

# Content analysis of science textbooks from the fourth, fifth, and sixth grades of elementary school based on the degree of emphasis on the dimensions of the health curriculum

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## Abstract

This research aimed to analyze the content of science textbooks of the fourth to sixth grade of elementary school based on the emphasis on the components of the health curriculum. The research population consisted of science textbooks of the science textbooks of elementary school, and the statistical sample size was equal to the population using the census sampling method. The research method was categorical content analysis, and the unit of analysis was sentence and theme. The measurement tool was a reverse questionnaire and a researcher-made checklist, and selective, axial, and open coding and maxqda software were used to analyze the data. The results showed that the mental and spiritual health components are not mentioned in the science textbook of the fourth and fifth grades among the health curriculum components, including physical, mental, environmental, social, and spiritual health. All the components of a health curriculum were mentioned in the science textbook of the sixth grade. The most emphasis was on the environmental health component, and the least was on the mental and spiritual health component among the mentioned components.

*Keywords:* Health curriculum, Components, Content analysis, Textbooks, Fourth, Fifth, and sixth grade of elementary school

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## 1. Statement of the problem

Humans achieve experimental science as one of the 11 areas of learning to perceive the surrounding world, which leads to the scientific education of students to have the requirements of a healthy and prosperous life [15]. Topics studied in the experimental science textbooks include life sciences, health sciences, earth sciences, and physical sciences, containing interesting and controversial topics. Health, in elementary school, accounts for more than a third of science books [16]. Health and well-being are known as related topics in the field of health curriculum with two main sub-areas of "health and hygiene" and "physical education, sports, and healthy recreation." These sub-areas include motor skills and physical fitness, sports fields, healthy recreation, principles of healthy and balanced nutrition, safety and prevention of individual and collective injuries in various dimensions and conditions, biological skills, and personal and public health [6]. The essential components of a health curriculum are learning reading, listening, analysis skills, decision-making, and applying these skills for prevention and treatment goals regarding physical and mental health [20]. The health curriculum for children should use applications, complex conversations, participation in project activities, and workshops to stimulate students' attitudes and perceptions. The primary purpose of education is to develop the students' mental and physical health who need more education and evolved life [9].

Health and education are inextricably related [7] and engaging students with these skills and learning about health issues requires educators to provide students with the results and findings of health issues [14]. The health curriculum includes health education, physical education, nutrition services, health care, and psychological services [2]. Therefore, the curriculum should represent the necessary knowledge, attitudes, and skills and be designed to promote students' healthy lives [4]. The health curriculum provides opportunities to acquire basic knowledge, insight, and life skills and inspires teachers and others who work at the school [3]. In addition, nutrition and health highly affect children's learning and behavior. Children with cognitive and sensory disorders have lower academic achievement who are more likely to have an academic failure [1].

In recent years, the Iranian educational system developed a document entitled "Fundamental Transformation Document" to guide conscious steps towards drawing the desired vision and achieving the country's comprehensive excellence infrastructure in various fields for the country's future. This document aimed to achieve the first economic, scientific, and technological position in the region until 2025 [6]. Bioeducation is considered as one of the fields of education and learning in the National Curriculum Document (2012), which is one of the main subsystems of the Fundamental Transformation Document. This type of education is a comprehensive learning map that provides the basis for a comprehensive, extensive, and profound transformation in educational concepts and content. The health curriculum is one of the six sacred areas of the Fundamental Transformation Document considered in the present study.

Successful and effective curricula in any society align with its dominant social philosophy. The philosophical basis of the Iranian education system is based on the teachings and values of the religion of Islam [6]. In this document, the fourth to sixth elementary students identify their mental and physical-motor characteristics, needs, and abilities and choose an appropriate behavior pattern in various situations. They promote their health and well-being and examine their impact on their own and others' health by participating in health, wellness, healthy recreation, physical education, and sports activities. They also explain the impact of their pattern of behavior on the environment as divine revelations and improve their performance by identifying their living environment.

