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The Effect of Sustainability Educational Game Activities Supported by the Social-Emotional Learning Program on the Social-Emotional Learning Skills of Young Athletes

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Abstract

This study aimed to assess the effects of various games on social-emotional skills within the context of educational games supported by the social-emotional learning (SEL) program. The study used an experimental pre-test and post-test control group design. While the experimental group consisted of between 14-16 years old 28 players from ü volleyball school in the Ankara Regional Leagues in the 2023-2024 seasons, the control group comprised 27 students studying at the same volleyball school. Neither of the groups selected had ever attended any educational games course. The players in the experimental group received a total of 12 sessions of SEL-based educational games during the study. However, control group players pursued their current educational schedule. It also utilized the Delaware Social-Emotional Competence Scale (DSEC-S) and reflective diary assessment form as the data collection tools. As part of the data analysis methods, the study performed descriptive statistics and One-Way Analysis of Covariance (ANCOVA) derived from the scales and percentile analysis obtained from the reflective daily evaluation form. As a result, the study concluded that 12-week SEL-based educational games were effective in helping young players develop social-emotional skills. Furthermore, the results of SEL-based educational games indicated the success of cultural adaptation.

Keywords: *Sports, Sustainable Educational Games, Social-Emotional Learning, Volleyball.*

INTRODUCTION

Self-improvement depends on individuals' overall emotional, social, and academic development. Emotional and social skills primarily take shape in a family environment. Its further development in the following years is closely related to the educational environment and parental attitudes. As widely acknowledged, the majority of the issues that children experience with their peers or adults originate from emotional and social dissatisfaction and inadequacies. Hence, parents can only prioritize their children's academic success while deferring their acquisition of emotional and social skills that will ensure their success in life.

Individuals can self-actualize themselves with emotional and social skills. The development and nurture of children's and youngsters' emotional and social skills—first in the family context and subsequently in the school setting—is essential for their success in school and life. Students acquire such skills through systematic school teaching [1]. It is explicit that under-socialized and emotionally impaired individuals develop several unfavorable attitudes and behaviors from an early age, including adolescent pregnancy, poor eating habits, AIDS, violence, alcoholism, smoking, and drug addiction. Furthermore, these actions may intensify in adulthood and get a severe level [2]. Since such negative behaviors have increased in recent years, studies have reportedly emphasized the significance of individuals' emotional and social development and advocated addressing these concerns more carefully. They further indicated the essence of emotional and social healthy development in addition to academic success.

Social and Emotional Learning (SEL) refers to acquiring the fundamental competencies necessary for individuals to be successful in their career and school life (Collaborative for Academic, Social, and Emotional Learning [CASEL] 2012) [3]. Elias (2003) defined the SEL as the process of developing the skills required to perform daily tasks, such as identifying one's own emotions and those of others, expressing and managing emotions, recognizing one's self strengths and weaknesses, establishing and upholding effective communication, and being sensitive towards the needs of the community [4]. However, the SEL skills are a set

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of competencies that support academic success (e.g., problem-solving, stress management, communication, and self-esteem) and play a crucial role in success in areas like collaboration with others, effective learning, business life, social life, and family life [5]. Therefore, it is essential to foster children's social and emotional development in addition to their academic success.

Research on SEL programs suggests that students must retain the highest level of social-emotional competence to succeed academically and participate more in school [6]. Results of a meta-analysis and three large-scale reviews on the effect of SEL programs indicate positive outcomes on children's and youngsters' behaviors, attitudes, and school performance [7,8]. Several studies reported that SEL programs improve students' social skills, such as getting calm, self-control, sharing, helping others, giving praise, collaborating, and strengthening social relationships [9]. Furthermore, SEL programs are essential to increase motivation and responsibility, foster participation and working habits, and strive for a strong society. They also improve students' behaviors in developing a positive attitude towards school, maintaining high academic motivation and setting educational goals, taking a more positive approach to study and learning, learning how to cope with school stress, and providing a better understanding of the consequences of behavior [10].

Numerous SEL-related studies reportedly underlined the significance of programmatically incorporating SEL skills in schools and included in educational schedules [11]. Indeed, children must acquire fundamental skills if they are to succeed in life as well as in school. Those who fail to retain such skills are less likely to succeed. Studies also indicated that SEL interventions implemented in schools improve the learning environment, boost student's behavioral and academic functioning, and enhance their life skills [12,13]. The most effective way to develop SEL skills in schools is to make students exercise.

