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The Effect of Health-Saving Educational Technologies on Development of Natural Abilities of Schoolchildren

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Abstract

Health saving-based educational technologies aim to provide a combination of children's needs, motivations, knowledge, optimal health level and normal physical development. In this study, the effect of the health-saving educational technologies program applied to secondary school students in increasing their physical fitness, self-efficacy in sports and mental endurance in reducing negative nutritional behaviors was examined. In the study, experimental procedures were carried out according to the 2x2 control group, pretest and posttest trial model. Experimental applications of the study lasted for 10 weeks, with 33 experimental and 33 control group students. During this period, the health-saving educational technologies program was applied in the experimental group; on the other hand, no application was made in the control group. Before and after the experimental procedure, pretests and posttests were applied to the experimental and control groups (Physical Fitness Test, Sports Self-Efficacy Scale, Negative Eating Behavior Scale and Mental Endurance Scale). According to the research findings, the students in the experimental group, who applied the health-saving educational technologies program, achieved higher levels of physical fitness, sports self-efficacy and mental endurance than their peers in the control group. It has also been found that the health-saving educational technologies program is effective in reducing negative eating behaviors.

Introduction

According to several researches, the learning-teaching environment at school constitutes up to 40% of the negative factors that impair the health of school-age children. The reasons for this are that the education system and process only focuses on academic issues; failure to comply with sanitary and hygiene standards and rules for the organization of the educational process, negligent behavior of pedagogical personnel in the protection and development of health, inadequacy of the methods, technologies and tools used in the learning-teaching process in reducing the factors that negatively affect the health of schoolchildren (Allensworth & Kolbe, 1987; Jabbour, 2011; Mukhin et al., 2020; Ulanova, 2014). However, it is seen that the inclusion of health saving-based educational technologies in school practices not only provides high academic performance, but also eliminates the overload in educational work, improves children in a versatile way, reduces negative behaviors and habits,

while making the practices effective and makes children versatile (Mukhin et al. ., 2020; Parsons, Stears & Thomas, 1995; Stears, 1995; Steiner, Erickson & Hernandeez, 2002; World Health Organization, 1996).

Health saving-based educational technologies aim to systematically employ algorithms, tools and techniques to implement complex measures to improve children's all-round health at every stage and stage of the education process (Atilgan & Tukel, 2021; Dorokhova et al., 2016; Karagöz, Dinç, & Kaya, 2022; Lazaridis et al., A., 2021; Ye et al., 2021). It is known that health is a state of physical, mental and social well-being. In general, health saving-based educational technologies aim to provide a combination of children's needs, motivations, knowledge, optimal health level and normal physical development (Karapuzova, 2015; Iermakova, 2014). To achieve this goal, there are some steps that must be carried out gradually in order. The first is the needs analysis or diagnosis phase. This stage includes examining children's personalities, learning and development characteristics, and environmental conditions. In the second stage, a development program is prepared for each child with a holistic approach, including health saving technologies, based on the results of the needs analysis. At this stage, it is important to include different and enriched teaching activities (cognitive, affective and psychomotor activities) in the plan. The third stage includes the realization of activities developed within the framework of the individual program. At this stage, in order to effectively implement health saving-based education technologies, gyms and related materials, environments that will provide health and balanced nutrition, visual arts and music workshops, drama and game rooms, school garden, and outdoor sports facilities, workshops for technical skills, it is important that there are multi-purpose educational environments, environments for individual and group work, psychological counseling, guidance and health services and environments at school and their effective use (Dorokhova, Kudryavtseva & Volgina, 2016; Koycheva, Budnik & Khyzhniak, 2019).

Health Saving-based Education Technologies and Holistic Education

Educational technologies based on health saving aim to provide intellectual, social, personal, professional, spiritual and physical development of the individual through holistic education, to educate him/her as a whole rather than just in the academic field, to ensure his development as a whole and to contribute to self-realization (Akdeniz et al., 2016; Farrington et al., 2012). Nurturing the individual as a "whole" means that teachers, those who design and administer education, and parents focus on the individual's whole self. Of course, this is a process that starts from kindergarten and continues until university years. This encompasses all aspects of an individual's well-being, including social-emotional, physical, creative and cognitive capacities. This means that not only the left brain, which is related to cognitive areas, but also the right brain, which is the brain of creativity, conscience, compassion, aesthetics and innovation, is processed, developed and valued (Cunha, Heckman & Schennach, 2010; Kautz et al., 2014). Giving equal importance to each of these aspects is essential for an individual's success both academically and in life. It is a priority for the individual to try while learning and grow, to make mistakes during these trials and to feel comfortable in the process. The aim of the education given is to equip the individual with the skills necessary to be a productive member of society as an adult, and as a result, to become a good person and a good citizen. Meeting the needs of individuals beyond academic fields and preparing them in this direction is of vital importance for both academic and life self-realization. In this context, we would like to remind Gardner's "Multiple Intelligence Theory (Gardner, 1999).