Textbooks are the product of the curriculum, which is considered a program to determine the quality of learning and is worth pondering. The education system in Iran is centralized, and books and

teachers are the axes of teaching and learning, and in many cases, the textbook is the only teaching tool available to the teacher. Understanding the effects of the textbook provides a review, revision, and modification of the curriculum and content of books in the areas of planning development and, consequently, academic achievement [8].

The health curriculum in this study aims to pay attention to physical health, mental health, social health, environmental health, and spiritual health.

Some of the critical studies in this regard are conducted by Mashaallahinejad, Saeedi Rezvani, Jalayeri Lain 2019, who analyzed the content of science textbooks and indicated that most of the books pay attention to environmental education and personal, civic, and social responsibility, and other cases are not mentioned [11]. Fazeli and Mahdavi Ikdloo 2019 stated that the most and least attention to environmental problems was in the seventh grade of high school and third grade of elementary school, respectively. Science textbooks paid the most attention to the role of humans in the environment and the least attention to noise pollution [5]. Piri and Mohammadi 2019 showed that the components of nutritional health (physical, family, mental, and environmental) were discussed more than and prevention was explained less than other contents among all the pages of elementary school textbooks [16]. Azimi 2017 revealed that the most and least attention of official textbook content was to mental and physical health and prevention of diseases, respectively [4]. Salehi Emrani and Abedini Beltarak 2011 demonstrated that the highest frequency of the textbook components was related to sports and physical activity, and the least attention was paid to the components of smoking and drugs [18]. Sassani, Mets, C. Sai et al. 2020 concluded that paying attention to the component of physical health in textbooks promoting physical activity can reduce anxiety, increase resilience, well-being, and positive mental health of children [19]. Manuel, Chira, Gatano, Ario 2019 represented that school has drastically reduced the hours devoted to health dimensions in the curriculum, which negatively affects the students' learning ability [10]. Mambuer-Kelchner 2018 presented the high demand for health services in the school environment, considering that there are one to five children with a mental disorder in the educational institution every year. Providing health resources is a preventive treatment and increases health literacy in the school environment [13]. Morris 2013 illustrated that the inclusion of psychological and social issues in students' science curricula is an excellent international trend, which can help increase student interest and participation apart from their intrinsic value [12]. Therefore, this research aimed to evaluate the importance of the health curriculum in the science textbooks in the fourth to sixth grades of elementary school.

## 2. Analysis method

The present research is a descriptive type of content analysis, and the unit of analysis in this research is sentence and content. The research population is all the sciences textbooks of the fourth to sixth grades of the elementary school published in 2020 by the Ministry of Education. The population is the pages of three books in the three grades of the elementary course with 119 (13 chapters), 104 (12 chapters), and 103 (14 chapters) pages. The entire population was considered as samples due to the nature of the research topic and the limitations of the statistical population for sampling. The research instrument was a reverse questionnaire and a researcher-made checklist, and two basic steps were taken in the content analysis section. According to theoretical foundations and research, components of the health curriculum were extracted using various methods, approaches, and perspectives on health from various databases and information sources (Table 1).

These components were provided to 12 experts in health and curriculum to determine the validity of the components mentioned for the health curriculum (Table 2).

Table 1: Themes and components of the health curriculum

Constructive themes	Basic themes
Physical health	Skin and hair health, oral health, healthy nutrition, exercise and physical activity, eye, and ear health, adequate and regular sleep, prevention of chronic diseases
Mental health	Resilience, coping with anxiety, stress, depression, self-esteem, anger control, ability to say no, boldness, avoiding high-risk behaviors.
Social health	Social cohesion, social acceptance, social participation
Environmental health	Saving resources (fuel, water, and energy), the importance of natural resources and their protection, sanitary disposal of waste, prevention of air pollution, prevention of noise pollution
Mental health	Communication with God, hope in life, adherence to morality, having a purpose, having meaning in life

