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Original Article

EFFECT OF AN INTERVENTION PROGRAM IN THE DEVELOPMENT OF EMOTIONAL, MOTOR AND COGNITIVE SKILLS OF 5TH-6TH GRADERS

EFEITO DE UM PROGRAMA DE INTERVENÇÃO NO DESENVOLVIMENTO DE HABILIDADES EMOCIONAIS, MOTORAS E COGNITIVAS DE ALUNOS DO 5º AO 6º ANO

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RESUMO

O objetivo deste estudo foi investigar o efeito de um programa de literatura no desenvolvimento de habilidades emocionais e motoras de alunos de 10 a 12 anos na modalidade voleibol. Participaram da pesquisa alunos do 5º e 6º ano (N=257, 123 meninos e 134 meninas). Os alunos foram divididos aleatoriamente em dois grupos. O primeiro grupo (n=173) seguiu um programa de literatura de 4 meses utilizando o livro literário The Knight in Rusty Armor" [O Cavaleiro da Armadura Enferrujada]e o segundo grupo (n=84) seguiu o programa típico de Educação Física. O ensino de habilidades emocionais foi combinado com um programa de aprendizagem da habilidade cognitiva de backhand do Voleibol. A inteligência socioemocional foi avaliada com o questionário "Emotional Quotient-Inventory: Youth Version (EQ-I:YV)" de Bar-On e Parker, enquanto a avaliação cognitiva do serviço de backhand foi realizada com a ficha de critérios 4 (p. 65) do livro de Educação Física do professor do 5º ao 6º ano. O teste não paramétrico de Friedman – amostras relacionadas a K e o teste não paramétrico de postos sinalizados de Wilcoxon foram utilizados para avaliar o efeito da intervenção da literatura. Os resultados mostraram que o programa de intervenção foi eficaz com os alunos do grupo experimental apresentando uma melhoria significativa em termos de competências emocionais: intrapessoais (P=0,290, Df(1), χ2: 1,119), empatia (P=0,128, Df(1), χ2: 2,312), responsabilidade social (P=0,610, Df(1), χ2: 0,261), adaptabilidade (P=0,006, Df(1), χ2: 7,615), controle de estresse (P=0,000, Df(1), χ2: 53,161) e humor geral (P=0,790, Df(1), χ2:0,071). Houve também melhora na habilidade cognitiva da técnica de saque de backhand, (P=0,000, Df(2), χ2: 61,843). Em contraste, os alunos do grupo de controle não apresentaram qualquer melhora nas habilidades emocionais e no desempenho da habilidade cognitiva de serviço de backhand. Portanto, os achados corroboram a contribuição positiva da literatura para o aprimoramento das habilidades emocionais e motoras por meio da prática do programa de intervenção.

Palavras-chave: habilidades emocionais, habilidades motoras, voleibol, literatura

ABSTRACT

The aim of this study was to investigate the effect of literature program on development emotional and motor skills of students aged 10-12 in the sport of volleyball. Students from 5th and 6th grade (N=257, 123 boys and 134 girls), participated in the research. The students were randomly divided into two groups. The first group (n=173) followed a 4 months literature program using the literary book "The Knight in Rusty Armor" and the second group (n=84) followed the typical Physical Education program. The teaching of emotional skills was combined with a program of learning the Volleyball cognitive backhand skill. Social-emotional intelligence was assessed with the questionnaire "Emotional Quotient-Inventory: Youth Version (EQ-I:YV)" by Bar-On and Parker, while the cognitive assessment of backhand service was carried out with criteria sheet 4 (p. 65) of the Physical Education book of the 5th-6th grade teacher. The non-parametric Friedman test – K related samples and the non-parametric Wilcoxon signed-rank test were used to evaluate the effect of the literature intervention. The results showed that the intervention program was effective with the students of the experimental group showing a significant improvement in terms of emotional skills: intrapersonal (P=0.290, Df(1), χ^2: 1.119), empathy (P=0.128, Df(1), χ^2: 2.312), social responsibility (P=0.610, Df(1), χ^2: 0.261), adaptability (P=0.006, Df(1), χ^2: 7.615), stress control (P=0.000, Df(1), χ^2: 53.161) and general mood (P=0.790, Df(1), χ^2:0.071). There was also an improvement in the cognitive of the back-hand service technique skill, (P=0.000, Df(2), χ^2: 61.843). In contrast, students in the control group did not show any improvement in emotional skills and performance of cognitive backhand service skill. Therefore, the findings support the positive contribution of literature to the improvement of emotional and motor skills through the practice of the intervention program.