Holistic education is a comprehensive teaching approach in which educators try to address the emotional, social, ethical and academic needs of students in an integrated learning format (Jacobs & Alcock, 2017). In such a system, an emphasis is placed on providing students equally with services that support both their academic and non-academic needs. It both encourages and enables individuals to learn, think and prepare for life by allowing them to deepen their natural curiosity and desire to wonder, explore and learn more, by being sensitive to their understanding, interests and abilities. Accepting and teaching the individual as a whole will contribute to their cognitive, emotional, physical and spiritual development. Such an approach and philosophy, that is, focusing on educating the individual as a whole, of course also requires understanding individuals and their relationships with others and the micro and macro communities in which they live (Jacobs & Alcock, 2017; Moffitt et al., 2010).

Both the dynamism and diversity of individuals, contexts and levels in the learning-teaching process, as well as the change and development of technology day by day, and studies on technology integration require education stakeholders to deal with learning-teaching processes with a holistic approach in schools. Since various individuals such as teachers, instructors, administrators and other personnel are involved in the process of integrating health saving-based technologies into the school, it is assumed that it will be limited to consider individual factors with a one-sided approach such as only the characteristics of the instructors, the beliefs of the students or the point of view of the administrators. It needs to be addressed in a way that includes all parties, including administrators, students and other individuals in the process. As a matter of fact, education as a social enterprise is a complex, multidimensional and dynamic system that includes many parties such as teachers, students, parents, administrators, commercial partners and rule makers, and the impact of each of these parties must be taken into account in order to effectively integrate health saving technologies into this process. (Afshari et al., 2009; Drent & Meelissen, 2008; Ertmer, 2005; Haslaman et al., 2008).

Health Saving-based Educational Technologies and Nutritional Habits

Educational technologies based on health saving aim to equip children of all ages and levels with balanced and conscious eating habits so that they can continue to develop as healthy individuals. Children who are exposed to many harmful-harmless foods during their growth process, where children consciously take their first steps into society, do not know what and how to eat, and they face nutritional problems because of not choosing the right foods at schools and homes and cooking them with inappropriate methods. The main purpose of these programs is to support the child's development by gaining the right nutrition habits and to ensure that the physiological, psychological and social development is at the most ideal level. The most important indicator of balanced and adequate nutrition is the child's height and weight values appropriate for his/her age, that is, his/her growth and development within healthy limits. In ensuring this, school administrations and teachers have important duties as well as parents and relatives. The Ministry of Health has tried to develop approaches that cover all the family-school-environment and child perspectives in its studies on nutrition practices in school-age children and has put its signature under many new applications. The change in eating habits in modern life has increased the prevalence of unbalanced nutrition. Skipping breakfast, eating especially fast food outside, eating in front of the TV, snacking between main meals, consumption of calorie-rich foods, drinking sugary drinks, insufficient consumption of milk and dairy products, unbalanced eating habits, frequent eating or emotional eating behaviors are common in

childhood. Fast-food products such as pizza and hamburgers have high calories, and eating out behavior is quite common in children recently (Bryant et al., 2022; WHO, 2017).

In the etiology of eating disorders in adolescence; weight gain, dissatisfaction with body image due to weight gain, social pressure, desire to diet, desire for weak body structure, and social media influence seem to play a role (Striegel-Moore & Bulik, 2007). Diet is one of the negative health behaviors seen in adolescents who are exposed to social media, family and friends pressure, where body image gains importance. Most of the time, as a result of unconscious diet, adolescents are deprived of necessary nutrients for growth and development (Micali et al., 2015). Studies show that adolescents who go to school in the early hours skip breakfast. It is stated that individuals who skip breakfast have a 4.5 times higher risk of obesity (Basch, 2011). It has been reported that excessive eating behavior as a result of excessive hunger after long-term fasting causes obesity (Blondin et al. 2015; Lebow, Sim & Kransdorf, 2015). Since adolescents spend most of their time with their friends, their eating habits are also affected by this environment. In addition, choosing fast-food with high fat content instead of the family table for lunch and dinner, the media's promotion of unhealthy foods, and the preparation of fast-food products in the school canteen play an important role in the formation of obesity (Olsen and Ruiz 2008; Jacobi et al., 2004).