Table 2: Status of health curriculum components

Health Curriculum Components	Degree of agreement	Status	
		Confirmed	Rejected
Physical health	0.100	*	
Mental health	0.100	*	
Environmental health	0.83	*	
Social health	0.66	*	
Spiritual health	0.83	*	

$$CVR = \frac{n_e - N/2}{N/2} \rightarrow For \begin{cases} n = 10 & N = 12 & CVR = \frac{10 - 6}{6} = 0.66 \\ n = 11 & N = 12 & CVR = \frac{11 - 6}{6} = 0.83 \\ n = 12 & N = 12 & CVR = \frac{12 - 6}{6} = 0.100 \end{cases}$$

According to experts, all constructive themes were approved, and according to the lavochi table, at least 0.56 is needed to determine the content validity for nine people. Based on the table, the components with at least 56% agreement were selected as the components of the curriculum. Coding methods including selective, axial, and open coding were used to analyze the data. Data were analyzed using maxqda, and open coding (initial coding) was put on the agenda to encode the components. First, the texts of the textbooks were read line by line, and the concepts related to the health curriculum were extracted. In the next step, the related codes and concepts were merged using the axial coding method, and the final coding was extracted selectively.

Table 3: Results of content analysis of the fourth-grade science textbook

Main class	First sub-class	Initial open codes	Frequency
Physical health	Exercise and physical activity	Playing bubbles in students	3
		Exercise	
	Healthy nutrition	Get enough milk and dairy	9
		Chew food properly	
		Body's need for healthy air and food	
		Drink enough water	
		Eat a variety of fruits and vegetables, olives, and walnuts for heart health	
		Planting required edible plants and using its product	
		Lack of drinking too much soda	
		Lack of eating high-fat foods	
	Lack of eating too hot or too cold foods		
	Prevention of chronic diseases	Fight pathogenic invertebrates to stay healthy	13
		Timely excretion of urine and care of the kidneys	
		Take care of the body by doing the right things	
		Use detergents, medicines, and spices for health and cleanliness	
		Lack of mixing detergents due to damage	
		Lack of tasting solutions and mixtures that we do not know	
		Proper functioning of different parts of the body and creating health	
		Properly meeting the needs of the body	
		Heart rate in a healthy adult human	
Carefully reading labels on containers when using ingredients and mixes			
Using metal utensils in cooking			
Better and faster heat transfer in metals			
Skin and Hair Health	Washing hands with soap and water before eating and after going to the bathroom	5	
	Keep nails short		
	Lice on the hair and severe itching of the skin		

Environmental health	Saving resources (fuel, water, and energy)	Need the energy to get things done	29
		Energy sources include wind, running water, fuels, and the sun	
		Energy consumption in various forms in life	
		Energy saving	
		Discuss and offer suggestions on ways to use energy properly	
		Energy consumption in irons, heaters, vacuum cleaners, and elevators	
		Power outage and lighting the candle	
		Electricity as one of the most consumed energies in the world	
		Disconnect the TV power switch after turning it off with the remote control	
		Save electricity	
		Turn off the lights when leaving the room	
		Lack of leaving the tap open while brushing and drinking a glass of water	
		Need for sunlight energy in plant growth	
		Sun as the largest source of energy	
		Solar energy; clean, cheap, and endless energy	
		Production of thermal energy in fuels such as gasoline, diesel, and municipal gas	
		Saving misplaced fuel consumption	
		Fuels; the most important energy source	
		Exhaustion of fuels	
		Prevent excessive consumption of fuels	
		Supplying heat to homes by burning firewood, gas, and oil in winter	
		The role of materials used in homes in fuel consumption	
		The presence of seams on doors and windows wastes heat energy	
		Use non-conductive materials to prevent heat loss in winter	
		Use non-conducting materials to prevent heat from entering the house in summer	
		Lack of opening the windows when the air conditioner and heater are on	
Covering the seams of doors and windows with sealants			
Using thick curtains to cover the windows			
Avoid increasing the flame of the heater and use warm clothes in winter			