Keywords: emotional skills, motor skills, volleyball, literature

Introduction

The relationship between literature and sports is proven, which begins almost simultaneously with the appearance of the written word. Since ancient times, famous poets and writers have recorded the stories of winners and Olympians. The relationship between writer and athlete is not accidental, since both experience failure as often as triumph[1]. The Homeric epics were the starting point of the historical path of sports in literature. The sporting spirit emerged gradually in the Creto-Mycenaean era (2200-1200 BC) and was later connected with the heroic ideal of the Homeric epics. From the epics of Homer we have a complete description of sports competitions such as: chariot races, boxing, wrestling, road, sword fighting, discus, archery and javelin. Nausicaa and her friends, after bathing on the bank of the river, threw away their handkerchiefs and began to play with the sphere: "And as they were enjoying the food, she and the paracores took out their boli and played the sphere among themselves" (Odysseus . g, 99-100, trans. Arg. Eftaliotis). Odysseus together with the Phaeacians played with a purple ball, made by Polybus, throwing it up with his hands as the others all around clapped their hands (Odyss. i, 372-4).

Additionally, according to the Interdisciplinary Common Curriculum Framework a key purpose of teaching literature is to strengthen students' communication skills and social and emotional development through reading, understanding and interpreting significant works of important Greek and foreign writers. The contact with representative works of our cultural heritage, national and global, gives personal experiences and sensitivities to the students, making people capable of actively utilizing knowledge, developing their aesthetic perceptions, acquiring a critical position towards basic issues of individual and social life and to choose their personal attitudes and beliefs[2].

School performance is affected by many factors related to social and emotional intelligence and the ability to create relationships with peers. Social and emotional skills training is a process by which people learn to behave correctly and responsibly, to create correct relationships with others, to avoid negative behaviors, to recognize and manage emotions, to care and take care of others and making good choices[3]. There is evidence that social and emotional skills training is positively related to increased school performance and better grades[4,5].

A high level of social emotional intelligence can lead to an increase in a person's ability to solve problems effectively, which implies an easy adaptation to difficult life situations. Educators in order to develop children's social emotional intelligence should focus and integrate aspects of emotionality into the daily school program, adapted to children's social, moral and intellectual abilities. Argues that programs that develop the skills of flexibility, creativity, and motivation, can lead to an increase in school performance and sociability of students. Many school subjects can be used to teach social and emotional skills[6]. These include the course of Social and Natural Sciences, History, Physical Education, etc.[7]. The development of emotional intelligence, according to the Analytical Curriculum of the Physical Education course in Greece, is one of the intended goals. In particular, the development of cooperation, team spirit, self-discipline, will, responsibility, patience, perseverance, courage, the development of self-esteem and positive self-perception, self-respect and respect for opponents, the development of concepts of honesty and justice[8].

The role of Physical Education Educators and coaches is to investigate, through continuous research, appropriate methods that are enjoyable and valuable for participants, so as to lead them to achieve high performance in specific movements (skills). It is evident that each individual's level of proficiency in a skill is directly related to the quantity and quality of skill practice[9]. It is therefore necessary to identify the methods by which individuals could practice their abilities, which affect the improvement of skills.

Every person from childhood to adolescence and adulthood is involved in a learning process to be able to move in a controlled and skilful way, reacting to the daily and constantly changing demands of the environment[10]. For successful future participation in sports, the comprehensive development of basic motor skills is necessary[11]. Childhood is a critical age for the acquisition of basic motor skills which will then be used in specialized sports leading to an increase in children's physical activity[12].