Nutrition education programs related to health saving-based educational technologies also reduce the false influence of children and adolescents from television (Kotz & Story, 1994; Taras & Gage, 1995). Often school-age children show more interest in food advertisements on TV, begin to act more erratically, and these behaviors turn into habits. School-age children generally enjoy the consumption of ready-packaged food, as well as the consumption of food at home. Over time, children start to enjoy shopping and eating out, and they prefer to eat in patisseries, school canteens, and fast food restaurants instead of consuming food at home (Drake et al., 2002). In childhood, consumption of vegetables and fruits and consumption of milk and dairy products were found to be insufficient, while consumption of packaged snacks was reported to be high. School-age children should consume foods with high nutritional value such as milk, buttermilk, fruit, cheese and bread for snacks (IOM, 2007). In this respect, the effects of health saving-based education technologies on unbalanced and wrong eating habits were also tested. What is written about children and nutrition is generally about malnutrition. However, the right approach should be to consider the concept of “Nutrition Disorder”. Malnutrition generally refers to malnutrition or lack of a special diet, but overeating and, accordingly, obesity are also examined under this heading today. If the malnutrition is temporary, children regain their health and quickly catch up with their growth rate. If the malnutrition continues for a long time, it causes developmental problems in adulthood. The groups most affected by nutritional problems are especially school-age children.

Health Saving-based Education Technologies and Sports

There is a wide variety of methods for maintaining or improving health. Undoubtedly, one of the points where these various methods come together is sports activities and recreational exercises (Dai & Menhas, 2020; Yalçın & Arslan, 2016). When the literature on health behavior, which is defined as the whole of behaviors related to the protection and development of health, is examined, many theories explaining health-promoting mechanisms and some research results show that sports-related variables are important in determining health behaviors such as

physical exercise, nutrition, weight control and attitudes towards habit-forming substances. (Johnson et al., 1993; Malm, Jakobsson & Isaksson, 2019). One of the purposes of Health saving-Based Education Technologies is to ensure that children are interested in sports, to improve their physical and mental health, to gain self-confidence and to reach a high level of performance. The importance of regular physical exercises for health becomes more evident with each passing day. Exercises ensure optimal functioning of muscles, bones, joints, cardiovascular system and functions. Physical health gained during childhood and youth and maintained throughout life is considered essential for the body to function at its highest capacity (Zubiaur, Zitouni & Del Horno, 2020). In this context, it is necessary to gain the habit of regular exercise or sports from an early age. It was observed that the physical activities of children between the ages of 12-14 were at the highest level, then decreased, and boys preferred more active and challenging activities than girls. In a study conducted in Finland, it was stated that physical activity reached its highest level at the age of 12 and then decreased. In addition, researchers reported that physical activity during youth is important, but it is a weak determinant of one's activity level after 9 years, and the best determinant is the degree of participation in physical education classes and organized sports at school. In this respect, health saving-based education technologies are based on providing children's physical education activities in a rich way and improving their physical fitness. While children's health-related physical fitness levels are related to flexibility, muscular and cardiovascular endurance, muscular strength and body composition, performance characteristics or ability characteristics to be chosen for sports are related to agility, strength, speed, coordination and balance (Harrison, Roberts & Elton, 2005). Due to the limited number of studies in the literature on health-saving educational technologies and the fact that these studies were carried out on a theoretical basis, this research was designed as an experiment. For this purpose, the effect of the health-saving educational technologies program applied to secondary school students aged 12-13 on negative nutritional behaviors, physical fitness, self-efficacy in sports and mental toughness was investigated with an experimental research. The study sought answers to the following questions:

- Is there a significant difference between the negative eating behaviors of the children in the experimental group, in which the Health-saving educational technologies program was applied, and the children in the control group, which did not receive any application?
- Is there a significant difference between the physical fitness and sports self-efficacy of the children in the experimental group, where the Health-saving educational technologies program was applied, and the control group, which did not receive any application?
- Is there a significant difference between the mental toughness of the children in the experimental group in which the Health-saving educational technologies program was applied and the children in the control group that did not receive any application?