	The importance of natural resources and their protection	Protection of energy resources	53
		Participate in environmental protection activities	
		Proper use of detergents and dyes and its dangers for living and natural	
		Use cloth bags instead of nylon bags in shopping	
		Keeping a rose bush in the school garden by students	
		Using plants to prepare a variety of medicines, oils, paints, paper, and so on	
		Efforts to protect plants	
		Avoid breaking tree branches and flowers	
		Avoid writing learning on the tree	
		Avoid harming plants and animals	
		Protection of flowers and trees	
		Extinguish the fire when returning from a family outing	
		Avoid harming living organisms	
		Failure to destroy habitats with activities such as road construction and factories	
		The duty of every human being;	
		Avoid harming living organisms	
		Avoid keeping animals in cages	
		Avoid harming animal nests in the desert, plains, coast, etc.	
		Caring for animals	
		Preparation of various tools and materials in life by various stones	
		Exhaustion of stones more quickly in its indiscriminate use	
		Damage to the habitat of plants and animals during rock extraction	
		Avoid moving rocks for no reason in nature	
Preventing the air pollution	Air pollution by fuel consumption	5	
	Doing the right thing in protecting energy resources and reducing air pollution		
	Using public transport instead of private car		
	Trying to keep the air healthy		
	Avoid playing outdoors on days of air pollution		

	Sanitary disposal of waste	Avoid leaving metal, plastic, and paper waste in nature	9
		Avoid leaving metal, plastic, and paper waste in nature	
		Dry waste recycling	
		Separating collection of paper waste	
		Collecting metal cans of drinks and food in separate bins	
		Throwing garbage in the trash	
		Avoid dumping garbage in rivers and seas when traveling	
		Exit garbage from the house	
		Avoid dumping garbage on the beach or river, where animals live	
Social health	Social participation	Conversation about textbook questions	17
		Conversation about figures	
		Conversation about mixtures	
		Experimenting with classmates	

Four physical, environmental, social, and mental health components were extracted following the fourth-grade science textbook's content analysis (Table 3). In addition, 3, 9, 13, and 5 open codes were identified in the sub-components of exercise and physical activity, healthy nutrition, prevention of chronic diseases, and skin and hair hygiene, respectively, in the primary physical health component. Similarly, 29, 53, 5, and 9 open codes were found in the sub-components of saving resources, the importance of natural resources, prevention of air pollution, and sanitary waste disposal in the main component of environmental health. A total of 17 open codes were specified in the social health component. Physical health included exercise and physical activity, healthy nutrition, prevention of chronic diseases, adequate sleep, skin and hair health, oral health, and eye and ear health. However, the fourth-grade science textbook extracted only the subcomponents of exercise and physical activity, healthy nutrition, prevention of chronic diseases, and skin and hair health due to content analysis. The purpose of exercise and physical activity in this study is exercise and play. In the fourth-grade elementary science textbook, on page 2, it was observed that students were playing bubbles in the schoolyard. Elsewhere in the book, it is mentioned that exercising helps the heart work better.

Healthy nutrition means following the health recommendations and avoiding improper nutrition. The extracted components in the content analysis of the fourth-grade science textbook are health recommendations and improper nutrition, and the use of appropriate utensils in the preparation of food. For example, the phrase, "Me and my classmates plant plants like basil, tomato, and cucumber in a pot and use the product," is used in the context of proper nutritional advice on page 110 of the science textbook. Sentences such as eating various fruits, vegetables, olives, and walnuts are suitable for the heart, and the recommendation to consume enough milk and dairy products are mentioned on page 82. Overall, there were six open codes for health advice in the book, but three codes were extracted for improper nutrition. For example, page 88 of the book states, "If we eat high-fat foods, our hearts and arteries may not work properly in adulthood because the fatty substances in food stick to the walls of the arteries and make it harder for blood to move."