Motor skills occupy a large part of human performance, for this reason scientists and educators strive to understand the processes and factors that influence their improvement, development and learning. Human performance includes movements with different goals such as complex performances for high athletic performance but also simple performances aimed at simple physical activity to maintain or optimize health. It also includes activities to serve daily operations and environmental requirements, e.g. cutting bread with a knife, balancing to climb a ladder or a mountain, and others dealing with mobility difficulties, e.g. aging, injury[13]. The purpose of this research was to examine the effect of literature program on the development of emotional and motor skills in the sport of volleyball among 10–12-year-old students. The hypotheses of this study were:

(H1) Students in the two groups (experimental literature group and control group) will not improve their emotional skills between the final measurement.

(H2) Students in the experimental literature group will improve their emotional skills in contrast to students in the control group between the final measurements.

(H3) Students in the two groups (experimental literature and control group) will not improve cognitive of backhand service skill between final and retention measurements.

(H4) Students in the experimental literature group will improve cognitive of the backhand service skill in contrast to students in the control group between the final, and retention measurements.

Methods

Study design and participants

In this research 387 5th and 6th grade Primary School students participated (N=257, 123 boys and 134 girls), aged 10 to 12 years (MO= 11.29 ± 6.22). Of these, 171 students were studying in the 5th grade, while, 86 students were in the 6th grade. The students were randomly divided into two groups, the literature group (ν=173) and the control group (ν=84). The first group participated in a 4 months literature intervention program. The second group followed activities decided by the Physical Education teachers. A necessary condition for the inclusion of the students in the intervention program was to inform the parents of the students about their child's voluntary participation and to obtain written consent from the parents before the intervention.

The research was carried out by 9 Physical Education teachers who participated voluntarily, having been trained for 6 weeks by the researcher before starting the intervention program. The content of the training for each week was as follows: a) 1st week: Development of Motor Skills in the Physical Education lesson, b) 2nd week: The role of Life Skills in the Physical Education lesson, c) 3rd week: Methods - Teaching style by Mosston, d) 4th week: The role of Music-Kinematic Education in learning, e) 5th week: Goals, Objectives and pursuits in the Physical Education lesson, f) 6th week: The use of Literature and Theatrical Game in the Physical Education lesson.

Before the start of the program and also after its end, the students of both groups (literature & control) completed the emotional skills questionnaire "Emotional Quotient-Inventory: Youth Version (EQ-I:YV)" by Bar-On and Parker[14]. Also, the backhand service in volleyball was measured in the students of both groups. The measurements were taken

before, after the interventions as well as two weeks after the interventions, without practice. A total of twenty-five (25) teaching hours were carried out, divided into one hour each time, while there was the possibility to do two teaching hours consecutively.

In particular, the intervention program included work sessions with physical activities with parallels and meaningful actions for the sport of volleyball. The planned lesson sessions were enriched with the knowledge from the book "The Knight in Rusty Armor" by Robert Fisher[15] with theatrical techniques (frozen-dynamic images), painting, modern dance and music. The courses were aiming at improving students' emotional skills such as cooperation, anger management, problem solving, communication, empathy, and stress management. The control group followed activities decided by the Physical Education teachers.

Ethics committee approval statement

The research was approved by the Institute of Educational Policy and by the Ethics Committee of Democritus University of Thrace, Greece. The protection of personal data was ensured with complete anonymity of the teachers as well as the right to voluntary participation, but also to withdraw from the research at any stage. The permission was announced to all the participating schools in Greece, with the aim of getting the approval by the school principals.

Development and Description of the questionnaire Emotional Quotient-Inventory: Youth Version (EQ-I:YV)

The questionnaire "Emotional Quotient-Inventory: Youth Version (EQ-I:YV)" by Bar-On and Parker is an instrument for measuring social-emotional intelligence, designed for children and adolescents aged 7 to 18 years. This is a valid and reliable instrument for measuring the social and emotional skills of young people, adjusted in the Greek population[16]. The 34 questions of the questionnaire are divided into 5 factors that assess self-esteem, emotional self-awareness, assertiveness, independence and self-realization (intrapersonality), empathy, social intelligence/ responsibility and interpersonal relationships (interpersonality), the positive attitude and flexibility in dealing with everyday problems (adaptability), impulse control and performing well under pressure (stress control), effectiveness in dealing with everyday demands in general (overall social and emotional intelligence) and conveying optimism and a positive outlook (general mood). Responses are given on a 4-grade scale from “Very rarely true of me” (1) to “Very often true of me” (4).

