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Letter from the Editor

Dear Readers,

The Turkic World refers to a geography and civilization basin shaped by common historical roots, linguistic kinship, and cultural structure. The Turkic World, encompassing Turkic states and communities, is also an ideal that requires continuous effort to realize. In the 21st century, in the face of the transformative and at times standardizing effects of globalization, the preservation of local identities and the sustainable transmission of shared heritage have gained importance. At this point, Mustafa Kemal Atatürk said, "We have brothers who share our language and faith under the leadership of our friend. We must be ready to stand by them. Being ready does not mean simply waiting silently for that day. We must prepare ourselves. How do nations prepare themselves? By maintaining their spiritual bridges. Language is a bridge. Faith is a bridge. History is a bridge." clearly sets out the intellectual framework of the Turkic World perspective. As Atatürk emphasized, the preparedness of nations is possible not only through political measures but also by maintaining their spiritual bridges. Indeed, the institutional contacts that developed among the Turkic states which gained independence following the dissolution of the Soviet Union can be regarded as a contemporary reflection of this historical foresight. The permanent integration of the Turkic World requires the convergence of shared values in the economic, educational, cultural, and academic spheres. In this regard, the Turkic World carries with it the responsibility of building a common future while making sense of the legacy of the past.

In this issue, the International Journal of Life Science and Social Studies Education (IJLSSSE) has included studies comparing the life science course curricula in Türkiye and Turkmenistan, as well as studies on the SCIM-C strategy and biomimicry technique in life science course.

I would like to thank the valuable authors who submitted their works to Volume 3, the academicians who meticulously evaluated these works, and Res. Asst. Eylem ÇOBAN and Res. Asst. Esra Nihlenur ŞEN who carefully prepared them for publication. I hope that IJLSSSE will contribute to studies on life science, the Turkic world, and innovative approaches in education.

Prof. Dr. Bayram TAY

Editor

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Comparison of Life Science Course Curricula in Türkiye (2018) and Turkmenistan (2021)

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Abstract

A comparative examination of life science course curricula implemented in different countries contributes to understanding similarities and differences in educational approaches and provides guidance for curriculum development. This study aims to comparatively examine the 2018 Türkiye and 2021 Turkmenistan life science course curricula. The study was conducted using a qualitative case study design. Life science curricula of the two countries constituted the data source, and the data were analyzed through document analysis. Findings indicate that while the program approach is explicitly included in the Türkiye Life Science Course Curriculum [TRLSCC], it is not included in the Turkmenistan Life Science Course Curriculum [TKMLSCC]. The objectives are structured more comprehensively in the Türkiye curriculum, whereas in the Turkmenistan curriculum they are mainly organized around healthy and safe living. In terms of learning outcomes, skills, values, and concepts, the Türkiye curriculum presents a denser structure. These elements in Türkiye curriculum emphasize individuals' multidimensional development, cultural identity awareness, and active participation in social life, while in Turkmenistan curriculum they focus on health, safety, and compliance with social rules. Explanations of the teaching-learning process, including specific days and weeks, are included in the Türkiye curriculum but not in the Turkmenistan curriculum. Although activity examples are not directly included, detailed activity explanations are provided in Turkmenistan teacher's guidebook. In the assessment dimension, Türkiye curriculum adopts a process-based and flexible approach, whereas Turkmenistan curriculum adopts a grade- and portfolio-based approach. It is recommended that content supporting early entrepreneurship awareness be integrated into both countries' life science curricula.

Keywords: Türkiye, Turkmenistan, life science course, curriculum, comparative education.

Introduction

Life science can be described as a course that prepares students for life. Aiming to foster children's self-awareness and self- understanding, the life science course is the first subject of the citizenship education curriculum, whose content is developed by taking children's cognitive levels into account and integrating elements from the social sciences, natural sciences, arts, thought, and values (Tay, 2017). This course also serves the goal of educating good citizens by supporting children's experiential exploration of the natural environment in which they live and fostering the development of their individual identities in harmony with shared values, qualities for society (Çoban et al., 2025; Güleryüz, 2008). Thus, the life science course lays the foundations of citizenship education in children and provides a basis for the subjects to be taught in subsequent grades (Akyürek Tay, 2024). To educate individuals who possess the aforementioned qualities, it's necessary to implement a curriculum designed in accordance with individual and societal needs effectively (Demir et al., 2025). In this respect, the aims, content, and implementation processes of the life science course are systematically and functionally structured through curricula.

A curriculum is a guide that specifies the subjects to be taught across various grades and courses at a particular level of education, the objectives of these subjects, the number of instructional hours allocated to each course per week at each grade level, and the teaching methods and techniques to be employed (Çoban, 2015). In another definition, a curriculum is described as a program that includes the objectives of the courses to be offered at a given educational level, the behaviors encompassed by these objectives, the instructional situations,

and the assessment procedures that indicate the extent to which these behaviors have been acquired (Senemoğlu, 2005). Curricula are of great importance as they constitute the foundation of educational processes and delineate the framework guiding instructional activities (Melanlıoğlu, 2008). Elements such as values, skills, and instructional approaches included in curricula can be regarded as important indicators that reflect countries' educational philosophies and societal priorities. Therefore, it can be argued that examining curricula contributes to understanding the overall orientations of an education system. Amore comprehensive and meaningful evaluation of these orientations requires the joint examination of curricula from different countries. Indeed, identifying similarities and differences across various education systems enables a clearer understanding of the ways in which curricula diverge from or overlap with one another. In this regard, it is emphasized that comparative education studies should be considered an important alternative and reference source in the processes of curriculum development and revision (Demircioğlu & Kardeş, 2020). Within this framework, comparative education studies stand out as a significant approach for the systematic analysis of curricula in different national contexts.

