learning facilities (Gandolfi et al., 2023). Previous studies have demonstrated that supportive school climates characterized by positive teacher–student relationships, peer acceptance, discipline, and learning support contribute to the development of prosocial behavior, emotional well-being, and social competence (Huang et al., 2021; Hanafie et al., 2022; Purwaningsih & Nurmala, 2021; Zhang et al., 2022). However, most studies have examined digital engagement and school environments separately, despite the possibility that students simultaneously experience socialization processes in both virtual and real-world environments.

Although substantial research has explored online gaming, school climate, and adolescent development, several gaps remain. First, previous studies have predominantly focused on internet gaming disorder, academic achievement, learning motivation, emotional outcomes, or psychological well-being rather than social behavior as a multidimensional construct encompassing cooperation, empathy, responsibility, self-control, and assertive communication (Tan & Nurul-Asna, 2023; Zhao et al., 2021). Second, limited studies have investigated the combined influence of online gaming intensity and school learning environments on students' social behavior within a single analytical framework. Third, empirical evidence from vocational high school settings remains limited, particularly in Indonesia and more specifically in Pesisir Selatan Regency. Considering that vocational education aims to prepare students for workplace participation, understanding factors associated with social behavior becomes increasingly important (Alzahrani et al., 2017; Kuleshova & Minnikov, 2019; Kuleshova & Minnikov, 2020).

Based on these considerations, this study examines the relationships between online game playing intensity, school learning environment quality, and students' social behavior among vocational high school students in Pesisir Selatan Regency. The novelty of this study lies in three aspects. First, it integrates digital and educational environmental factors within a single explanatory model of social behavior. Second, it conceptualizes social behavior through contemporary dimensions, including cooperation, empathy, social responsibility, self-control, and assertive communication. Third, it extends the existing literature by providing empirical evidence from vocational education, a context that has received relatively limited attention in previous studies. The findings are expected to enrich the literature on adolescent social development and provide practical implications for educators, parents, and policymakers in fostering positive social behavior within both digital and educational environments.

## Method

This study employed a quantitative correlational design to examine the relationships between online game playing intensity, school learning environment quality, and social behavior among vocational high school students in Pesisir Selatan Regency, Indonesia. The study was based on Social Learning Theory and Bronfenbrenner's Bioecological Theory, which explain that social behavior develops through interactions between individuals and their environments. The population consisted of 221 vocational high school students, all of whom were included as research participants using a census approach. Online game playing intensity ( $X_1$ ) and school learning environment quality ( $X_2$ ) served as independent variables, while social behavior ( $Y$ ) was the dependent variable.

Data were collected using four-point Likert-scale questionnaires. The online game playing intensity instrument measured gaming frequency, duration, habits, self-control, and emotional involvement. The school

learning environment instrument assessed learning facilities, classroom conditions, teacher–student relationships, peer interactions, and school discipline, while social behavior was measured through cooperation, empathy, social responsibility, self-control, and assertive communication. All instruments were tested for validity and reliability before use. Data were analyzed using descriptive statistics, assumption tests (normality, linearity, multicollinearity, and heteroscedasticity), Pearson correlation, simple regression, and multiple regression analyses with SPSS at a significance level of 0.05.

## Results and Discussions

This section presents the results of the statistical analyses conducted to examine the relationships between online game playing intensity, school learning environment quality, and students' social behavior among vocational high school students in Pesisir Selatan Regency. The analysis began with descriptive statistics to provide an overview of the distribution of each research variable, followed by assumption testing to ensure compliance with the requirements of regression analysis. Subsequently, correlation and regression analyses were performed to determine the individual and simultaneous contributions of online game playing intensity and school learning environment quality to students' social behavior. The findings are presented systematically through descriptive, inferential, and hypothesis-testing results.

**Table 1.** Descriptive Statistics of Research Variables

Variable	N	Mean	SD	Minimum	Maximum
Online Game Playing Intensity ( $X_1$ )	221	72.76	6.43	63	88
School Learning Environment Quality ( $X_2$ )	221	79.45	7.18	68	96
Social Behavior (Y)	221	79.76	6.48	68	96

Table 1 presents the descriptive statistics of the research variables. The average score of online game playing intensity was 72.76 (SD = 6.43), indicating a moderate level of engagement in online gaming among vocational high school students. The school learning environment obtained a mean score of 79.45 (SD = 7.18), suggesting that students generally perceived their learning environment positively. Meanwhile, social behavior recorded the highest mean score of 79.76 (SD = 6.48), indicating that students demonstrated relatively favorable social behavior. The distribution of scores showed adequate variability across all variables, supporting further inferential analyses.