Method

This study is an experimental study based on the split-plot model with 2x2 control group, pretest, posttest) aiming to reveal the effectiveness of the health-saving educational technologies program aimed at reducing negative eating behaviors and increasing the physical fitness and mental stamina of students attending secondary school aged 12-13. In the study, the independent variable is the health-saving educational technologies education program, and the dependent variable is the negative eating behaviors, physical fitness and mental toughness scores

of the subjects. In the study, the effect of manipulating the independent variable on the dependent variable was examined.

A health-saving educational technologies program was applied to the subjects participating in the research for an average of 120 minutes a day for 10 weeks. Body measurements, nutritional behavior measurements, mental toughness measurements and tests were carried out before and after the health-saving educational technologies program. In the study, 5 modules were applied: physical fitness, participation in sports activities, healthy eating behavior and literacy, mental endurance activities and holistic learning.

The physical fitness and self-efficacy module in sports consists of 10 minutes of warm-up, 50 minutes of aerobic, anaerobic, flexibility and jumping exercises, the last 10 minutes of cool-down and relaxation exercises. In the healthy eating behavior and literacy module, the energy and nutritional requirements of school-age children, health and balanced nutrition, food safety, school-age nutrition problems, nutritional literacy, and negative eating habits are covered. In the mental endurance module, health-saving educational technologies and mental-cognitive development, Health life and mental endurance - subjective well-being were applied with activities. Subjects participated in the tests and measurements specified under the heading of data collection tools before and after the study program.

The study group of the research consists of children between the ages of 12-13 who are studying in a secondary school in the city center of Almaty in the 2022 academic year. In the experimental and control groups, negative eating behavior test, mental endurance scale, sports self-efficacy scale and physical fitness-performance test (aerobic, anaerobic, flexibility and running test) were applied as pre-test at the beginning of the research. Pretest measurements were carried out simultaneously in both groups. The results of the pretest measurements performed in the experimental and control groups were reviewed in terms of statistical difference. At the beginning of the experimental applications of the study, it was observed that the children in the experimental and control groups were equivalent to each other in terms of research parameters (see Table 1, Table 2, Table 3).

Table 1. Analysis of Pre-test Physical Fitness Test Scores of Experimental and Control Groups by t-Test

	Pre-Test	Group	N	Mean	Std. Deviation	t	p
PHYSICAL FITNESS TEST	Vertical Bounce	Experimental	33	25.08	3.13	-1.08	0.28
		Control	33	25.87	2.79		
	Anaerobic Power	Experimental	33	87.72	8.09	0.17	0.86
		Control	33	87.36	8.77		
	Aerobic power	Experimental	33	37.21	2.78	1.17	0.26
		Control	33	37.91	2.00		
	Flexibility	Experimental	33	24.20	2.09	-0.67	0.50
		Control	33	24.52	1.68		
	30m Sprint	Experimental	33	6.07	0.85	0.07	0.95
		Control	33	6.06	0.90		

According to Table 1, there is no significant difference between the arithmetic means of the pretest physical fitness scores of the experimental and control groups ($p > 0.05$). This shows that the physical fitness scores of the students in both groups in the pretest are very close to each other, the difference between the mean scores is not at a significant level and the groups are considered equal to each other in terms of physical fitness before the application.

According to Table 2, there is no significant difference between the arithmetic mean scores of the pre-test sport self-efficacy scores of the experimental and control groups ($p > 0.05$). This shows that the self-efficacy scores of the students in both groups from the pretest are very close to each other, the difference between the mean scores is not at a significant level, and the groups are considered equal to each other in terms of self-efficacy in sports before the application.

Table 2. Analysis of Pre-test Sport Self-Efficacy Scores of Experimental and Control Groups by t-Test

Pre-Test	Group	N	Mean	Std. Deviation	t	p
Self-efficacy in Sports	Experimental	33	3.11	0.39	-1.05	0.30
	Control	33	3.21	0.39		

According to Table 3, there is no significant difference between the arithmetic means of the pretest negative eating behavior scale scores of the experimental and control groups ($p > 0.05$). This shows that the negative eating behavior scores of the students in both groups from the pretest are very close to each other, the difference between the mean scores is not at a significant level, and the groups are considered equal to each other in terms of negative eating behavior before the application.