Comparative education is defined as an interdisciplinary field that analyses the educational systems of two or more countries and aims to reveal their similarities and differences based on predetermined criteria (Koç, 2019). In a similar vein, comparative education is a research approach that examines the education systems and curricula of different countries, draws on their advanced practices, and seeks to reveal how similar problems emerge in different national contexts and how they may be addressed (Balcı, 2007; Kuru Çetin et al., 2017). Comparative education examines all issues related to education, including diverse educational policies, education-related legislation, the financial resources and organizational structures of education systems, diplomas, aims, content, methods, students, teachers, administrators, parents, and supervisors (Türkoğlu, 2020). The comparative education approach may enable the identification of effective practices by revealing the relationships among curricular aims, content organization, and pedagogical approaches.

Furthermore, in an effort to enhance and enrich their education systems, countries may systematically examine the curricula of other nations and incorporate effective practices into their own curricula. From this perspective, the evaluation of life science course curricula within an international and comparative framework can contribute not only to the continuous improvement of national curricula but also to a more comprehensive understanding of both shared educational orientations and context-specific curricular practices. Within this framework, the present study undertakes a comparative examination of the life science course curricula implemented in Türkiye and Turkmenistan.

In order to enable a meaningful comparison of curricula. It is considered necessary to examine the structural characteristics and fundamental components of the education systems of the countries in which these curricula are implemented. In this context, information regarding the educational levels of Türkiye and Turkmenistan is presented in Table 1.

Table 1.

Schematic Representation of the Education Systems of Türkiye and Turkmenistan

Türkiye education system			Turkmenistan education system		
Grade level	Educational stage	Student age	Grade level	Educational stage	Student age
	Pre-primary education	—		Pre-primary education	0–5
1*	Primary school	6	1*	Primary school	6
2*		7	2*		7
3*		8	3*		8
4*		9	4*		9
5*	Lower secondary school	10	5*	Lower secondary school (Middle school)	10
6*		11	6*		11
7*		12	7*		12
8*		13	8*		13
			9*		14
9*	Upper secondary school (High school)	14			
10*		15	10*		15
11*		16	11*	Upper secondary school (General secondary)	16
12*		17	12*		
—	Tertiary Education	18 and above	—	Tertiary Education	

*Compulsory Education

As shown in Table 1, compulsory education in Türkiye has been set 12 years. The 12 year compulsory education is divided into three stages, each lasting four years. The first stage is primary school, the second stage is lower secondary school, and the third stage is upper secondary school. The education system in Turkmenistan is organized into several levels: preschool education up to age 5, primary school ages 6-9, lower secondary school for ages 10-15, and general secondary education for ages 16-17. Compulsory education begins at age 6 and lasts for 12 years. The difference between the education systems of Türkiye and Turkmenistan are presented in Table 2.

Table 2.

Differences Between the Education Systems of Türkiye and Turkmenistan

	Türkiye	Turkmenistan
Ministry	Ministry of National Education of the Republic of Türkiye	Ministry of Science of Turkmenistan
Language of instruction	Turkish	Turkmen
Education system structure	4+4+4	4+6+2
Compulsory education	12 years	12 years
Weekly school days	5 days	6 days
Duration of one class period	40 minutes	45 minutes
Grading system	100-point grading system	5-point grading system
School structure	Different levels in separate buildings	All levels within the same buildings

As shown in Table 2, the education system in Türkiye is administered by the Ministry of National Education of the Republic of Türkiye, whereas the education system in Turkmenistan is administered by the Ministry of Education of Turkmenistan. In Türkiye, compulsory education consists of three levels: four years of primary education, four years of lower secondary education, and four years of upper secondary education, amounting to a total 12 years. In Turkmenistan, compulsory education also spans 12 years and includes four years

of primary education, six years of lower secondary education, and two years of general and vocational-technical secondary education. In Türkiye, education is delivered in separate school buildings, operates five days per week, and each class period lasts 40 minutes. In contrast, in Turkmenistan all levels of education are provided within the same building, instruction takes place six days a week (excluding Sunday), and the duration of a class is 45 minutes. Information regarding the grading and assessment systems of the two countries is presented in Table 3.

Table 3.

Grading and Assessment Systems in Türkiye and Turkmenistan

Türkiye education system			Turkmenistan education system		
Numeric grade	Score range	Description	Numeric grade	Score range	Description
5	85–100	Very good	5	--	Very good
4	70–84	Good	4	--	Good
3	55–69	Average	3	--	Average
2	45–54	Pass	2	--	Pass
1	0–44	Fail	1	--	Fail

According to Table 3, Türkiye employs a 100-point grading system that can be converted into a five- point scale. In addition, while the grading system in Türkiye includes defined score ranges, the grading system in Turkmenistan does not specify score intervals. Instead, the grading system in Turkmenistan is based on a five-level assessment scale. The education systems of Türkiye and Turkmenistan differ in both administrative organization and assessment approaches. Although compulsory education lasts 12 years in both countries, differences in the structure of educational levels and instructional time allocation are reflected in the curricula at the basic education level. Courses such as life science, characterized by their interdisciplinary orientation and their pivotal role in the individual's socialization process, occupy distinct positions within the two educational systems under consideration. The associated learning outcomes and curricular structures provide critical insights into the underlying educational philosophies and the resultant student competencies of both contexts. A central parameter in this comparative inquiry is the allocation of instructional hours, which determines the intensity of curriculum implementation and is presented in Table 4.

Table 4.