Walter (2009) claimed that exercise helps students practice and stimulate social relations and emotional skills since bodily movements require coping with social interactions and emotional skills. Educational games are among the substantial activities that provide momentum for exercising and learning, enabling the learning environment for consolidation [14].

The term 'development' in humans refers to a lengthy process that persists habitually and varies periodically throughout life. Individuals must engage in diverse games and activities in different periods if they deem a healthy development. Designing and preparing these games—played by an individual to support their development—based on their developmental stages adds significant educational value to the games [22,23,24,25].

Students acquire skills by actively engaging in the teaching and learning process, including problem-solving, planning, strategic thinking, reasoning, taking responsibility, decision-making, quick thinking, communication, et cetera. Educational games may also foster the development of collaboration, cooperation, and socialization-like skills [15]. As a result, educational games explicitly constitute a comprehensive and integrated experience strongly related to SEL skills and the cognitive dimension.

Students and youngsters who struggle to communicate effectively with academics and their peers, who are reluctant to express themselves, who are unable to solve problems, who find it difficult to express their feelings, who avoid engaging in social interactions, transfer their failure and unhappiness into their lives. Therefore, individuals must possess adequate social-emotional skills to express themselves efficaciously and attain lifelong success.

SEL programs typically involve children and adolescents. The study aimed to reveal the need for developing SEL skills for young players on a branch level and emphasized the potential of SEL-based physical activity programs to improve the SEL skills of such individuals. Therefore, this study intended to apply SEL-based educational games and focused on the effect of the application on the SEL skills of young players.

Materials and Methods

Study Purpose

This study aimed to assess the effects of SEL-based educational games on the SEL skills of young players and aspired to answer the following questions:

Is there any significant difference between the experimental group—applied SEL-based educational games—and the control group regarding pre-test and post-test scores on SEL skills?

Does teaching SEL-based educational games affect the SEL skills of the experimental group?

Study Design

This study used an experimental pre-test post-test control group model. The pre-test and post-test control group model involves two groups—experimental and control—generated by the random method. In all groups, measurements are taken both before and after the experiment. The availability of the pre-tests in the model helps identify the pre-experiment similarity levels among the groups and revise the post-test results accordingly. While the experimental group receives the process whose effect on the dependent variable will be tested (an application such as a new course material, a different teaching method, or a training program), the control group follows the standard procedure [16].

Study Sample

The study used a purposive sampling method [17]. While the experimental group consisted of between 14-16 years old 28 players from Çankayagücü volleyball school in the Ankara Regional Leagues in the 2023-2024 seasons, the control group comprised 27 students studying at the same volleyball school. The experimental and control groups included individuals from various Turkish provinces and diverse ethnicities. The players' ages ranged from 14 to 18.

The study compared the pre-test total scores from the Delaware Social-Emotional Competence Scale (DSDY-S) to determine if the groups' SEL skills were comparable. Table 1 displays the result of the variance equity measures.

Table 1. Variance equity measures of players' pre-test total scores on SEL skills (One-Way ANOVA)

	Variables	N	$\overline{X}$	sd	df	f	p
Pre-test	Experimental	28	117.65	17.30	1	1.431	.265
	Control	27	106.34	24.23	57		

$p<.05$

According to Table 1, the experimental and control groups had no statistically

significant difference in the pre-test scores on players' SEL skills ($F_{(1,57)} = .265$, $p>.05$). This data indicated that the SEL skills of the players in both groups were comparable.

Data Collection Tools

The study used the Delaware Social-Emotional Competence Scale (DSEC-S) and reflective diary assessment form as the data collection tools.

Delaware Social-Emotional Competence Scale

Mantz et al. (2016) developed a scale for psychometrical assessment of students' social-emotional competencies. The scale scored the items on a 4-point Likert scale—consisting of 12 items—divided into four sub-dimensions, and each sub-dimension included the following three items: Responsible Decision-making (items 1, 5, and 9), Relationship Skills (items 4, 8, and 12), Self-management (items 3, 7, and 11), and social awareness (items 2, 6,

and 10). The first item on the scale was reverse-scored. The lowest and highest scores on the scale were between 12 and 48, respectively. The following are the sample questions provided in the scale: "I am good at learning from my mistakes (responsible decision-making)," "I care about how others feel (social awareness)," "I think over before acting (self-management)," and "I get along well with others (relationship skills)" [18].