Development and Description of the test cognitive backhand service

For the cognitive evaluation of the backhand service technique in Volleyball, criteria sheet 4 (p. 65) of the Physical Education book of the 5th-6th grade teacher of the Ministry of Education was used. A total of 3 measurements were taken. In particular the first (initial) measurement was made before the start of the intervention program and the cognitive of the service technique was evaluated. The second measurement (final) was made on the last day of the intervention program and again assessed the cognitive of the backhand service technique in order to establish the effect of the intervention program. The third measurement took place two weeks after the final measurement to assess retention of performance/ learning. The questions for the cognitive evaluation of the overhead serve were as follows: a) In which part of the hand does the ball hit? b) Which leg is in front? c) Which foot is the weight transferred to during the strike? Answers were given on a scale from "at least" (1), "to a moderate extent" (2), "to a satisfactory extent" (3).

Limitations of the research

1. The absence of personal contact of the researcher with the students themselves.

2. It is not known if a representative sample from all the departments of Greece participates.
3. The degree of participation and response of the trainees to the program.
4. The technical problems that may arise as well as the technological skills of the trainees.
5. The research is limited to the study of the effects of the intervention program and the performance in a specific motor skill, students aged 10-12.

Results

Statistical procedures

For the statistical analysis, the SPSS 21 package was used, defining $p<0.05$ as a coefficient of statistical significance. In order to examine this, a specific sequence of statistical analyses had to be performed. These analyses were as follows:

The Kolmogorv-Smirnov test was used to check the normality of the data from which it was found that there is no normal distribution. To test for possible baseline differences between groups, analysis of variance (One-Way Anova) was performed on all variables. The results showed that there were differences in the initial measurements of the two groups. For this reason, the non-parametric Friedman test – K related samples was applied to compare each skill of each group in the same measurement as well as for each skill of each group separately in each measurement. The non-parametric analysis Wilcoxon signed-rank test was also used in order to compare the percentages of each group (pre-post for emotional skills, pre-post and retention measure for cognitive of volleyball skills).

The statistical analyses were as follows:

The Intraclass coefficient was used to test the reliability of the measures of emotional skills (intrapersonality, empathy, social responsibility, adaptability, stress control, general agreeableness) and backhand service. The values were at satisfactory levels for emotional skills, ranging from 0.668, 0.592, 0.643, 0.622, 0.476, 0.666 and Volleyball cognitive backhand service skill it was .451.

Emotional skills

After the application of the Friedman test – K related before and after the implementation of the intervention program, the following were found for each factor of the emotional skills of the two groups:

1) Intrapersonal:

In the literature experimental group, regarding the "intrapersonal" factor, there were no significant differences (P=.290, Df(1), χ^2: 1.119). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the literature group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.365, z= -906).

In the control group, regarding the "intrapersonal" factor, there were no significant differences (P=0.758, Df(1), χ^2:0.095). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the control group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.890, z= 0.138).

2) Empathy

In the literature experimental group regarding the "empathy" factor there were no significant differences (P=0.128, Df(1), χ^2: 2.312). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the literature group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.033, z= -

2.132).

In the control group, regarding the "empathy" factor, there were no significant differences (P=0.355, Df(2), χ^2: 0.857). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the control group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.343, z= -0.949).

3) Social responsibility

In the literature experimental group, regarding the "social responsibility" factor, there were no significant differences (P=0.610, Df(1), χ^2: 0.261). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the literature group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.461, z= -0.737).

In the control group, regarding the "social responsibility" factor, there were no significant differences (P=0.655, Df(1), χ^2: 0.200). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the control group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.736, z= -0.337).

4) Adaptability

In the literature experimental group, regarding the "adaptability" factor, there were significant differences (P=0.006, Df(1), χ^2: 7.615). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the literature group show a statistically significant difference between the 1st and 2nd measurements (P=0.006, z= -2.566).

In the control group, regarding the "adaptability" factor, there were no significant differences (P=0.228, Df(1), χ^2: 1.455). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the control group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.635, z= -0.475).