Comparative Distribution of instructional Hours in Life Science Course Curricula

	1st grade	2nd grade	3rd grade	4th grade	Monthly	Total
TRLSCC	4 hours	4 hours	3 hours	-	16-12 hours	144 hours
TKMLSCC	1 hour	1 hour	1 hour	1 hour	4 hours	32 hours

Drawing on Table 4, notable differences emerge between Türkiye and Turkmenistan regarding the temporal distribution and intensity of life science instruction. In Türkiye, the course is confined to the first three years of primary education, whereas in Turkmenistan it extends across a broad educational trajectory, beginning in Grade 1 and continuing through Grade 10. Nevertheless, when the primary level (Grades 1-4) is examined specifically, the instructional intensity of life science, in terms of allocated class hours, appears higher in Türkiye.

A review of the literature reveals that the life science curriculum in Türkiye has been compared with those of Germany (Baysal et al., 2018), Azerbaijan (Aydemir & Palancıoğlu,

2023), Singapore, Hong Kong, and Canada (Gök, 2022), Greece (Bekiroğlu & Ütkür Güllühan, 2023), Russia (Ütkür Güllühan & Guseinova, 2021), and the Turkish Republic of Northern Cyprus (Ütkür Güllühan & Bekiroğlu, 2022). However, a study that jointly examines the life science curriculum of Turkmenistan, sharing historical, cultural, and linguistic ties with Türkiye would not only contribute to the existing body of literature but also illuminate how the subject is structured within educational systems grounded in similar cultural foundations. A comparative analysis of the two countries' life science curricula, with particular attention to curriculum components, is expected to enhance a more holistic understanding of the role of the subject within their respective educational systems. Accordingly, this study aims to identify the similarities and differences between the life science curricula of Turkmenistan and Türkiye. In line with this aim, the research problem is articulated as: "What are the similarities and differences between the life science course curricula of Türkiye and Turkmenistan?" based on this overarching question, several sub-problems have been formulated.

1. Has the curriculum approach been incorporated into the life science course curricula of Türkiye and Turkmenistan?

2. Are the objectives explicitly specified in the life science course curricula of Türkiye and Turkmenistan?

2.1. Are the objectives clearly articulated in the life science course curricula of both countries?

2.2. How are learning outcomes addressed within the life science course curricula of Türkiye and Turkmenistan?

3. How is the content dimension delineated in the life science course curricula of Türkiye and Turkmenistan?

3.1. Are skills included within the life science course curricula of Türkiye and Turkmenistan?

3.2. Are values included within the life science course curricula of Türkiye and Turkmenistan?

3.3. Are concepts included within the life science course curricula of Türkiye and Turkmenistan?

3.4. Are specific days and weeks included within the life science course curricula of Türkiye and Turkmenistan?

4. Is the instructional process dimension specified in the life science course curricula of Türkiye and Turkmenistan?

4.1. Are explanations provided regarding teaching-learning processes in the life science course curricula of Türkiye and Turkmenistan?

4.2. Are examples of instructional activities included in the life science course curricula of Türkiye and Turkmenistan?

4.3. Are explanations provided for learning outcomes and instructional activities in life science course curricula of Türkiye and Turkmenistan?

5. Is the assessment and evaluation dimension specified in the life science course curricula of Türkiye and Turkmenistan?

Method

This study adopts a qualitative research approach. Qualitative research refers to a process that focuses on meanings, concepts, definitions, characteristics, metaphors, symbols, and descriptions attributed to phenomena (Berg & Lune, 2019). The aim of examining the life science curricula in terms of their curricular components necessitated the adoption of a qualitative research approach.

Research Design

This study employed a case study design. A case study aims to explore how and why a bounded system functions within its natural context (Chmiliar, 2010). In this study, the curricula of the countries were examined in depth with respect to their vision, curricular approach, objectives, content, instructional processes, and assessment components. In addition, the case study design, with its reliance on multiple data sources such as documents and written materials (Creswell, 2007; Merriam, 2013), enabled a systemic and holistic comparison of the curricula, thereby allowing for a detailed identification of similarities and differences between the curricula. The curricula examined in this study are official documents; therefore, the research was conducted using document analysis. Document analysis involves examining the content of a document and often exploring its purpose, intent, and underlying motivations within a historical or contemporary context (Harvey, 2024). Document analysis was employed to comparatively analyze the content of the life science curricula of Türkiye and Turkmenistan and to identify their fundamental orientations.

Data Sources

The data sources of the study consist of the 2018 life science Curriculum of Türkiye and the 2021 life science Curriculum for I-X of Turkmenistan.

Research Process

In this study, the document analysis steps proposed by O'leary (2004) were followed. These steps include planning, collection, review, questioning, reflection, refinement, and data analysis. During the planning stage, documents appropriate to the purpose of the study were identified. Since the curricula selected as documents are publicly available, ethical approval was not required. It was planned to collect textual data from the curricula. During the data collection stage, the life science curriculum of Türkiye was obtained from the official website of the Ministry of National Education of the Republic of Türkiye. The 2021 life science curriculum of Turkmenistan was obtained through a classroom teacher working at a school in the Lebap region of Turkmenistan. This situation was regarded as an indicator of the documents' authenticity during the review stage, in which the originality of the documents was examined. In the questioning stage, the curricula were read and examined repeatedly in order to explore their content. During the reflection and refinement stage, the research plan was

continuously revised based on insights gained from the literature review and the in-depth examination of the documents. In the final stage, data analysis, the data were subjected to document analysis. In the analysis concerning the inclusion of skills and values in the curricula, closed coding was employed. This approach involves grouping recording units according to a pre-existing category system. According to Bilgin (2006), closed coding involves grouping recording units based on a pre-existing category system. Accordingly, the skills and values specified in the life science Curriculum of Türkiye were taken as the reference framework for categorization. In the remaining analyses, an open coding approach was adopted, in which categories were identified as message units were examined and reviewed. As stated by Bilgin (2006), this approach allows categories to emerge inductively during the analysis process. In this context, the characteristics included in the units of analysis were identified through repeated examination of the curricula. The coding process was carried out by the researcher together with an expert who has conducted studies on life science and curriculum development. The intercoder agreement coefficient was calculated as .85 using the reliability formula proposed by Miles and Huberman (1994). This value was considered sufficient to ensure the reliability of the coding process.