The study employed the Delaware scale to 32,414 students enrolled in 3-12 grades in 126 public schools, including primary, secondary, and high schools. Considering the correlation coefficients and social-emotional competence scores between the total sub-dimensions of the scale, these values displayed a medium and high correlation, with the scores between .65 and .95 for the sub-dimensions and .47 and .82 for total scores, respectively ($p < .001$). Additionally, the study determined internal consistency coefficient values between .58 and .69, and .84 in total (Mantz et al., 2016). The adapted scale's Cronbach Alpha reliability coefficient ranged from .76 to .79, and .70 in total [18].

Reflective Diary Assessment Form

Researchers developed a 10-query form by the SEL levels. The players were required to complete this form after each of the 12 lessons in the experimental process. The participant players assigned themselves a number between 1 and 5 for each level after that day's lesson. Below is the list of expressions:

Responsible decision-making: "I made a significant decision that affected my friend" and "I made a significant decision that affected myself."

Relationship skills*:* "I exercised with my friend" and "I assisted someone on something."

Self-management: "I controlled my behavior towards my friends" and "I forced and motivated myself to achieve a goal."

Social awareness: "I empathized with my friend's feelings, thoughts, and differences" and "I respected my friend's behaviors that stemmed from cultural diversities."

Self-awareness*:* "I recognized how my feelings and thoughts about a subject affect my behavior" and "I accepted the consequence of my behavior by evaluating my strength or weakness."

Data Collection Process

The experimental group consisted of 28 players from Çankayagücü volleyball school in the Ankara Regional Leagues in the 2023-2024 seasons, and the control group comprised 27 students studying at the same volleyball school. Researchers designed the study plan one day a week for 12 weeks—12 lessons in total—at Çankayagücü volleyball school for the 2023-2024 volleyball season. They further studied the contents and sample applications of CASEL (2012) and Zins et al. (2004) to design the teaching plan. After this literature review, the researchers prepared 12 lesson programs, incorporating acquirements related to SEL levels and target behaviors into educational games [3,10].

Researchers initially briefed the experimental and control groups about the study objective and distributed the voluntary consent forms. Subsequently, they collected these forms and requested that the participating students complete the DSEC-S for pre-testing. Afterward, they executed the SEL-based educational games in the experimental group for 12 weeks. However, the control-group players adhered to their standard teaching program. The researchers personally carried out the technical applications of the experimental group's educational games course and the implementation of the SEL program. After the application, DSEC-S was re-administered to the experimental and control groups as a post-test. Table 2 lists the experimental applications.

Table 2. Experimental Applications of the Study

Course	Level	Learning outcome	Activity
1	Self-awareness	Self-respect, respecting others, and self-control	Meetingand amalgamation games
2	Self-awareness	Finding analytical solutions to problems, building trust in each other	Meeting and amalgamation games

3	Self-awareness	Self-control, finding analytical solutions to problems	Designing games with various materials
4	Self-management	Controlling emotions, setting goals	Designing games with various materials
5	Self-management	Controlling win-lose emotions, self-regulation	Preparing an independent study program
6	Responsible decision-making	Self-motivation, self-confidence, and taking responsibility for personal decisions	Designing educational games
7	Responsible decision-making	Problem-solving, decision-making, and summative assessment	Teaching an educational game to someone else
8	Relationship management	Establishing a relationship, maintaining a relationship	Learning educational games as a group
9	Relationship management	Collaborating, active listening, negotiating conflict	Designing educational games in groups
10	Social awareness	Recognizing diversity, creativity, self-expression, and collaboration	Playing the designed educational games
11	Social awareness	Social awareness, cooperation, empathy	Teaching each other educational games designed with various materials
12	Social awareness	Social awareness, collaboration, self-expression	Group and trust-building games

The teaching of the lessons was based on SEL levels. Each lesson retained a 10-minute time interval for awareness about the subject matter before the commencement of the class. Afterward, participants engaged in subject-related physical activities during the educational game. Following these activities, the group convened a meeting to expand their awareness of the day's subject. Furthermore, participants had the opportunity to express their thoughts. At the end of each lesson, researchers requested the players to evaluate themselves.