Table 3. Analysis of Pre-test Negative Eating Behavior Scores of the Experimental and Control Groups with the t-Test

Pre-Test		N	Mean	Std. Deviation	t	p
Negative Eating Behavior	Experimental	33	6.03	0.55	.10	.92
	Control	33	6.01	0.96		

According to Table 4, there is no significant difference between the arithmetic means of the pre-test psychological resilience scores of the experimental and control groups ($p > 0.05$). This shows that the resilience scores of the students in both groups from the pre-test are very close to each other, the difference between the mean scores is not at a significant level, and the groups are considered equal to each other in terms of resilience before the application.

Table 4. Analysis of Pre-test Psychological Resilience Scores of the Experimental and Control Groups with the t-Test

Pre-Test	Group	N	Mean	Std. Deviation	t	p
Psychological	Experimental	33	3.32	0.44	0.04	0.97
Resilience	Control	33	3.32	0.53		

Data Collection Tools

Physical Fitness Tests

Vertical Jump Test and Calculation of Anaerobic Power: Measurement was made using a vertical jump board. When the feet are together and the body is upright, the two arms are extended upwards and the last point where the fingertips touch is marked. Then, the subject made contact with the board by jumping upwards with all his might with both feet. The subject did not take a step during the upward jump and bent his/her knees 90°. This process was repeated three times and the best value was recorded. The anaerobic power of the athletes was calculated with the Lewis formula using the jump distance and body weight (Tong et al., 2014).

Flexibility Measurement: The flexibility of the subjects was measured with the Sit and Reach test on the flexibility bench. Subjects were recruited for this test after warming up. The subjects' bare feet are resting on the test bench, sitting on the ground, reaching forward without bending their knees, pushing the ruler forward on the table, and the stretching distance was recorded by stopping for 1-2 seconds at the farthest point (Nakata et al., 2017).

30 m Running Test: After warming up, the subjects were kept ready at the exit point on the measured ground. When the exit signal was given, they ran 30 m at maximum speed. The time between start and end was determined by photocell. The test was applied to the subject twice and the best value was recorded (Ferrauti et al. 2002).

Sports Self-Efficacy Scale

It is evident that psychological structures have an effect on athlete performance, such as the ability to measure sports self-efficacy consistently. The aim of this study is to develop a measurement tool with psychometric properties that can measure the self-efficacy beliefs of athletes. *Materials and methods:* The participants of the study consisted of 325 athletes (age 21.6 ± 4.2) actively engaged in various sports in Turkey. Exploratory and confirmatory factor analyzes were used in the validity and reliability analysis of the scale. The Cronbach's Alpha reliability coefficient value of the total scale is .88. *Findings:* The findings revealed that the validity and reliability analysis results of the scale were in perfect agreement in general. In conclusion, it can be said that the Athlete Self-Efficacy Scale (ASES) is a valid and reliable measurement tool and can be used to determine the self-efficacy levels of adult athletes. *Result:* The validity and reliability studies of the Athlete Self-Efficacy Scale should be repeated in sports branch-specific or younger age groups. In addition, the self-efficacy of the athlete is a universal concept. In this respect, it is also valid in other cultures and it is recommended to adapt the scale to other languages and cultures.

Negative Eating Behavior Test

The "Negative Nutrition Behavior Test" was developed by the researcher to measure the negative food consumption of children. The scale consists of 10 items determined to determine the negative food consumption and habits of children and to measure unhealthy food consumption. Some of these items are 'I would like to snack all the time', 'I constantly consume chips and similar foods', 'I eat candy and chocolate most of the time'. A score

between 0 and 10 is taken from the test. High scores from the test indicate unhealthy food consumption, and low scores indicate healthy and positive food habits. All items in the test are scored as 1 if there is negative food consumption or habit, or as zero if there is no negative food consumption or habit. The validity and reliability analyzes of the test, which reveals the one-dimensional structure, were made by the researcher. The KR-20 reliability coefficient of the test was calculated as 0.84.

Mental Endurance Scale

In order to determine the mental resilience of the participants in the study, the "Mental Resilience Scale (MRS)", consisting of 11 items, consisting of 11 items and a reliability coefficient of 0.86, was used. The scale is comprised of Confidence, which means “believing in the abilities to reach the goal in difficult situations that require struggle and thinking that it is good in any situation”, Continuity meaning “taking responsibility, concentrating and struggling in line with the determined goals” and “keeping one's coolness under pressure or unexpected situations”. It consists of 11 questions containing the sub-dimensions of Control, which includes the concepts of “being in control and being comfortable”. In addition to these concepts, the scale also provides information about total mental toughness.