Ethical Permits of Research:

In this study, all the rules specified to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were complied with. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics", which is the second part of the directive, have been taken.

Ethics Committee Permission Information:

Since the research was conducted with publicly available documents, it does not require ethics committee approval.

Findings

The findings related to the research problem, "1. Has the curriculum approach been incorporated into the life science course curricula of Türkiye and Turkmenistan?", are presented in Table 5.

Table 5.

Approaches in the Life Science Course Curricula of Türkiye and Turkmenistan

Türkiye	Turkmenistan
✓ Unit-based approach	✓ --
✓ Spiral approach	✓ --

Based on Table 5, it is observed that the life science course curriculum implemented in Türkiye employs the terms unit-based approach and spiral approach to describe its curricular orientation, whereas no explicit statements regarding a curriculum approach are included in the life science curriculum of Turkmenistan. However, an examination of the Turkmenistan curriculum indicates that the curriculum is implicitly designed according to a spiral approach. Direct quotations related to the curriculum approach from the life science curriculum of Türkiye are presented below.

TRLSCC

Based on a unit based approach, the curriculum identifies six units with the same titles across all three grade levels: "Life at Our School", "Life at Home", "Healthy Life", Safe Life", "Life in Our Country", and "Life in Nature".

In line with this approach, the curriculum includes learning outcomes and explanations that recur across different topics and grade levels through a spiral structure, while also incorporating holistic learning outcomes intended to be achieved in a single stage,

In this study, the extent to which the objectives dimension is specified in the life science curricula of Türkiye and Turkmenistan was examined. The findings related to the research problem, "2.1. Are the objectives clearly articulated in the life science course curricula of both countries?" are presented in Table 6.

Table 6.

Objectives of the Life Science Course Curricula of Türkiye and Turkmenistan

Türkiye	Turkmenistan
✓ General Objectives of Turkish National Education	✓ —
✓ Fundamental Principles of Turkish National Education	✓ —
✓ Developing self-confidence and self-discipline	✓ —
✓ Developing basic verbal, numerical, and scientific reasoning skills	✓ —
✓ Acquiring social skills	✓ Contributing to the development of values such as a culture of safe living, a sense of responsibility toward personal and social safety, and valuing health and life
✓ Developing aesthetic sensitivity	✓ —
✓ Ensuring that individuals adopt a healthy life orientation	✓ Enabling students to acquire knowledge about healthy living and to develop the personal qualities necessary to maintain a healthy lifestyle
✓ —	✓ Alignment with the health-related policies of the President of Turkmenistan, Gurbanguly Berdimuhamedov
✓ —	✓ Familiarity with the content of the book Payhas Çeşmesi
✓ —	✓ Promoting the development of healthy citizens who are sensitive to the "Climate Change" agreement
✓ —	✓ Learning the use of protective measures and first aid practices in the event of dangerous and emergency situations
✓ —	✓ Becoming familiar with dangerous emergency situations and learning principles of safe behavior in the event of their occurrence

According to Table 6, the objectives of the Türkiye Life Science Course Curriculum are structured into 14 articles under the heading "Special Objectives of the Life Science Course Curriculum", based on the General Objectives of Turkish National Education. Furthermore, the objectives intended to be achieved at each grade level are presented prior to the content of that grade. In contrast, the life science curriculum of Turkmenistan includes statements regarding the curriculum's goals in the "Explanatory Note" section; however, specific objectives for individual grade levels are not explicitly stated. Despite these differences in

structure, it was determined that the life science teaching curricula of both countries contain similar meanings.

The findings related to the research problem, "2.2. How are learning outcomes addressed within the life science course curricula of Türkiye and Turkmenistan?" are presented in Table 7.

Table 7.

Units and Numbers of Learning Outcomes in the Life Science Course Curricula of Türkiye and Turkmenistan

	Türkiye		Turkmenistan	
Grade 1	✓ Life at our school	17	✓ Order comes first	8
	✓ Life at home	7	✓ My family	2
	✓ Healthy life	7	✓ My friends	7
	✓ Safe life	7	✓ Be careful	3
	✓ Life in our country	7	✓ Seasons and us	4
	✓ Life in nature	8	✓ Nature and us	8
	✓		✓ Generality	2
	Total	53	Total	34
Grade 2	✓ Life at our school	11	✓ Daily uine	7
	✓ Life at home	9	✓ Concept of hygiene and personal hygiene	15
	✓ Healthy life	7	✓ Student and traffic rules	4
	✓ Safe life	6	✓ Nose and ears	4
	✓ Life in our country	8	✓ Vision	2
	✓ Life in nature	9	✓ Generality	2
	Total	50	Total	34
Grade 3	✓ Life at our school	10	✓ Prevention of diseases occurring in teeth and the oral cavity	3
	✓ Life at home	8		
	✓ Healthy life	5	✓ Hygiene of sense organs	8
	✓ Safe life	7	✓ Effect of nutrition on human health	8
	✓ Life in our country	9	✓ Safety rules	8
	✓ Life in nature	6	✓ Water and human	3
			✓ Animals and humans	2
	✓		✓ Generality	2
	Total	45	Total	34
Grade 4	-	-	✓ Students' daily routine	11
	-	-	✓ Sun, air and water as our best friends	3
	-	-	✓ Healthy mindy in healthy body	4
	-	-	✓ Student and school	11
	-	-	✓ Household responsibilities	3
	-	-	✓ Generality	2
	Total	-	Total	34
Overall total		148		136

As shown in Table 7, the Türkiye Life Science Course Curriculum consists of six units at each grade level, with 53 learning outcomes in Grade 1, 50 in Grade 2, and 45 in Grade 3. In the Turkmenistan Life Science Course Curriculum, content is organized around subjects rather than units; the number of subjects is six in Grades 1, 3, and 4, and five in Grade 2. The number of learning outcomes is 34 at each grade level. Although the life science curriculum is taught across three grade levels in Türkiye and four grade levels in Turkmenistan at the primary school level, the Türkiye life science curriculum stands out in terms of the number of learning outcomes. Furthermore, the distribution of learning outcomes across grade levels shows slight variation in the Türkiye curriculum, whereas the Turkmenistan life science curriculum demonstrates a more balanced structure.