2.6. Data Analysis

The study used several procedures for data analysis, including standard deviation and mean-value analysis for descriptive statistics of pre-test and post-test scores derived from DSEC-S, one-way ANOVA analysis to identify variance equality measures of groups, and one-way ANCOVA analysis to determine whether there is a difference between the post-test scores by checking the pre-test scores of the groups. The reflective daily evaluation form's statistics were also analyzed using percentage analysis techniques. The study also used the SPSS 20.0 package program for statistical analyses.

RESULTS

The study calculated the skewness and kurtosis coefficients of the players' pre-test total scores from DSEC-S between -1 and +1 and observed that the data was distributed normally [19]. Table 3 indicates the Skewness and Kurtosis values.

Table 3. Skewness and Kurtosis Values of DSEC-S

		N	Skewness		Kurtosis	
	Variables	**Statistics**	**Statistics**	**Std. Error**	**Statistics**	**Std. Error**
Pre-test	Experimental	28	.468	.277	-.167	.425
	Control	27	.278	.280	-.516	.431
Post-test	Experimental	28	.647	.277	-.613	.425
	Control	27	.451	.280	-.450	.431

According to the DSEC-S post-test total scores, the experimental group players improved their social-emotional learning skills, whereas the control group players indicated a slight increase in the same skills.

The study also performed a one-way ANCOVA analysis to identify whether there was a significant difference between the post-test scores of the players concerning their group-wise pre-test scores. Table 4 displays the analysis results.

Table 4. One-Way ANCOVA Results of DSEC-S

Source	Sum of Squares	df	Mean squares	*F*	*p*	n^2
Adjusted model	4647.70	2	2162.32	6.456	.005	.151
Intersection	31532.21	1	21724.11	51.112	.000	.462
Pre-test	3178.22	1	2178.13	6.453	.022	.086
Group	3108.16	1	2108.16	6.526	.021*	.090
Error	22357.48	75	508.61			
Total	978022.00	60				
Adjusted total	307008.40	48				

According to Table 4, when initially reviewing DSEC-S group-wise pre-test total scores and then evaluating the post-test total scores, there was a significant difference between the scores of the groups [$F(1,75)= 6.526$, $p<.05$] in terms of social-emotional learning skill levels. Furthermore, the Bonferroni test results identified a significant difference between the experimental ($X = 41.44$) and control ($X = 41.44$) groups' post-test scores in favor of the experimental group.

Findings about Reflective Diary Assessment Form

Below are the statements the players responded to at the end of each lesson over 12 weeks, indicating their social-emotional learning skills.

Responsible Decision-Making

Considering the statements "I made a significant decision that affected my friend" and "I made a significant decision that affected myself," the rate of responsible decision-making behavior of the players increased from 66% to 74%. Accordingly, the study identified an 8% increase in players' responsible decision-making behaviors.

Self-Awareness

Regarding the players' statements "I recognized how my feelings and thoughts about a subject affect my behavior" and "I accepted the consequence of my behavior by evaluating my strength or weakness," the rates of players' self-awareness behaviors increased from 35% to 56% at the end of 7th lesson; however, it further reached up to 71% after the 12th lesson. As a result, the study identified a 36% increment—translating to a substantial increase—in the players' self-awareness behavior.

Relationship Skills

According to the statements "I exercised with my friend" and "I assisted someone on something," the study found that the rate of players' relationship skills behavior increased from 71% to 88%, indicating a 17% increment in the players' relationship skills behavior.

Social Awareness

About the statements "I empathized with my friend's feelings, thoughts, and differences" and "I respected my friend's behaviors that stemmed from cultural diversities," the study identified that the rate of players' social awareness behavior increased from 59% to 72%, representing a 13% increment in the players' social awareness behavior.

Self-Management

Considering the statements "I controlled my behavior towards my friends" and "I forced and motivated myself to achieve a goal," the study found that the rate of players' self-management behavior increased from 58% to 68%. Therefore, there was a total increase of 10% in the players' self-management behavior.

