

The Impact of the Educational Game “Castle of Emotions” on the Social-emotional Learning of Third-grade Students

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Abstract: Academic success extends beyond cognitive achievement and requires the development of social and emotional competencies such as self-awareness, self-regulation, social awareness, effective communication, and responsible decision making. Despite increasing attention to these competencies in educational discourse, classroom practices often remain centered on traditional instructional approaches, while students face growing social and behavioral challenges. Early elementary school represents a critical developmental period in which strengthening social and emotional skills can contribute to students' academic engagement, interpersonal relationships, and overall well-being. The present study examined the effectiveness of an educational board game, *Castle of Emotions*, designed to promote social and emotional learning (SEL) among third-grade elementary school students. The game was developed based on key SEL components and structured to encourage the practice of skills such as task articulation, peer interaction, and self-regulation through collaborative and interactive gameplay. These elements were embedded within the mechanics of the game to provide students with opportunities to experience and apply social and emotional competencies during structured learning activities. A quasi-experimental design with pre-test and post-test and a control group was employed. Thirty students were selected through convenience sampling and then randomly assigned to experimental and control groups. Data were collected using a standardized Social-Emotional Learning questionnaire. In addition, qualitative information was gathered through semi-structured student interviews and systematic classroom observations during gameplay. The intervention consisted of implementing the *Castle of Emotions* board game in 12 sessions, each lasting 45 minutes. Data were analyzed using analysis of covariance. The findings indicated that participation in the intervention significantly improved students' social and emotional learning and its components, with a large effect size. The results suggest that structured educational board games can be effective tools for fostering social and emotional competencies in elementary education.

Keywords: Game-based learning, Social-emotional learning, Educational board games, Serious games, Primary education

1. Introduction

In the modern era, the concept of successful education and the holistic development of individuals has moved far beyond the mere transmission of cognitive knowledge and academic skills. It is increasingly oriented toward nurturing the emotional, social, and moral dimensions of students. Prominent international organizations, such as the Organisation for Economic Co-operation and Development (OECD), UNESCO, and the World Bank, have reached a broad consensus that twenty-first century competencies encompass critical thinking, creativity, collaboration, and, importantly, social and emotional skills. Within this context, Social-Emotional Learning (SEL) has gained a prominent position as a comprehensive and evidence-based framework (Gueldner et al., 2020).

Social-Emotional Learning, systematically introduced by the Collaborative for Academic, Social, and Emotional Learning (CASEL), comprises five core domains: self-awareness, self-management (self-regulation), social awareness, relationship skills, and responsible decision-making (Frye et al., 2024). Extensive systematic reviews and meta-analyses (e.g., Durlak et al., 2022; Oberle et al., 2020) demonstrate that SEL-based programs not only enhance social-emotional skills by an average of 23 to 27 percent but also improve academic performance by approximately 11 percent. Furthermore, such programs are associated with reductions in risk behaviors and yield long-term positive effects extending up to 18 years after the intervention.

SEL is recognized as one of the strongest predictors of academic success, occupational achievement, and overall quality of life in adulthood. Longitudinal studies indicate that children who acquire higher SEL skills during their primary education are less likely to engage in risk behaviors, substance abuse, and delinquency later in life and generally exhibit better mental health and interpersonal relationships. However, despite this strong theoretical and empirical foundation, the systematic implementation of educational interventions—

particularly educational games designed to foster SEL—remains limited in many educational contexts (Durlak et al., 2011).

Traditional teaching methodologies, which are predominantly teacher-centered, unidirectional, and reliant on memorization and repetition, provide limited opportunities for students to experience and practice social-emotional skills. In contrast, educational games create interactive learning environments that allow children to directly experience success and failure, collaboration, and competition, thereby serving as an effective complement to existing pedagogical approaches (Hafeez, 2021). Nevertheless, many educators lack adequate training in this domain, and gameplay is frequently relegated to a marginal or purely recreational activity rather than being used as a structured instructional strategy (Greipl et al., 2020).

Recent educational research highlights the growing need to address students' behavioral and emotional challenges through structured SEL interventions. Educational board games represent a cost-effective and adaptable instructional tool that can be integrated into regular classroom activities (Johnson and Brown, 2022). However, a review of the literature reveals a notable research gap. Relatively few studies have designed structured board game-based interventions using standardized SEL measurement tools to examine their effects on key competencies such as self-regulation, peer relationships, and responsible decision-making among third-grade primary school students (Çataldaş et al., 2025). Therefore, further empirical investigation is needed to explore how structured educational board games can be used as effective tools to support the development of social-emotional competencies among primary school students.