Another issue examined in this study concerns how the content dimension is addressed in life science course curricula of Türkiye and Turkmenistan. The findings related to the research problem, "3.1. Are skills included within the life science course curricula of Türkiye and Turkmenistan?" are presented in Table 8.

Table 8.

Skills Included in the Life Science Course Curricula of Türkiye and Turkmenistan

Skills	Türkiye	Türkmenistan
✓ Research	19	2
✓ Use of information and communication technologies	6	1
✓ Perceiving change and continuity	4	-
✓ Balanced nutrition	4	3
✓ Environmental protection	5	7
✓ Entrepreneurship	1	1
✓ Observation	7	5
✓ Communication	14	2
✓ Co-operation	6	2
✓ Decision making	4	5
✓ Career awareness	4	-
✓ Use of resources	24	1
✓ Self-protection	28	10
✓ Self-awareness	4	1
✓ Personal care	8	8
✓ Compliance with rules	14	7
✓ Spatial perception	15	5
✓ Recognizing national and cultural values	9	1
✓ Self-management	28	1
✓ Protecting health	14	11
✓ Problem solving	3	-
✓ Social participation	9	7
✓ Time management	3	6
Total (where it passed in the curriculum)	233	86
Total (number skills)	23	20

An examination of Table 8 indicates that 23 skills are referenced in 233 instances within the Türkiye Life Science Course Curriculum, with self-protection and recognition of national and cultural values being the most frequently emphasized skills. In the life science curriculum of Turkmenistan, 20 skills are identified across a total of 86 instances, with health protection and self-protection appearing most frequently. In the Turkmenistan life science curriculum. Values and skills are presented under the same heading. During the analysis process, the researcher differentiated between skills and values. Examples of direct quotations illustrating the skills included in the life science course curricula of Türkiye and Turkmenistan are presented below.

Examples related to self-protection skills

TRLSCC

HB.1.4.4. Applies safety rules while communicating with people in his/her environment.

Emphasis is placed on demonstrating effective refusal behaviors when faced with invitations or offers that violate personal rights during interpersonal communication.'

TKMLSCC

Safety rules at home.

Examples related to health protection skills:

TRLSCC

HB.2.3.4. Explains the necessity of cleanliness for a healthy life.

Emphasis is placed on personal cleanliness and environmental cleanliness.

TKMLSCC

Adopting a healthy lifestyle and participating in sports activities.

The findings related to the research problem "3.2. Are values included within the life science course curricula of Türkiye and Turkmenistan?" are presented in Table 9.

Table 9.

Values Included in the Life Science Course Curricula of Türkiye and Turkmenistan

Values	Türkiye	Turkmenistan
✓ Justice	5	2
✓ Friendship	1	1
✓ Truthfulness	1	1
✓ Self-discipline	4	1
✓ Patience	1	-
✓ Respect	18	2
✓ Love	7	-
✓ Responsibility	22	8
✓ Patriotism	13	7
✓ Helping	7	5
Total (where it passed in the curriculum)	79	27
Total (number skills)	8	6

While Table 9 is examined, it is observed that the eight values presented under the heading core values in the Türkiye life science curriculum appear 79 instances throughout the curriculum. In contrast, values are identified in a total of 27 instances in the life science curriculum of Turkmenistan. In both countries' life science curricula, responsibility is the most frequently emphasized value. However, in terms of frequency of repetition, the Türkiye curriculum demonstrates a more dominant emphasis on this value. It was also determined that values of patience and love are not included in the Turkmenistan curriculum. Examples of direct quotations taken from the curricula are presented below.

Examples related to the value of responsibility:

TRLSCC

HB.3.2.4. Fulfills duties and responsibilities at home.

Topics such as setting the table, growing plants, feeding pets, care, repair, and garden maintenance are addressed.

TKMLSCC

Responsibilities at home.

The findings related to the research problem "3.3. Are concepts included within the life science course curricula of Türkiye and Turkmenistan?" are presented in Table 10.

Table 10.

Concepts Included in the Life Science Course Curricula of Türkiye and Turkmenistan

Concepts	Türkiye	Turkmenistan
✓ Address	4	1
✓ Air	2	3
✓ Animal	11	5
✓ Book	2	1
✓ Building	1	2
✓ Communication	8	1
✓ Conscious consumer	1	-
✓ Culture	5	5
✓ Desire	3	1
✓ Development	2	3
✓ Disaster	-	2
✓ Emotion	4	1
✓ Environment	35	2
✓ Family	21	2
✓ Fire	3	3
✓ Friend	20	3
✓ Game	12	1
✓ Gas	1	1
✓ Sun	4	4
✓ Health	5	15
✓ Help	8	3
✓ Home	20	17
✓ Homeland	3	2
✓ Human	12	13
✓ Hygiene	2	15
✓ Map	1	-
✓ Nature	13	6
✓ Need	9	-
✓ Opinion	2	-
✓ Pedestrian	2	3
✓ Plant	10	2
✓ Republic	2	-
✓ Respect	8	4
✓ Responsibility	6	5
✓ Right	3	3
✓ Rule	8	33
✓ Rules of conduct	12	19
✓ Safety	10	7
✓ School	27	18
✓ Season	7	3
✓ Society	5	3
✓ Solidarity	5	-
✓ Solution	1	1
✓ Sport	4	7
✓ Sun	12	1
✓ Technology	3	3
✓ Time	3	2
✓ Traffic	5	7
✓ Transportation	2	2
✓ Trip	1	1
✓ Trust	2	8
✓ Vision	-	3
✓ Water	7	11
Total (where it passed in the curriculum)	354	258
Total (number skills)	51	47