5) Stress control

In the literature experimental group, regarding the "stress control" factor, there were significant differences (P=0.000, Df(1), χ^2: 53.161). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the literature group show a statistically significant difference between the 1st and 2nd measurements (P=0.000, z= -7.585).

In the control group, regarding the "stress control" factor, there were significant differences (P=0.000, Df(1), χ^2: 25.474). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the control group show a statistically significant difference between the 1st and 2nd measurements (P=0.000, z= -4.861).

6) General mood

In the literature experimental group, regarding the "general mood" factor, there were no significant differences (P=0.790, Df(1), χ^2:0.071). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the literature group did not show a statistically significant difference between the 1st and 2nd measurements (P=0.438, z= -0.776).

In the control group, regarding the "General mood" factor, there were no significant differences (P=.070, Df(1), χ^2: 3.273). To determine any differences between the 2 measurements (before, after) each time period was compared with the previous measurement and the results showed that the participants of the control group show a statistically significant difference between the 1st and 2nd measurements (P=0.020, z= -2.330)

The table 1 shows the means and standard deviations of the emotional skills factors.

Table 1. Pre, Post of emotional skills (means, standard deviation).

Emotional Skills	Test	Literature group n=173		Control group n=84	
		M	*SD*	*M*	*SD*
Intrapersonality	Pre	2.31	.75	2.43	.69
	Post	2.34	.74	2.43	.63
Empathy	Pre	2.95	.66	3.04	.58
	Post	3.07	.61	2.97	.58
Social responsibility	Pre	3.21	.60	3.37	.56
	Post	3.26	.57	3.35	.56
Adaptability	Pre	2.89	.62	2.99	.61
	Post	3.01	.61	2.96	.59
Stress control	Pre	2.41	.61	2.44	.55
	Post	2.77	.40	2.81	.36
General mood	Pre	3.37	.59	3.52	.49
	Post	3.42	.49	3.42	.50

Source: authors

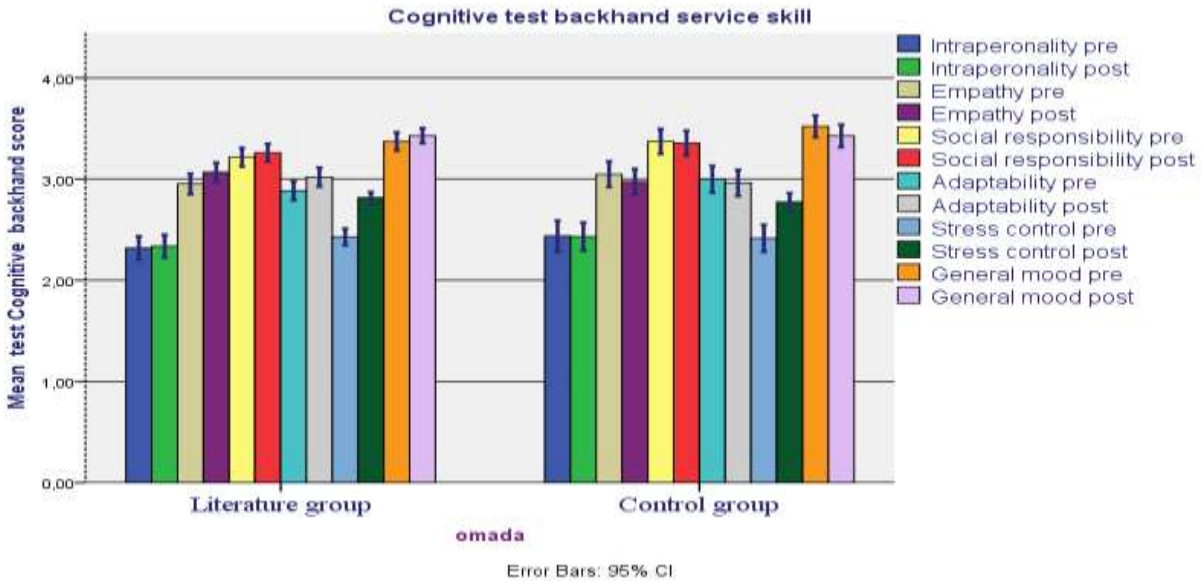

Figure 1. Performance on all measurements across time of the backhand service of the two groups.
Source: authors