To address this scientific and practical gap, the present study investigates the impact of a structured educational game program, specifically the *"Castle of Emotions"* board game, on the social-emotional learning of third-grade primary school students. The study examines whether participation in the *"Castle of Emotions"* educational board game can significantly improve students' social-emotional learning. The findings are intended to provide empirical evidence for educators, curriculum developers, school administrators, and policymakers regarding the potential value of integrating educational games into classroom practice to support the development of socially and emotionally competent learners.

2. Methodology

2.1 Research Design

The present study adopted a quasi-experimental quantitative research design employing a pre-test–post-test structure with a control group. This design was selected to examine the causal effect of the independent variable (the educational board game intervention) on the dependent variable (students' social-emotional learning outcomes) while controlling for baseline differences between participants.

Participants were randomly assigned to either the experimental or the control group after the initial selection of the sample. The pre-test–post-test structure enabled the researchers to compare changes in social-emotional competencies before and after the intervention, while the inclusion of a control group helped reduce potential threats to internal validity.

2.2 Participants and Sampling

The statistical population of this study consisted of third-grade female students attending a public primary school located in District 5 of Tehran during the 2025 academic year. Due to accessibility and school administrative constraints, a convenience sampling approach was employed to select the participants.

A total of 30 students were selected from the target population and randomly assigned into two equal groups: an experimental group ($n = 15$) and a control group ($n = 15$). The focus on female students was consistent with the gender-segregated structure of the school system in the study context, which limited access to mixed-gender samples. All participants were enrolled in the same grade level and shared similar educational conditions within the school environment. It should be noted that, as a convenience sample drawn from a single school, the participants may not fully represent the broader population of primary school students. Therefore, the findings should be interpreted with caution in terms of generalizability.

2.3 Instruments

Data were collected using a localized Persian version of the Social-Emotional Learning Scale (SELS), originally developed by Coryn et al. (2009). This self-report questionnaire consists of 20 items measured on a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The instrument assesses three key dimensions of social-emotional competencies: Task Articulation, Peer Relationships, and Self-Regulation.

In the original validation study, confirmatory factor analysis demonstrated an acceptable model fit, and the internal consistency coefficients (Cronbach's alpha) for the subscales were reported as $\alpha = 0.69$ for Task Articulation, $\alpha = 0.80$ for Peer Relationships, and $\alpha = 0.80$ for Self-Regulation. Previous studies using the Persian version of the instrument have also reported satisfactory levels of construct validity and reliability among primary school populations in Iran.

In addition to the quantitative questionnaire, qualitative data were collected to obtain a deeper understanding of students' learning experiences during the intervention. Semi-structured interviews were conducted with participating students following the completion of the intervention to explore their emotional responses, self-regulation strategies, and perceptions of peer interaction during gameplay.

Furthermore, systematic classroom observations were carried out throughout the 12 intervention sessions using structured observation checklists. These observations aimed to document behavioral engagement, emotional responses, peer interaction patterns, and the practical demonstration of social-emotional competencies within the game-based learning environment.

2.4 Procedure and Ethical Considerations

Prior to the implementation of the intervention, a pre-test was administered to both the experimental and control groups using the Social-Emotional Learning questionnaire. Following the pre-test phase, the experimental group participated in the structured intervention program involving the *"Castle of Emotions"* educational board game. The intervention was conducted over 12 sessions, held three times per week, with each session lasting approximately 45 minutes.

During these sessions, students engaged in various interactive gameplay activities designed to foster key social-emotional competencies such as emotional expression, peer interaction, cooperation, and responsible decision-making. The sessions were facilitated under consistent conditions to ensure that all participants in the experimental group experienced the same structured gameplay process.

Meanwhile, the control group continued their regular classroom instruction without exposure to the educational game intervention. This allowed for a comparison between students who participated in the game-based learning activities and those who followed the standard curriculum.

Upon completion of the intervention period, a post-test was administered to both groups using the same questionnaire to measure changes in social-emotional competencies.