As shown in Table 10, a total of 51 concepts are identified across 354 instances in the Türkiye life science curriculum, whereas 47 concepts appear in 258 instances in the life science curriculum of Turkmenistan. In the Türkiye curriculum, the concepts of "environment", "school", "family", and "friends" are emphasized with relatively high frequency. By contrast, in the Turkmenistan curriculum, the concepts of rule and rules of behavior are used more frequently. Furthermore, the concepts of "disaster" and "vision" in the Türkiye curriculum, as well as "conscious consumer", "Republic", "solidarity", "opinion", "map", and "need" were found to be absent from the Turkmenistan curriculum. Examples of direct quotations from the curricula are presented below.

Examples of curricula related to the concept of fire:

TRLSCC

HB.3.4.4. Explains what actions to take in an emergency situation and from whom help can be requested.

TKMLSCC

Causes and prevention of dangerous situations at home and in other settings (e.g., fires, floods).

The findings related to the research problem "3.4. Are specific days and weeks included within the life science course curricula of Türkiye and Turkmenistan?" are presented in Table 11.

Table 11.

Specific Days and Weeks in the Life Science Course Curricula of Türkiye and Turkmenistan

Türkiye	Türkmenistan
✓ Some learning outcomes in the curriculum should be taught during periods corresponding to specific days and weeks. For example, during the week of 29 October Republic Day, topics related to the Grade 1 life science learning outcome "Life in Our Country" (1.5.6) "Willingly participates in celebrations, ceremonies, and commemorations" may be taught (Guidelines for the implementation of the life science Course Curriculum, Article 7).	✓ --

Table 11 reveals that the Türkiye Life Science Course Curriculum includes explanations related to specific days and weeks, whereas such explanations are not included in the Turkmenistan Life Science Course Curriculum. In the Türkiye curriculum, these explanations are provided under the heading "Considerations for the Implementation of the Life Science Course Curriculum".

In this study, the extent to which the instructional situations dimension is specified in the life science course curricula of Türkiye and Turkmenistan was also examined. The findings related to the research problem "4.1. Are explanations provided regarding teaching-learning processes in the life science course curricula of Türkiye and Turkmenistan?" are presented in Table 12.

Table 12.

Explanations Regarding Learning-Teaching Processes in the Life Science Course Curricula of Türkiye and Turkmenistan

Türkiye	Turkmenistan
✓ Care should be taken to implement both in-school and out-of-school activities during instruction. Especially for relevant learning outcomes, out-of-school practices such as oral history, local history, museum visits, nature education, and introducing public and private institutions should be emphasized, and student-centered activities planned in advance should be implemented accordingly.	--
✓ Students' cognitive, affective, and psychomotor development levels, as well as individual differences, should be taken into account in both in-school and out-of-school activities.	--
✓ Efforts should be made to establish a connection between school and real life through activities designed in line with learning outcomes.	--
✓ Students should be allowed to use living and non-living entities in their environment as instructional materials, with due consideration given to ethical issues.	--
✓ In activities that require students to conduct research, they should be encouraged to share their findings with their classmates using materials such as posters, bulletin boards, brochures, newspapers, tables, and graphs.	--
✓ Simple experiments may be conducted for learning outcomes related to nature.	--
✓ Some learning outcomes in the curriculum should be taught during periods corresponding to specific days and weeks. For example, during the week of 29 October Republic Day, topics related to the Grade 1 life science curriculum outcome "Life in Our Country" (1.5.6. "Willingly participates in celebrations, ceremonies, and festivities") may be addressed.	--
✓ Since students up to the third grade have not yet learned to read and write numbers greater than 1,000, dates related to national holidays should not be presented in numerical or written form in textbooks. Instead, teachers may express these dates verbally during instruction.	--
✓ While implementing the curriculum, necessary flexibility should be provided for students with special needs, and activities should be prepared and planned in accordance with students' interests, needs, and preferences.	--
✓ During curriculum implementation, emphasis should be placed on students' acquisition of values; all learning outcomes should be associated with relevant values, and lessons should be conducted in line with the hidden curriculum approach.	--
✓ Particular importance should be given to the development of core life skills, and activities should be designed in accordance with this perspective.	--

As shown in Table 12, explanations regarding learning–teaching processes in the Türkiye Life Science Course Curriculum are presented under the heading "Issues to Be Considered in the Implementation of the Life Science Course Curriculum" in the form of eleven distinct items. In contrast, it has been determined that the Life Science Course Curriculum of Turkmenistan does not include explicit explanations related to learning–teaching processes.

"4.2. Are examples of instructional activities included in the life science course curricula of Türkiye and Turkmenistan?" the findings regarding the sub-problem statement indicate that examples of effectiveness are not included in the curricula.

With reference to the sub-problem, "4.3. Are explanations provided for learning outcomes and instructional activities in life science course curricula of Türkiye and Turkmenistan?" it was determined that the Türkiye life science curriculum includes explanatory statements for certain learning outcomes or instructional activities. However, detailed explanations and examples concerning how learning outcomes should be implemented in the instructional process are provided in the teachers' guidebook prepared for the life science course. In this guidebook, activity examples, implementation suggestions, and explanatory notes supporting the instructional process are presented in detail to facilitate the effective integration of learning outcomes into classroom practice.

The findings related to the research problem "5. Is the assessment and evaluation dimension specified in the life science course curricula of Türkiye and Turkmenistan?" are presented in Table 13.