DISSCUSION

This study applied SEL-based educational games to players for 12 weeks and tested their potential effect on players' social-emotional learning skills. Accordingly, the study findings revealed that SEL-based educational games positively affected the SEL skill development of young players. Hence, it is believed that the SEL-based educational games program implemented on young participants in this study will serve as an example for other research projects. Applying SEL-based physical activity programs is also feasible for adults who receive inadequate service and need psychological and social-emotional support. In this sense, this study indicated the significance of such programs for adults who need to improve their SEL skills. This study also involved young players from different provinces with diverse cultures and ethnic origins and asked them to design games with various materials and teach them to other players. The content should be the priority in such programs. The outcomes of SEL-based educational games demonstrated that such activities are critical in ensuring adaptation to a group or community. Moreover, the current study found that SEL-based activities provided favorable outcomes when combined with physical activities. Lastly, this study potentially indicated that the SEL-based program applied through physical exercise and education would be more appealing and motivating for adults.

Considering the DSEC-S post-test total scores, the study identified an increase in the social-emotional learning skills of the experimental-group players, while the control-group players displayed a negligible increase in their social-emotional learning skills. As a result, it is reasonable to conclude that SEL-based educational games positively affected the development of young players' social-emotional learning skills. Regarding the DSEC-S sub-dimensions, the study found an increase in all sub-dimensions in the experimental group; however, it identified an increment only in the decision-making and relationship skills sub-dimensions, contrarily, a slight decrease in the self-management and social awareness sub-dimensions in the control group. Therefore, it is viable to assert that SEL-based dance educational games improved the players' self-management, self-awareness, responsible decision-making, relationship skills, and social awareness behaviors.

The study findings revealed a significant difference in the players' SEL skill scores—in favor of the experimental group—and indicated a significant interaction effect on the SEL skill scores of the experimental group, suggesting that teaching SEL-based educational games has a positive impact on the development of players' SEL skills. As a result, the current study indicated that teaching educational games contributed to social-emotional skill development.

Researchers invited players to self-evaluate their social-emotional learning behaviors at the end of each lesson. Accordingly, the overall assessment of this data revealed an 8%, 36%, 17%, 13%, and 10% increase in the players' responsible decision-making, self-awareness, relationship skills, social awareness, and self-management behaviors, respectively. Hence, the study concluded an explicit advancement in the behaviors of the players, including their perceiving of how their emotions and thoughts influence their behavior, controlling how they behave towards others, striving to achieve the goal, making significant decisions, helping others, collaborating with individuals, empathizing with others, respecting individual differences, and solving problems. Furthermore, the study revealed that self-awareness and self-management behaviors improved the most and the least, respectively. According to Goleman (1995), Salovey and Mayer (1990), managing emotions refers to the capacity to regulate and control emotions in a way that averts emotional excess and extreme discomfort [20,21]. In this sense, there is a potential to increase the intensity of activities to raise behavioral levels, particularly stress management, self-discipline, self-motivation, organizational skills, and goal-setting.

CONCLUSIONS

In conclusion, this study applied SEL-based educational games to only young players who were exclusively active in volleyball and focused on the effect of teaching on the players' SEL skills. Future research can be carried out across various age groups and in different branches, with different parameters (i.e., subjective well-being, self-efficacy, attitude, and individual-social responsibility) by developing diverse SEL-based physical activity programs.

Recommendations

The study findings indicated that players who actively participated in sports in sports schools also need SEL skill-developing activities. It also revealed that youngsters with good communication with their parents, educators, and friends and those whose needs are met effectively and have a decent social environment develop their emotional and social skills healthily. Given the holistic nature of education, it is expectedly critical to address not just the academic-cognitive dimension but also the social-emotional dimensions of individuals throughout their educational life. In this sense, in addition to academic communication with individuals, it is also crucial for educators/trainers to engage in social communication through activities to foster their socio-emotional skills. Players should also be able to have settings where they can freely interact with society, the environment, and their peers. These settings should also serve as places to organize activities where they potentially experience behaviors such as sharing, cooperation, collaboration, empathy, goal-setting, teamwork, socialization, and communication. Lastly, sports schools should design SEL skill improvement programs in the format of weekly activities.

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