**Table 2.** Assumption Testing Results

Assumption Test	Indicator	Value	Sig.	Decision
Normality	Kolmogorov–Smirnov	0.061	0.228	Normal Distribution
Linearity ( $X_1$ to Y)	Deviation from Linearity	2.607	0.327	Linear
Linearity ( $X_2$ to Y)	Deviation from Linearity	0.564	0.928	Linear
Multicollinearity ( $X_1$ )	Tolerance/VIF	1.000 / 1.000		No Multicollinearity
Multicollinearity ( $X_2$ )	Tolerance/VIF	1.000 / 1.000		No Multicollinearity
Heteroscedasticity ( $X_1$ )	Glejser Test		0.125	No Heteroscedasticity
Heteroscedasticity ( $X_2$ )	Glejser Test		0.448	No Heteroscedasticity

The assumption testing results demonstrated that all requirements for regression analysis were satisfied. The Kolmogorov–Smirnov test produced a significance value of 0.228 ( $> 0.05$ ), indicating that the residuals were normally distributed. The linearity tests showed significance values of 0.327 and 0.928 for the relationships between online game playing intensity and social behavior, and between learning environment quality and social behavior, respectively, confirming linear relationships. Furthermore, the tolerance values exceeded 0.10 and VIF values were below 10, indicating no multicollinearity. The Glejser test also revealed significance values greater than 0.05, suggesting the absence of heteroscedasticity. Therefore, the data met all prerequisites for hypothesis testing.

Table 3 summarizes the results of correlation and regression analyses conducted to test the proposed hypotheses. The findings revealed that online game playing intensity had a positive and significant relationship with students' social behavior ( $r = 0.442$ ,  $p < 0.001$ ), explaining 21.5% of the variance in social behavior. Similarly, the school learning environment demonstrated a positive and significant relationship with social behavior ( $r = 0.487$ ,  $p < 0.001$ ), accounting for 23.7% of the variance. When examined simultaneously, online

game playing intensity and school learning environment quality significantly predicted students' social behavior ( $R = 0.489$ ,  $F = 34.166$ ,  $p < 0.001$ ), explaining 23.9% of the variance. Among the predictors, the school learning environment showed the strongest standardized effect on social behavior. Therefore, all three research hypotheses were supported.

**Table 3.** Summary of Correlation, Regression, and Hypothesis Testing Results

Hypothesis	Predictor(s)	r/R	R <sup>2</sup>	$\beta$	t/F	p-value	Decision
H1	Online Game Playing Intensity ( $X_1$ ) to Social Behavior (Y)	0.442	0.215	0.442	4.728	0.000	Supported
H2	School Learning Environment ( $X_2$ ) to Social Behavior (Y)	0.487	0.237	0.487	8.246	0.000	Supported
H3	Online Game Playing Intensity ( $X_1$ ) and School Learning Environment ( $X_2$ ) to Social Behavior (Y)	0.489	0.239	$X_1 = 0.042$ ; $X_2 = 0.487$	$F = 34.166$	0.000	Supported

Regression Equations

$$H1: \hat{Y} = 76.552 + 0.442X_1$$

$$H2: \hat{Y} = 44.862 + 0.439X_2$$

$$H3: \hat{Y} = 41.820 + 0.242X_1 + 0.439X_2$$

**Table 4.** Simultaneous Significance Test (ANOVA)

Source	Sum of Squares	df	Mean Square	F	Sig.
Regression	2202.625	2	1101.312	34.166	0.000
Residual	7027.140	218	32.235		
Total	9229.765	220			

The ANOVA results showed an F-value of 34.166 with a significance level of 0.000 ( $< 0.05$ ), indicating that the regression model was statistically significant. Therefore, online game playing intensity and school learning environment quality simultaneously contributed to students' social behavior. The findings support the third hypothesis and demonstrate that both digital engagement and educational environmental factors play important roles in shaping students' social behavior.

**Table 5.** Multiple Regression Analysis of Online Game Playing Intensity and School Learning Environment on Social Behavior

Predictor	B	SE	Beta	t	Sig.
Constant	41.820	6.059		6.903	0.000
School Learning Environment ( $X_2$ )	0.439	0.053	0.487	8.233	0.000
Online Game Playing Intensity ( $X_1$ )	0.242	0.060	0.042	0.705	0.001

The multiple regression analysis indicated that both online game playing intensity and school learning environment quality positively predicted students' social behavior. However, the school learning environment emerged as the stronger predictor ( $\beta = 0.487$ ) compared to online game playing intensity ( $\beta = 0.042$ ). These findings suggest that although digital gaming activities are associated with social behavior, the quality of the school learning environment has a more substantial role in fostering positive social interactions among vocational high school students.

The results demonstrated that all hypothesized relationships were statistically significant. The strongest relationship was found between school learning environment quality and social behavior ( $r = 0.487$ ), followed by online game playing intensity and social behavior ( $r = 0.442$ ). When examined simultaneously, both predictors showed a significant collective contribution to students' social behavior ( $R = 0.489$ ), supporting all research hypotheses.