Cognitive test backhand service skill

After applying the Friedman test – K related criterion before, after and after the retention measurement after 2 weeks (figure 1) in the cognitive evaluation the cognitive of the service technique: 1) participants in the literature experimental group showed a statistically significant difference in the three measurements (P=0.000, Df(2), χ^2: 61.843). To determine any differences between the 3 measurements (before, after, and retention measurement after 2 weeks), the non-parametric Wilcoxon signed-rank test was used where it appeared that there were statistically significant differences.

The results showed that the participants of the experimental group presented a statistically significant difference between the 1st and 2nd measurement among the three measurements (P=0.000, z=-5.371), as well as the 1st and 3rd measurement (P=0.000, z=-5.857), while they did not present a significant difference between the 2nd and the 3rd measurement (P= 0.446, z=-0.762).

Participants in the control group did not show a statistically significant difference in the three measurements (P=.261, Df(2), χ^2: 2.688).

To determine any differences between the 3 measurements (before, after, and maintenance measurement after 2 weeks), the non-parametric Wilcoxon signed-rank test was used where it appeared that there were statistically significant differences.

The results showed that the participants of the literature group did not present a statistically significant difference between the 1st and 2nd measurement (P=0.972, z=-0.919), the 1st and 3rd measurement (P=0.358, z=-5.857) and 2nd with the 3rd measurement (P= 0.523, z=-0.638).

Table 2 shows the means and standard deviations of the overhand serve.

Table 2. Pre, Post and Retention test of backhand service (means, standard deviations).

Cognitive test	test	Literature group n=158		Control group n=30	
		M	*SD*	*M*	*SD*
backhand service	Pre	3.80	.75	3.78	*.66*
	Post	4.21	.58	3.74	*.85*
	Retention	4.27	.51	3.61	.65