All ethical considerations were carefully observed throughout the research process. Informed consent was obtained from school authorities and students' parents prior to participation. Participant anonymity and data confidentiality were ensured. Additionally, permission was obtained for the use of photographs taken during the intervention sessions for research documentation purposes.



Figure 1: Non-verbal emotional expression prompted by an interaction card during gameplay

Figure 1 illustrates a gameplay interaction in which a student draws an interaction card and non-verbally acts out an emotion they experienced during the day. Another player attempts to identify the portrayed emotion based on the student's gestures and expressions. This activity supports the development of relationship skills

within the social-emotional learning (SEL) framework by encouraging empathy, emotional awareness, and non-verbal communication among peers.



Figure 2: Strategic path selection during gameplay to maximize team rewards

Figure 2 illustrates a strategic phase of the game in which a student evaluates different paths across the board in order to collect tokens and obtain interaction cards. Through this process, the player must consider available options and select the path that best supports both individual progress and team outcomes. This gameplay situation engages the responsible decision-making component of social-emotional learning (SEL), as students are encouraged to reflect on their choices and consider their potential impact on themselves and their peers.

2.5 Data Analysis

The collected data were analyzed using both descriptive and inferential statistical methods. Descriptive statistics were calculated to summarize the central tendencies and distribution of the variables. To test the research hypotheses and evaluate the effectiveness of the intervention, Analysis of Covariance (ANCOVA) was conducted using SPSS statistical software.

ANCOVA was selected to compare the post-test scores of the experimental and control groups while statistically controlling for the pre-test scores as a covariate. This approach helped reduce the potential influence of initial group differences and provided a more accurate estimation of the intervention effect.

In addition, qualitative data obtained from the semi-structured interviews and classroom observations were analyzed using thematic analysis. The data were transcribed, systematically coded, and categorized into recurring themes to identify patterns related to students' emotional experiences, self-regulation behaviors, and peer interactions during gameplay. This qualitative analysis was conducted to complement the quantitative findings and provide deeper contextual insights into the learning process.

3. Results

3.1 Descriptive Statistics

Prior to conducting the primary analyses, descriptive statistics were calculated to examine the mean and standard deviation of the Social-Emotional Learning (SEL) scores for both the experimental and control groups at the pre-test and post-test stages. These descriptive findings are presented in Table 1. As shown in the table, the experimental group demonstrated a notable increase in SEL scores from pre-test ($M = 105.33$) to post-test ($M = 138.90$). In contrast, the control group exhibited only a minimal change during the same period (from $M = 104.80$ to $M = 108.20$).

Table 1: Means and standard deviations of pre-test and post-test scores for the experimental and control groups

Variable	Group	Number	Pre-test $M \pm SD$	Post-test $M \pm SD$
Task articulation skill	Experimental	15	35.20 $\pm$ 5.12	46.83 $\pm$ 4.01
	Control	15	35.00 $\pm$ 5.48	36.10 $\pm$ 5.67
Peer relationships	Experimental	15	34.90 $\pm$ 4.88	45.60 $\pm$ 3.79
	Control	15	34.70 $\pm$ 5.02	35.90 $\pm$ 5.11
Self-regulation	Experimental	15	35.23 $\pm$ 4.95	46.47 $\pm$ 3.92
	Control	15	35.10 $\pm$ 5.21	36.20 $\pm$ 5.48
Total SEL	Experimental	15	105.33 $\pm$ 12.81	138.90 $\pm$ 10.66
	Control	15	104.80 $\pm$ 13.42	108.20 $\pm$ 12.94

3.2 Inferential Statistics

To determine the effectiveness of the educational board game intervention on students' social-emotional learning and its sub-components, an Analysis of Covariance (ANCOVA) was conducted. The pre-test scores were entered as the covariate to control for initial differences between the groups. Prior to conducting the inferential analyses, preliminary tests were performed to examine whether the assumptions of ANCOVA were met.

Based on the results of Levene's test, the homogeneity of variances between the experimental and control groups was confirmed ($F = 0.87$, $p = 0.36$). To examine the normality of the data distribution, the Shapiro–Wilk test was applied; the results indicated a normal distribution of scores in both groups (experimental group: $W = 0.93$, $p = 0.31$; control group: $W = 0.91$, $p = 0.25$). In addition, the test of homogeneity of regression slopes indicated that the relationship between the pre-test and post-test scores did not differ significantly between the two groups ($p > 0.05$). These findings indicate that the data met the assumptions required for ANCOVA.