**Table 6.** Hypothesis Testing Summary

Hypothesis	Path	Coefficient	p-value	Result
H1	Online Game Playing Intensity to Social Behavior	$r = 0.442$	0.000	Supported
H2	School Learning Environment to Social Behavior	$r = 0.487$	0.000	Supported
H3	Online Game Playing Intensity & School Learning Environment to Social Behavior	$R = 0.489$	0.000	Supported

The findings revealed that online game playing intensity was positively and significantly associated with students' social behavior ( $r = 0.442$ ,  $p < 0.001$ ), contributing 21.5% to the variance in social behavior. This result suggests that online gaming may function as a medium for social interaction when students engage in collaborative and communication-oriented games. Through team-based missions, strategic coordination, and peer interaction, students may develop cooperation and communication skills that are transferable to real-world social settings. This finding supports Social Learning Theory, which posits that individuals acquire social behaviors through observation and interaction within their environments. Nevertheless, the positive association observed in this study should be interpreted cautiously because previous studies have also reported negative outcomes of excessive gaming, including social withdrawal, reduced academic engagement, and behavioral problems (Kwok et al., 2021; Sun et al., 2023). Therefore, the influence of gaming on social behavior appears to depend on the nature of game interactions, the level of engagement, and the social context in which gaming occurs (Gu & Mao, 2023; Heng et al., 2021).

The quality of the school learning environment demonstrated a stronger relationship with social behavior ( $r = 0.487$ ,  $p < 0.001$ ), explaining 23.7% of the variance. This finding indicates that the school environment remains a dominant context for students' social development despite the growing influence of digital technologies. In line with Bronfenbrenner's Bioecological Theory, schools provide continuous opportunities for interaction through classroom activities, teacher guidance, peer collaboration, and institutional norms (Gandolfi et al., 2023). Positive teacher-student relationships, supportive peer interactions, and a conducive learning climate encourage the development of empathy, responsibility, and cooperative behavior. These findings are consistent with previous studies showing that a positive school climate contributes significantly to students' social competence, emotional well-being, and prosocial behavior (Hanafie et al., 2022; Wei et al., 2025).

The stronger contribution of the school learning environment is particularly relevant within vocational education settings. Unlike general secondary education, vocational schools emphasize workforce preparation, where students are expected to develop not only technical expertise but also employability skills such as teamwork, communication, adaptability, and social responsibility. Consequently, social behavior is cultivated not only through formal instruction but also through practical learning activities, group projects, and workplace-oriented experiences. This context may explain why the school learning environment emerged as a more influential predictor than online gaming intensity. The finding reinforces the view that educational institutions play a central role in shaping students' interpersonal competencies and social readiness for future employment (Febriady et al., 2022; Purwaningsih & Nurmala, 2021).

When both variables were analyzed simultaneously, online game playing intensity and school learning environment quality significantly predicted social behavior ( $R = 0.489$ ,  $R^2 = 0.239$ ,  $p < 0.001$ ). However, the increase in explanatory power from the school learning environment alone (23.7%) to the combined model (23.9%) was relatively small, indicating that online game playing intensity provided only a complementary contribution to the model. This finding suggests that although digital interactions contribute to social development, their influence is considerably weaker than the influence of direct educational experiences within schools. The results support an ecological perspective in which adolescent social behavior is shaped by multiple interacting environments, including both virtual and real-world contexts (Norum et al., 2024; Zheng et al., 2021).

Despite the statistical significance of the regression model ( $F = 34.166$ ,  $p < 0.001$ ), approximately 76.1% of the variance in social behavior remained unexplained. This finding indicates that social behavior is a multidimensional construct influenced by numerous factors beyond online gaming and school environments, including family relationships, peer group dynamics, personality characteristics, emotional intelligence, socioeconomic conditions, and participation in extracurricular activities. Consequently, future studies should incorporate these variables to develop a more comprehensive explanatory model. From a practical perspective, efforts to enhance students' social behavior should extend beyond regulating gaming activities and focus on strengthening school climate, family support, and positive peer interactions through collaborative interventions involving schools, parents, and communities (Kuleshova & Minnikov, 2020; Tharnwipat & Sawakejun, 2010).

## Conclusions

This study concludes that online game playing intensity and the quality of the school learning environment are significantly associated with the social behavior of vocational high school students in Pesisir Selatan Regency. Online game playing intensity demonstrated a positive and significant relationship with students' social behavior, contributing 21.5% to the variance in social behavior. Similarly, the school learning environment showed a positive and significant relationship, with a contribution of 23.7%. Furthermore, when examined simultaneously, online game playing intensity and school learning environment quality jointly explained 23.9% of the variance in students' social behavior. These findings indicate that students' social behavior is shaped by both digital interaction experiences and the educational environment in which they learn. Therefore, schools, teachers, parents, and students should collaborate to promote responsible digital engagement while fostering a supportive and conducive learning environment to strengthen positive social behavior among vocational high school students.

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