Source: authors

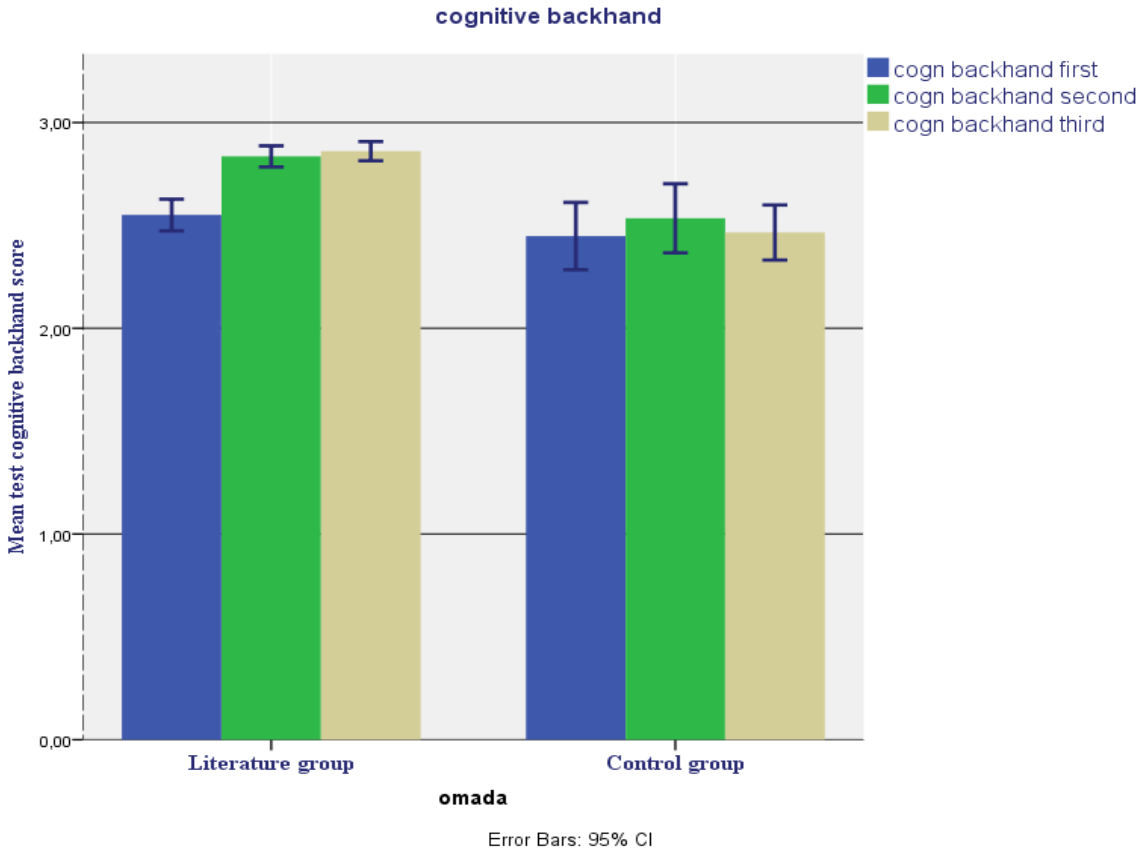

Figure 2. Performance on all measurements across time of the backhand service of the two groups.
Source: authors

Discussion

The purpose of this study was to define the effect of the literature program in the development of students' social skills as well as the improvement of the cognitive backhand volleyball skill in students aged 10-12 years. The students' social skills were measured before and after the interventions. The students' volleyball cognitive backhand skill was measured before, after the interventions as well as two weeks after the interventions. The students of the literature group attended a program based on the literary book: "The Knight in Rusty Armor" by Robert Fisher enriched with theatrical techniques (frozen-dynamic images),

painting, modern dance and music. Before and after the four-month intervention program, the students' emotional skills were measured before after, and after two weeks without practicing the intervention program, the cognitive backhand skill was measured.

The students in the control group did not receive any structured training program. The Physical Education teachers of the control group followed their own exercise program to achieve the goals as far as learning Volleyball cognitive backhand skill is concerned.

The results of this study revealed that the students of the experimental group showed a significant improvement in terms of emotional skills: intrapersonal, empathy, adaptability, while the students of the control group did not show any improvement in any of the factors of emotional skills. There was also an improvement in the knowledge of the service skill from above, in contrast to the students in the control group who had no improvement.

These results are in agreement with those of previous studies. For example, according to Kolovelonis[17], the Physical Education course can effectively contribute to the development of the social and emotional skills of the students, as long as the Physical Education courses are designed in such a way that alongside motor and sports skills, they are taught cognitive and behavioral skills that will be useful to students in their academic life later on.

In addition, the improvement of the emotional skills of the students in the literature group is in agreement with Solomon, Battistich, Watson, Schaps and Lewis[18]. The researchers using the reading and discussion of literary texts implemented a life skills program in the school environment of duration (3) three years for the development of social, moral and intellectual values with positive results even in their academic performance. Students who participated in the literature program improved their emotional skills as well as their cognitive of the backhand service skill.

Conclusion

In conclusion, the utilization of literature is an innovative tool, which can be used by Physical Education teachers to improve cognitive and emotional skills. The research result agrees with Bloom, who argues that learning has three domains: the cognitive, emotional and psychomotor. The cognitive field of learning is linked to the development of cognitive and intellectual skills, which includes knowledge, its understanding, its application in practice, its analysis, synthesis and finally its evaluation[19].

Future research should be conducted with younger or older students to determine whether literature can improve emotional and cognitive skills at other ages, such as elementary school students as well as middle or high school students.

It is documented that students trained in PE in teamwork, brainstorming and problem solving both individually and in groups can apply life skills[20]. Certainly a supportive learning environment helps to improve emotional and cognitive skills, since the Physical Education course teaches students how to behave with the rules for positive social behavior[21, 22]. The results of the research agree with those of previous qualitative evaluations of life skills programs[23, 24, 25] and show that participatory teaching methods and active techniques (such as theater, literature, dance) were appropriate for teaching the emotional, social, and cognitive skills of the intervention program[26]. Also, other studies describe skill development through sport and also transfer to other domains[27,28, 29]. The present research can be applied in the future in volleyball sports clubs for better academic skills of volleyball players and cognitive skills of the sport of Volleyball.

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