Findings

According to Table 5, there is a significant difference between the arithmetic averages of the posttest Vertical Jumping, Anaerobic Power, Aerobic power and Flexibility scores of the experimental and control groups ($p < 0.05$). However, no significant difference was found between the posttest 30-meter running averages of the experimental and control groups. These findings lead to the conclusion that the health-saving educational technologies program applied in the experimental group provides high physical endurance compared to no application in the control group, and this performance of the students is higher. According to this result, it can be interpreted that the activities based on the health-saving educational technologies program are effective on the physical endurance of the students.

Table 5. t-test Results of the Posttest Physical Fitness Scores of the Experimental and Control Groups

	Post-Test	Group	N	Mean	Std. Deviation	t	p
PHYSICAL FITNESS TEST	Vertical Bounce	Experimental	33	28.93	2.65	2.05	0.04
		Control	33	27.66	2.38		
	Anaerobic Power	Experimental	33	92.42	5.46	2.17	0.03
		Control	33	88.88	7.61		
	Aerobic power	Experimental	33	39.53	3.20	3.01	0.00
		Control	33	37.42	2.47		
	Flexibility	Experimental	33	26.84	2.56	2.54	0.01
		Control	33	25.42	1.92		
	30m Sprint	Experimental	33	5.65	.64	-1.50	0.14
		Control	33	5.94	.90		

According to Table 6, there is a significant difference between the arithmetic means of the posttest sport self-efficacy scores of the experimental and control groups ($p < 0.05$). These findings lead to the conclusion that the health-saving educational technologies program applied in the experimental group provides a high perception of self-efficacy in sports compared to the case of no application in the control group, and the students raise these competencies to higher levels. According to this result, it can be interpreted that the activities based on the health-saving educational technologies program are effective on the self-efficacy of the students in sports.

Table 6. Mean, Standard Deviation and t-test Results of the Experimental and Control Groups' Posttest Sport Self-Efficacy Scores

Post-test	Group	N	Mean	Std. Deviation	t	p
Self-efficacy in Sports	Experimental	33	4.06	0.58	4.58	0.000
	Control	33	3.45	0.50		

According to Table 7, there is a significant difference between the arithmetic mean of the posttest negative eating behavior scores of the experimental and control groups ($p < 0.05$). These findings lead to the conclusion that the health-saving educational technologies program applied in the experimental group reduced negative nutritional behaviors compared to no application in the control group. According to this result, it can be interpreted that the activities based on the health-saving educational technologies program are effective and reduce the negative nutritional behaviors of the students.

Table 7. Mean, Standard Deviation and t-test Results of the Experimental and Control Groups on Posttest Negative Eating Behavior Scale Scores

Post-Test	Group	N	Mean	Std. Deviation	t	p
Negative Eating Behavior	Experimental	33	4.12	1.32	-4.98	.000
	Control	33	5.43	0.74		

According to Table 8, there is a significant difference between the arithmetic averages of the posttest mental toughness scores of the experimental and control groups ($p < 0.05$).

Table 8. Mean, Standard Deviation and t-test Results of the Posttest Mental Resilience Scores of the Experimental and Control Groups

Post-test	Group	N	Mean	Std. Deviation	t	p
Psychological Resilience	Experimental	33	4.40	0.72	3.82	0.00
	Control	33	3.64	0.88		

These findings lead to the conclusion that the health-saving educational technologies program applied in the experimental group provides high mental endurance compared to no application in the control group, and these competencies of the students are increased to higher levels. According to this result, it can be interpreted that the health-saving educational technologies program is effective on the mental endurance of the students.