Table 13.

Assessment in the Life Science Course Curricula of Türkiye and Turkmenistan

Türkiye	Turkmenistan
✓ Assessment and evaluation practices should be maximally aligned with all components of the curriculum, and the boundaries of learning outcomes and explanations should be taken as the basis.	✓ *A grade of "5" is awarded to students under the following conditions:* ✓ Students fully internalize the knowledge, comprehension, and depth of the entire curriculum. ✓ Students can identify the main ideas in the learned material, summarize them with facts and examples, draw conclusions, establish interdisciplinary and intradisciplinary connections, and creatively apply the acquired knowledge to real-life situations ✓ In oral responses, students can present the learned material accurately and completely; they can correct minor errors with the help of additional questions from the teacher and comply with the rules of written and spoken language.

Continue to Table 13

✓ The curriculum does not impose strict limits on the assessment tools and methods to be used in the assessment process; rather, it provides guidance. However, the selected assessment tools and methods must comply with the required technical and academic standards.	✓ *A grade of "4" is awarded to students under the following conditions:* ✓ Students possess knowledge of the entire curriculum material. ✓ Students can identify the main ideas of the studied material, summarize it through facts and examples, draw conclusions, establish inter- and intra-disciplinary connections, and apply the acquired knowledge. ✓ Students can reproduce the learned material with minor (non-critical) errors or omissions and comply with the basic rules of written and oral communication.
✓ Assessment and evaluation practices are an integral part of education and are carried out throughout the educational process. Assessment results are considered holistically together with the observed learning processes, not in isolation.	✓ *A grade of "3" is awarded to students under the following conditions:* ✓ Students demonstrate knowledge and learning of the material at the minimum requirements level of the curriculum, experience difficulty in revising independently, and require limited assistance from the teacher. ✓ Students can work at a repetition level and experience difficulty in responding to modified questions. ✓ Students make one or more serious errors while reproducing the learned material, along with minor violations of refined language and writing rules.
✓ Due to individual differences, it is not appropriate to adopt a single, uniform assessment and evaluation method applicable to all students. Students' academic development cannot be measured and evaluated through a single method or technique.	✓ *A grade of "2" is awarded to students under the following conditions:* ✓ Students demonstrate knowledge and comprehension below curriculum requirements, with insufficient detailed understanding of the learned material. ✓ Students experience difficulty responding to standard questions and show deficiencies in reproduction skills ✓ Students make several serious errors and numerous minor errors in reproducing the learned material and significantly violate the rules of written and oral communication.
✓ Education aims not only at "knowing" (cognition) but also at "feeling" (affect) and "doing" (action); therefore, cognitive assessments alone are not considered sufficient. ✓ Multi-focused assessment is essential. Assessment and evaluation practices are carried out with the active participation of teachers and students. ✓ Since individuals' characteristics such as interests, attitudes, values, and achievement may change over time, assessments that consider changes throughout the process rather than measuring at a single point in time are essential.	

An examination of the Türkiye Life Science Course Curriculum reveals that assessment is addressed under the heading "Measurement and Evaluation Approach in Curricula" through 7 specific principles. The curriculum emphasizes acting with maximum diversity and flexibility in the assessment process. Accordingly, Türkiye's curriculum adopts a multi-focused, flexible assessment and evaluation approach that is grounded in process-oriented assessment.

In the Turkmenistan Life Science Course Curriculum, student achievement and knowledge are evaluated using a five-point grading system. Students' grades are recorded in portfolios. The academic year consists of four terms, and at the end of each term, students' course average scores are determined based on portfolio records. Written examinations and assignments conducted during the term are evaluated using the same grading criteria and are likewise recorded in students' portfolios.

Discussion and Conclusion

In this study, the 2018 Türkiye and 2021 Turkmenistan life science curricula were examined comparatively to identify their similarities and differences. In the comparison, first, the curriculum approaches were discussed. It was noted that the Türkiye curriculum adopts a 'unit-based approach' and a 'spiral approach,' while it was found that the Turkmenistan curriculum does not specify a curriculum approach. Although the approach is not explicitly mentioned, it appears that the Turkmenistan curriculum is also designed according to the spiral approach. Indeed, the life science course aims to gradually review similar formations to help students develop opinions (Baymur, 1937). Additionally, the spiral approach is described as a structure that can be provided for each child in lessons related to the education of social fields in elementary school (Uçuş Güldalı & Demirbaş, 2017).

In this study, the life science course curricula of Türkiye and Turkmenistan were compared in terms of the objectives dimension. Within this scope, objectives and learning outcomes were examined. It was determined that the objectives in Türkiye curriculum were developed in line with the General Objectives of Turkish National Education and structured as 14 specific objective statements, whereas the Turkmenistan curriculum includes statements related to the curriculum's objectives in the Explanatory Note section. In terms of objectives, it was concluded that the primary area of convergence between the two curricula is health and healthy and safe life skills.

The findings indicate that fundamental life skills intended to be acquired at early ages occupy a central place in both education systems. However, in the Türkiye life science curriculum, objectives are addressed from a multidimensional perspective, including enabling individuals to recognize themselves and their environment, internalize family and societal values, develop personal growth and self-care skills, cultivate feelings of love and responsibility toward their country, and acquire scientific process skills. In contrast, the objectives of the life science curriculum of Turkmenistan are framed within a more limited scope, with a particular emphasis on developing knowledge and skills related to health, healthy living, and safe behaviors. In this context, it can be stated that the Türkiye curriculum adopts a holistic approach that addresses the individual across social, affective, cognitive, and values education dimensions, whereas the Turkmenistan curriculum places greater emphasis on basic life skills

within a protective and preventive educational framework. These findings reveal differences in the educational priorities and the functions attributed to the life science course in the two countries. The life science course aims to help students recognize their environment and integrate with it to adapt effectively, fostering individuals who are mentally strong, physically and emotionally healthy, possess democratic attitudes, are loyal to their homeland and nation, and are equipped with both national and universal values (Sabancı & Şahin, 2005). Based on this, the objectives outlined in the Türliye curriculum can be considered as an element that strengthens the multifaceted function of the course.