Furthermore, two open codes were extracted from the sub-component of using suitable dishes in food preparation. Chronic diseases refer to illnesses often caused by unhealthy behaviors (such as malnutrition, inactivity, and physical activity). A total of nine open codes were extracted from

the second sub-component of disease prevention due to content analysis. For example, "I never mix different detergents because it may harm me" was stated on page 14. There are eight other open codes in this field, listed in Table 1. Skin and hair health refers to health care for skin and hair health. Page 97 stated, "Wash your hands with soap and water after going to the bathroom and before eating." Two more codes were extracted due to content analysis in the textbook.

Table 4: Results of content analysis of the fifth-grade science textbook

Main class	First sub-class	Initial open codes	Frequency
Physical health	Exercise and physical activity	Playing and competing Exercising	5
		Playing balls	
		Auxiliary exercise to strengthen muscles	
	Healthy nutrition	Making yogurt or fizzy doogh	6
		The usefulness of milk, meat, and eggs for the muscles	
		Proper bone growth, eating dairy, and exposure to sunlight	
		Drinking a glass of milk every day	
		Using fresh bread	
		Avoid eating very cold and very hot foods	
	Prevention of chronic diseases	Muscle function in the body	7
		Joints cause bone movement	
		Brain; Responsible and commander of body work	
		Operating the front teeth of humans and carnivores like a wedge	
Control of the heart and lungs by the brain			
The role of the spinal cord in controlling the activities of the body to the brain			
Recognizing flavors, such as sweetness and bitterness through the taste nerve			
Skin and Hair Health	Washing hands and face with soap and water	7	
	Using disposable gloves and shovels when working with dirt		
	Washing hands with soap and water after the test		
	Washing hands before eating		
	Skin; Protects the body against germs, cold, and heat		
	Awareness of the brain of cold, heat, touch, and contact through receptors		

		Sensitivity of skin in parts of the body with more touch receptors	
		Muscle function in the body	
	Eye and ear health	Failure to see some objects easily	18
		Eye problems in some elderly people	
		Myopia and nearsightedness	
		Blinking and eye movement by muscles	
		Eye protection by the scalp	
		The role of retinal cells in seeing objects and recognizing their color and shape	
		Maintaining eye health	
		The protective role of the eyelids in the entry of dust into the eyes	
		Maintaining eye health	
		Transmitting messages by nerves from eyes and ears to the brain	
		The role of the cochlea of the ear in hearing a sound	
		The role of earwax in preventing small animals from entering the ear	
		The secretion of earwax in the ear prevents hearing sounds	
		Ear irrigation and removal of excess material	
		Lack of shouting in someone's ear	
		Lack of shouting in someone's ear	
		Avoid hitting anyone's ear with a hand, book, or other objects	
Environmental health	The importance of natural resources and their protection	Extinction of dinosaur generations in the distant past	
		Information obtained from the effect of dinosaur feet in Kerman coal mine	
		Find living characteristics based on the effect of some parts of its body	
		Searching for relics of past living things	
		Fossils include relics of past plants and animals	
		Finding information about the habitat and type of food of the past by studying fossils	
		Displacement and crushing of rocks due to wind, mountain fall, and water flow	
		Plant roots cause rocks to crumble	
		Crushing rocks with temperature change	
		Suitability of garden soil for plant growth	
		Humus contains suitable and necessary materials for plant growth	
		Extensive effect of irrigating plants on their further growth	