Conclusion and Discussion

In this study, the effect of the health-saving educational technologies program applied to secondary school students in the 12-13 age group on their negative nutritional behaviors, sports self-efficacy, physical fitness and mental endurance was tested by experimental research. According to the research findings, the students in the experimental group, in which the health-saving educational technologies program was applied, got lower negative eating behavior scores in the post-test compared to their peers in the control group who did not receive any treatment. This finding shows that the health-saving educational technologies program is effective in reducing negative eating habits. These findings are similar to the findings of studies conducted by Chansukree & Rungjindarat (2017), Galloway et al. (2015), Kim et al. (2019), Kim, Cho & Kim (2021), Yusufov et al. (2016). According to Kim, Cho, and Kim (2021), employing health-based multifaceted strategies, including psychosocial, sports and physical activity participation, has a very high effect in reducing negative eating behaviors. According to Kelder, Hoelscher & Perry (2015) and Lee, Cho & Kim (2020), on the other hand, holistic nutrition and health programs based on self-efficacy, beliefs, attitudes and control of negative habits reduce children's negative eating behaviors and related habits. According to Sobal and Bisogni (2009), the factors contributing to poor eating habits are complex and improving eating behavior requires an interdisciplinary approach that accepts the social context. Healthy eating behaviors are essential in maintaining physical health and supporting optimal learning and school success (Kim et al., 2016). Developing food literacy within the scope of a holistic nutrition program is an important factor for healthy food choices (Vidgen & Gallegos, 2014). In this respect, the health-saving educational Technologies program carried out in the experimental group has been effective in reducing the negative nutritional behaviors of children, with holistic and rich practices aimed at improving balanced nutrition, food literacy and awareness, sports self-efficacy, physical fitness and mental endurance.

Another correlation discussed in this research is the effects of the health-saving educational technologies program on sports self-efficacy and physical fitness. According to the research findings, the students in the experimental group who applied the health-saving educational Technologies program achieved higher levels of physical fitness and self-efficacy in sports compared to the control group. These findings are similar to the findings of studies conducted by Anderson and Haraldsdottir (1995), Derelieva (2007), Slimani et al. (2016), Tatiana et al. (2016). The creation and development of an individual's physical culture, including physical fitness, sportive skills, behaviors and competencies, is closely related to the protection of student health and to providing them with healthy lifestyle education. According to Slimani et al. (2016), children who learn to control their bodies effectively, at any time or speed, can adapt to a large number of changes. In this respect, health-saving educational Technologies program applications, which include aerobic and anaerobic exercises, have served the results such as effectively controlling the bodies of the students, increasing their physical fitness and developing self-efficacy. Similarly, in a study conducted by Güvenç (2007), it was seen that 11-16 year old children in the experimental group participating in active sports and aerobic-anaerobic exercise program had significantly higher physical fitness values than their peers in the control group who did not exercise regularly. Movement and physical activity training programs conducted by Katie et al. (2003) showed that the physical fitness and sports performance of 12-14 year old children improved positively. According to Anderson and Haraldsdottir (1995), the school environment provides an excellent environment for children by enabling them to implement very rich physical

fitness programs. Including many activities such as strength, endurance, health, fitness and mental endurance within the scope of the Health-saving Educational Technologies program made high contributions to the physical endurance of children as well as their sportive self-efficacy. In support of these findings, many scientific studies show that physical fitness education should be part of an effective strategy of comprehensive health care and physical performance for young people, as long as it is done systematically (Anderson & Haraldsdottir, 1995; Faigenbaum, 2007; Izquierdo et al., 2010; Simons-Morton et al., 1993; Sharma, 2006).

The last finding obtained in this study is about the effects of health-saving educational technologies program applications on mental resilience. According to the research findings, the students in the experimental group who applied the health-saving educational Technologies program achieved higher mental toughness scores compared to the control group. Studies in the field of health show that physical activity, balanced diet and participation in holistic health practices have positive effects on mental health, psychological health, specific well-being and mental resilience (Da Silva et al., 2012; Hamer et al., 2008). Again, Bale et al. (2015), Gonzelez et al. (2016), Paluska and Schwenk (2000) and Torkildsen (2006) found that active participation in sports and exercises performed both in school and out of school are effective in increasing the psychological health and mental resilience of individuals.

Based on the findings of this study, the following recommendations can be made. The effects of 10-week health-saving educational technologies program applications on the physical, psychological and behavioral parameters of children in different age groups can be examined. Generally, short-term programs do not have an effect on the development and change of nutrition, mental endurance and physical fitness parameters. For this reason, multi-group research can be conducted to reveal the effects of health-saving educational technologies program applications for 1 year or more. In-service trainings, seminars and workshops can be organized for teachers and educators about the applications of the health-saving educational technologies program. It is recommended that future research focuses on the multifaceted effects of changes in participation in activities based on the Health-saving educational technologies program on psychological variables.

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