The results of the ANCOVA, presented in Table 2, indicate a statistically significant effect of the intervention group on the Total Social-Emotional Learning score, $F(1, 27) = 92.55$, $p < 0.001$, partial $\eta^2 = 0.48$. Furthermore, the intervention yielded significant improvements across all sub-components, including Task Articulation Skill (partial $\eta^2 = 0.49$), Peer Relationships (partial $\eta^2 = 0.47$), and Self-Regulation (partial $\eta^2 = 0.48$).

Table 2: Results of the ANCOVA for social-emotional learning and its sub-components

Variable	Source	Sum of Squares	df	Mean Square	F	p-value	Partial η^2
Task articulation skill	Pre-test	1092.4	1	1092.4	84.61	< 0.001	
	Group	1480.5	1	1480.5	114.23	< 0.001	0.49
	Error	349.87	27	12.96			
Peer relationships	Pre-test	987.6	1	987.6	79.34	< 0.001	
	Group	1620.2	1	1620.2	94.25	< 0.001	0.47
	Error	464.16	27	17.19			
Self-regulation	Pre-test	1056.8	1	1056.8	82.91	< 0.001	
	Group	1340.6	1	1340.6	105.14	< 0.001	0.48
	Error	344.25	27	12.75			
Total SEL	Pre-test	4821.5	1	4821.5	68.42	< 0.001	
	Group	6520.4	1	6520.4	92.55	< 0.001	0.48
	Error	1902.22	27	70.45			

3.3 Qualitative Findings

Qualitative analysis of the student interviews and classroom observations resulted in the identification of three main themes: Game-Based Motivation and Engagement, Collaborative Peer Dynamics, and Emotional Awareness and Regulation.

3.3.1 Game-based motivation and engagement

The visual elements and structured challenges of the “*Castle of Emotions*” game enhanced students’ intrinsic motivation and engagement in the learning activities. The game mechanics reduced classroom boredom and helped maintain sustained attention during the sessions.

Observational Note: Students demonstrated high enthusiasm for the game’s challenges, frequently asking to play additional rounds and maintaining focus throughout the 45-minute sessions.

3.3.2 Collaborative peer dynamics

During the intervention, the classroom environment showed an increase in supportive exchanges and positive peer interactions. Students actively practiced relationship skills and mutual assistance while participating in the game activities.

Student Quote: “When my classmate didn’t know how to act out the emotion on the card, we all tried to give friendly hints so that he wouldn’t lose his turn.”

3.3.3 Emotional awareness and regulation

The scenarios presented within the game encouraged students to reflect on their own emotions and practice self-regulation strategies. Some students also reported applying these strategies to situations beyond the game context.

Student Quote: “The game helped me understand why I get angry sometimes. Now, when I get upset in class, I try to think first instead of just yelling.”

Table 3: Sample student quotes and observational data illustrating the identified themes

Basic Themes	Organizing Themes	Overarching Themes	Quotes / Observational Data
Enjoyment of mental challenges, effort for personal progress, eagerness for positive competition, insistence on participating in subsequent rounds of the game.	Increased intrinsic motivation	Game-Based Motivation and Engagement	<i>“I really liked the game pieces and the board. I always wanted to guess the emotions right to move my piece forward.”</i>
Friendly exchanges of opinions, mutual support, encouragement of classmates, reducing conflicts during group play.	Supportive peer interactions	Collaborative Peer Dynamics	<i>“I liked how we listened to each other. When someone got stuck on a hard emotion card, we didn’t laugh at them; we tried to help them.”</i>
Attention to personal feelings, curiosity about how others react, expressing strategies for calming down, application of game rules to real-life classroom behavior.	Growth of emotional self-regulation	Emotional Awareness and Regulation	<i>“Before, I didn’t know how to show I was happy without being too loud. The game taught us how to control our excitement.”</i>

4. Discussion and Conclusion

The present study aimed to examine whether participation in the “*Castle of Emotions*” educational board game could enhance the social-emotional learning (SEL) competencies of third-grade students. The findings indicate that students who participated in the game-based intervention demonstrated significantly higher post-test scores in overall social-emotional learning compared with those in the control group. After controlling for pre-test scores, the ANCOVA results showed a statistically significant effect of the intervention on total SEL scores, $F(1, 27) = 92.55$, $p < .001$, with a large effect size (partial $\eta^2 = .48$). These findings suggest

that structured board game–based learning activities can play a meaningful role in promoting social-emotional competencies among primary school students.