		The effect of light on plant growth	
		The effect of amount and type of water on plant growth	
		Providing suitable water for plant growth in agriculture	
		A good mixture of clay, sand, and fertilizer in the garden soil	
		The effect of sunlight on plant growth	
		The effect of planting plants on environmental cleanliness	
		Planting a tree in our residential area and taking care of it	
		Clay; The best soil for plant growth	
		Shoveling gardens	
		Planting steps	
		Transfer of water and soluble substances to the plant by lethal filaments	
		Receive oxygen through the plant leaf pores	
		Elimination of carbon dioxide through the pores in the leaves of plants	
		Plants need suitable soil and sufficient water to survive and grow	
		The effect of suitable soil, light, sufficient climate on obtaining a better crop	
		Irrigating plants every day	
		Fertilize garden soil at certain times of the year	
		The effect of suitable soil, light, and weather in obtaining a better crop	
		Doing teamwork with the participation of different people	
	Saving resources (fuel, water, and energy)	Burning gas in the oven	18
		Avoid wasting water	
		Avoid extravagance	
		Human involvement in changing nature	
		Water contamination with finer grain soil	
		Soil erosion with the movement of soil by water and wind over time	
Social health	Social participation	Collaborate in preparing the table for eating	19
		Doing group work with different people and experiments with classmates	

Following the content analysis of the fifth-grade science textbook in the main component of physical health, 5, 6, 7, 7, and 18 open codes were identified in subcomponents of exercise and physical activity, healthy nutrition, prevention of chronic diseases, skin and hair health, and eye and ear health, respectively. A total of 40 open codes were specified in subcomponents of the importance of natural resources of the main component of environmental health, and 19 open codes were detected in subcomponents of the social participation in the main component of social health. The first component of exercise and physical activity is one of the items considered in the component of physical health. As a result of content analysis, it was extracted that "Alireza and his classmates exercise. They bend, run, hit the ball and throw it. When they exercise, they move different parts of their body" (page 44 of the fifth grade science textbook, the second sub-component of sports and games). The other four extracted open codes in the fifth-grade science textbook are listed in the table. The use of dairy products and proteins, dietary abstinence, and healthy foods are some of the items that have been extracted as a result of content analysis from the component of healthy nutrition as four open codes in the textbook. For example, page 42 of the textbook states the importance of consuming dairy products in childhood, "Eating enough dairy products will help your bones grow and strengthen well and be strong in adulthood." Two open codes were extracted from the component of abstinence from food and consumption of healthy foods, which are mentioned in the table. Overall, four open codes were extracted through content analysis from the subcomponent of chronic disease prevention, healthy behaviors. For example, page 42 of the textbook mentioned, "Exposure to sunlight causes bones to grow better and prevents osteoporosis in adulthood." In addition, two open codes were extracted in organ care diagnosis of eye diseases, and structure and maintenance of eye and ear health are the second subclasses with 18 open codes. After content analysis, seven open codes were extracted from the sub-component of skin and hair hygiene (cleanliness and skin protection). For example, page 86 of the textbook states, "Wash your hands with soap and water after performing the tests."

Table 5: Results of content analysis of the sixth-grade science textbook

Main class	First sub-class	Initial open codes	Frequency
Physical health	Exercise and physical activity	Running	9
		Tug of war	
		Mountaineering	
		Ice or snow skiing	
		Cycling	
		Exercise	
		Doing some soft work out	
	Healthy nutrition	Exercise	4
		Feeling of cheerfulness in the body	
		Eat adequate and varied food	
		Eating nutritious foods, such as dates and raisins	
	The role of nutrition in the development of some non-communicable diseases		
	Avoid salty and fried foods with lots of oil		

Prevention of chronic diseases	The outbreak of infectious diseases	39
	The outbreak of infectious diseases	
	Pathogens	
	The life of microbes as disease carriers in the body of animals	
	Malaria-carrying mosquitoes	
	Dogs carrying rabies	
	The body's defense barrier	
	Skin; the barrier to the entry of germs into the body	
	Avoid shaking hands and kissing people with colds	
	Nasal mucosa and airways	
	The secretion of antibodies in the body is a barrier against the entry of microbes	
	Proper and timely use of medication during illness	
	Disease recovery	
	Increase body resistance	
	The effect of vaccines on the body's resistance to disease	
	Strengthen muscles and heart	
	Non-communicable diseases	
	Diabetes	
	Malaria	
	Purulent sore throat	
	Hypertension	
	Healthy behaviors	
	Maintaining health	
	Proper sitting down	
	Proper walking	
	The health of children and adolescents	
	The role of bacteria in our body	
	Production of vitamins in the human intestine by bacteria	
	Eliminating harmful bacteria by bacteria in the skin	
	Signs and symptoms of the disease	
	Halitosis	
	Muscle pain	
	Burning when urinating	
	Destruction of the lungs by tuberculosis germs	
Disorders of the body's organs		
Consume foods with calcium and protein		
Avoid softening bones and breaking them with minimal impact		
Consume foods with calcium and protein		
Avoid damaging the spine		

Environmental health	Skin and Hair Health	Avoid contacting oxygenated water with the skin	3
		Using gloves during chemical tests	
		Washing hands with soap and water before and after the test	
	Oral Health	Teeth brushing	3
		Avoid breaking hard things with teeth	
		Healthy teeth	
	The importance of natural resources and their protection	Storing oxygenated water in a dark place	38
		resources and their protection	
	Avoid using oxygenated water indoors		
	Avoid combining bleach with other detergents and cleaners		
	Avoid prolonged contact with toxic lead metal		
	Avoid contact with industrial acids		
	Avoid performing experiments indoors		
	Avoid putting alcohol on direct heat		
	Planting a tree on Arbor Day with parents		
	Creating fertile agricultural lands		
	Improving and strengthening the soil		
	Planting trees		
	Losing forests		
	Cutting down forest trees		
	Irrigation of trees and green spaces		
	Wastewater treatment by specific bacteria		
	Planting native trees		
Storage of solar light energy in plants			
Plants that produce food for living organisms			
Leaves; the principal place of food production in plants			
Earthquake; One of the natural phenomena on Earth			
Damage to life and property during an earthquake			
Recognition of earthquakes and other natural phenomena			
Earthquake effects			
Maximum seismic damage at the fracture site			
Reinforcement of buildings			
Organisms' need for oxygen			
Nutritive relationship of living things			
Residuals of living things by fungi and their return to nature			

Social health		Habitat change	6		
		Extinction of some organisms due to their incompatibility with habitat change			
		Hunting animals by humans			
	Saving resources (fuel, water, and energy)		Metal; the best electrical conductor	6	
			Heating houses and moving cars and power plants with fossil fuels		
			Sunlight; the primary source of energy		
			Convert energy from one form to another		
			Energy labels on appliances and food		
			Energy consumption		
			social solidarity		
	Conversation about the disadvantages of having a personal relationship with students				
	Student participation in school practical work				
	Helping the injured				
	Performing tests with the help of the teacher				
	Helping others	6			
	Changing means of communication from the past to the present				
	Communication of humans with each other				
	Tourism development	5			
	Iranian culture				
Lack of carelessness in crossing the street	5				
Mental health	Dealing with anxiety, stress, and depression	Maintaining composure		5	
		Good manners and fair and respectful treatment of those			
		Good manners and fair and respectful treatment of those around			
		Mental health			
	Avoid high-risk behaviors	Dangerous games and jokes			
Spiritual health	having goal	Thinking in creation	4		
		Wonders of Creation			
	Hope in life	Solve life problems			
		Kindness			