The descriptive results further support this conclusion. Students in the experimental group showed a substantial increase in their mean SEL scores from pre-test to post-test, while the control group demonstrated only minimal change over the same period. This pattern indicates that the observed improvements are likely associated with participation in the “*Castle of Emotions*” gameplay activities rather than general classroom development alone.

The results align with previous research emphasizing the educational value of play-based and game-based learning environments in fostering social-emotional development (Greipl et al., 2020; Gueldner et al., 2020). Educational games provide interactive contexts in which children can practice emotional expression, cooperation, empathy, and responsible decision-making in a supportive and engaging environment. Within the “*Castle of Emotions*” gameplay structure, students were encouraged to identify emotions, communicate with peers, collaborate to achieve shared goals, and reflect on their behavioral choices during gameplay.

From a theoretical perspective, these findings are consistent with experiential learning theory (Kolb, 2013), which suggests that meaningful learning occurs through active engagement, reflection, and interaction with concrete experiences. The board game created opportunities for students to encounter emotionally relevant scenarios and respond to them through role-play, discussion, and collaborative problem-solving. In addition, the results support the Mechanics–Dynamics–Aesthetics (MDA) framework of game design (Fullerton, 2018), which highlights how game mechanics and interaction dynamics can generate meaningful emotional and cognitive engagement. Through interaction cards, strategic decision points, and cooperative gameplay, the “*Castle of Emotions*” game appears to have provided a structured yet playful environment for practicing social-emotional skills.

The qualitative observations recorded during gameplay sessions also support the quantitative findings. Students frequently demonstrated increased emotional awareness, cooperative behavior, and peer support during gameplay interactions. Activities such as acting out emotions, interpreting peers’ non-verbal cues, and making collaborative decisions about movement across the game board appeared to encourage empathy and communication. These observations suggest that students were not only exposed to SEL concepts but were increasingly able to apply these strategies during social interactions with their peers.

Despite these encouraging findings, several limitations should be considered when interpreting the results of this study. First, the relatively small sample size ($N = 30$) may limit the statistical power of the analyses and reduces the extent to which the findings can be generalized to broader populations. Additionally, the participants were selected through convenience sampling from a single school, which may limit the representativeness of the sample; therefore, the results should be interpreted with caution in terms of generalizability. Furthermore, because the intervention was implemented in a natural classroom environment, participant and instructor blinding was not possible, which may introduce expectancy or observer bias. Finally, the study did not include a follow-up assessment, making it unclear whether the observed improvements in social-emotional competencies would persist over time.

Future research could address these limitations by including larger and more diverse samples from multiple schools and educational contexts. Longitudinal studies incorporating follow-up assessments would also help determine whether the benefits of game-based SEL interventions are sustained over longer periods. Additionally, future studies might compare different types of educational games or integrate digital game-based approaches to further explore how game design elements influence social-emotional learning outcomes.

In conclusion, the findings of this study provide empirical support for the use of structured educational board games as an effective pedagogical tool for promoting social-emotional learning among primary school students. The “*Castle of Emotions*” game created an interactive environment in which students could practice emotional expression, cooperation, and responsible decision-making through engaging gameplay experiences. These results suggest that well-designed educational games may serve as valuable complementary tools for supporting the development of social-emotional competencies within primary education settings.

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Ethics Declaration: This study was conducted in accordance with the ethical standards of Allameh Tabataba'i University for low-risk educational research. As the study involved only standard educational activities (a board game and a questionnaire), posed no physical or psychological harm to participants, and collected data anonymously without any identifying information, it was classified, according to the university's internal guidelines, as exempt from formal ethics committee review.

AI Declaration: During the preparation and writing of this article, the authors used the artificial intelligence tool Gemini 3.1 Pro exclusively for improving textual readability and language editing. All AI-generated suggestions were carefully reviewed and critically revised by the authors, who assume full responsibility for the accuracy, validity, and final content of the manuscript. It is explicitly stated that no AI tools were involved in the research design, data collection, statistical analysis, or interpretation of findings, and all reported results are solely based on original empirical data and real participant interactions.

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