The content analysis of the sixth-grade elementary science textbook in the main component of physical health led to 9, 4, 39, 3, and 3 open codes in sub-components of exercise and physical activity, healthy nutrition, prevention of chronic diseases, skin and hair health, and oral health. A total of 38 and 6 open codes were found in the sub-component of the importance of natural resources and saving resources from the main component of environmental health, and 8 and 3 open codes were detected in the sub-component of social participation and cohesion from the main component of social health. The content analysis regarding the sub-component of exercise, physical activity, and playing resulted in 9 open codes in the textbook by mentioning sports, such as skiing, mountaineering, cycling, and running. Regarding healthy nutrition, nutritional recommendations with two open codes and preventive nutrition with two open codes were extracted from content analysis. Accordingly, page 69 of the textbook states that "Eating certain foods such as raisins or dates can give energy to the body." Sub-components of pathogens, dealing with disease, healthy behaviors, the role of bacteria in the body, signs and physical effects of diseases, and calcium intake were extracted by content analysis regarding the prevention of chronic diseases. As shown in the table, 39 open codes were observed in the textbook. For example, page 99 of the textbook states that sitting, walking, and exercising properly prevent damage to the spine. In addition, page 97 of the textbook says, "If antibiotics are prescribed to cure your disease, take them at the same hours as your doctor tells you to. Failure to do so will give the germs a chance to make themselves resistant to the antibiotics, so the medicine will not be able to kill them." Hand care and health under the skin and hair health components were extracted by content analysis, and four open codes were identified in the textbook. According to page 78 of the textbook, "You should wash your hands with soap and water before and after experiments." Dental care was extracted as from content analysis in the oral health sub-component with three open codes. For example, page 99 of the textbook expressed, "We can have healthy teeth by doing simple tasks, such as brushing and avoiding breaking hard things with teeth."

### 3. Discussion and conclusion

The results of research in the fourth-grade science textbook showed that the most significant emphasis on the component of physical health was on the subcomponents of chronic disease prevention (13), healthy nutrition (9), skin and hair health (5), and exercise and physical activity (3), respectively. No code was extracted in the sub-components of oral health, eye and ear health, adequate and regular sleep. The greatest emphasis on the environmental health component was in the sub-components of the importance of natural resources (53), saving resources (29), sanitary disposal of waste (9), prevention of air pollution (5), and no open code were identified under the component of noise pollution. A total of 17 open codes were identified in the social health component in the social participation sub-component. No code was extracted in the components of mental and spiritual health. The most emphasis of the fifth-grade science textbook regarding physical health was on sub-components of the eye and ear health (18), skin and hair health (7), prevention of chronic diseases (7), healthy nutrition (6), and exercise (5), respectively. Sub-components of oral and dental health and adequate and regular sleep were not mentioned. Overall, 40 and 18 open codes were identified in the environmental health component for the sub-components of the importance of natural resources and resource-saving (fuel, water, and energy), respectively. No open code was extracted in air pollution, noise pollution, and sanitary waste disposal sub-components. A total of 19 open codes were identified in the social health component, the social participation sub-component. No open code was identified in mental and spiritual health component in the fifth-grade textbook. Open codes for sub-components of chronic diseases (39), exercise and physical activity (9), healthy nutrition (4), skin and hair health, and oral health (3) were extracted in the sixth-grade science textbook for the

physical health component. There was no mention of adequate and regular sleep and ear health components. The greatest emphasis in the environmental health component was on the importance of natural resources with 38 codes and saving resources with six codes, respectively, and no open code was identified in other sub-components. Generally, 19 and 6 open codes were identified in social participation and social cohesion sub-components regarding social health.

In addition, the spiritual health component had goal and hope sub-components with two open codes. Health components in textbooks do not have a normal distribution, while some components have received more attention than others. These results were consistent with Mashaallahinejad, Saeedi Rezvani, Jalayeri Lain 2019, who analyzed the content of science textbooks and indicated that most of the books pay attention to environmental education and personal, civic, and social responsibility, and other cases are not mentioned (11). Fazeli and Mahdavi Ikdloo 2019 stated that the most and least attention to the role of humans in the environment and noise pollution, respectively (6). Manuel, Chira, Gatano, Ario 2019 represented that school has drastically reduced the hours devoted to health dimensions in the curriculum, which negatively affected students' learning ability (10). Given the rapid developments of technology and the environmental challenges and consequences, additional and supplementary education resources should be provided to teachers and students in the form of booklets, related booklets, and educational software in cooperation with other relevant organizations, including the Environment Organization in addition to textbooks related to environmental education. Skills exercises and their application in the content of textbooks can enrich environmental content. Psychological and spiritual issues in school science textbooks increase students' interest and participation in school activities, in addition to the intrinsic value of these topics.

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