While the life science course curricula of two countries are compared in terms of learning outcomes, it is observed that the number of outcomes in Türkiye is 53 in Grade 1, 50 in Grade 2, and 45 in Grade 3, whereas in Turkmenistan, the number of learning outcomes is 34 across Grades 1, 2, 3, and 4. In terms of the number of learning outcomes, the Türkiye life science curriculum appears to be more extensive. While the Türkiye curriculum is characterized by a comprehensive structure that supports multidimensional development, the Turkmenistan curriculum reflects a more concise and focused approach, demonstrating consistency across grade levels.

In the comparison of the 2018 Türkiye and 2021 Turkmenistan life science curricula in terms of the content dimension, skills, values, concepts, and specific days and weeks were examined. It was determined that 23 skills are referenced a total of 233 times throughout the Türkiye curriculum, with self-protection and recognition of national and cultural values being the most frequently emphasized skills. This finding indicates that the Türkiye curriculum places simultaneous emphasis on the development of both safe life skills and cultural identity and values 86 instances, with health protection and self-protection emerging as the most frequently expressed skills. This finding highlights the prominence of a health and safety-oriented content approach in the Turkmenistan curriculum, which is also consistent with the objectives articulated in the curriculum. However, the absence of skills such as perceiving change and continuity, career awareness development, and problem-solving in the Turkmenistan curriculum suggests that the curriculum may be limited in addressing certain higher-order skills that support individuals' long-term development and adaptation to social life.

It is emphasized that students need to internalize the relationship between the past, present, and future in order to understand society, the culture in which they live, and themselves (Çakmakcı & Ütkür Güllühan, 2025). In addition, developing career awareness at an early age makes a significant contribution to individuals' long-term career goals and career choices (Demirtaş & Erol, 2024), and problem-solving skills are regarded as highly important for children's social-emotional development and healthy participation in social life (Uzunkol & Özdemir Yılmaz, 2018). In this context, it can be argued that these skills occupy an important and functional position within the life science course.

Including these skills in the content dimension of the Turkmenistan life science Curriculum could broaden the scope of the curriculum and support students' more active participation in social life. On the other hand, the finding that "entrepreneurship" is the least emphasized skill in the curricula of both countries indicates that the life science course at early

grade levels focuses more on fundamental life skills and values education than on economic and productive roles. Since early entrepreneurship education can positively influence students' future entrepreneurial careers (Chell, 2015), this finding may be considered an area open to further development in both curricula.

The findings obtained from the comparison of the curricula in terms of values indicate that eight values appear in 79 instances in the Türkiye curriculum, whereas six of these values are represented in 27 instances in the Turkmenistan curriculum. The fact that "responsibility" is the most strongly emphasized value in the life science curricula of both countries suggests that fostering a sense of duty, self-regulation, and adherence to social rules from an early age is regarded as a shared priority. The values "friendship" and "honesty" are among the least emphasized in both curricula. This situation may be interpreted as these values being addressed primarily through the hidden curriculum or left to teachers' instructional practices. More explicit inclusion of these values in curriculum texts could strengthen the social-emotional dimension of the life science course.

On the other hand, the absence of the values of "patience" and "love" in the Turkmenistan curriculum may be considered a noteworthy limitation in terms of the scope of values education. Given that values such as love and patience are directly related to children's emotional development, social relationships, and social adaptation, their omission from the curriculum may restrict the contribution of the course to students' affective development.

The life science course curricula of Türkiye and Turkmenistan were compared in terms of the concepts they include. It was determined that 51 concepts appear 354 times in the Türkiye curriculum, whereas 47 concepts appear 258 times in the Turkmenistan curriculum. These findings indicate that the Türkiye curriculum demonstrates a more pronounced emphasis in terms of both the number of concepts and their frequency of use. The frequent use of concepts such as "environment", "school", "family", and "friends" in the Türkiye curriculum suggests that the course is structured around students' immediate surroundings and grounded in social relationships. This reflects key principles of the life science course, such as learner-centeredness, locality, progression from the near to the distant, and relevance to real life (Cebeci Topcubaşı & Tay, 2021).

In contrast, the more frequent repetition of the concepts of "rule" and "rules of behavior" in the Turkmenistan curriculum suggests an approach that prioritizes individuals' adaptation to social order and the development of rule-compliant behavior. Furthermore, the analysis revealed that the concepts of "disaster" and "vision" are not included in the Türkiye curriculum, whereas "conscious consumer", "Republic", "solidarity", "opinion", "map", and "need" are absent from the Turkmenistan curriculum. These differences indicate that the social, cultural, and citizenship-oriented learning priorities emphasized in the life science course diverge between the two countries at the conceptual level. In particular, the absence of concepts such as "Republic", "solidarity", and "conscious consumer" in the Turkmenistan curriculum suggests that areas related to citizenship awareness, economic literacy, and social solidarity are addressed in a limited manner. In this context, it can be argued that the observed differences in conceptual emphasis are consistent with the divergences identified in the values and skills dimensions of the curricula.

The findings of the study indicate that the Türkiye Life Science Course Curriculum includes explanations related to specific days and weeks, whereas such arrangements are not present in the Life Science Course Curriculum of Turkmenistan. In the Türkiye curriculum, it is emphasized that certain learning outcomes should be addressed in connection with specific days and weeks; for example, during the period October, Republic Day, it is recommended that activities related to learning outcomes encouraging participation in celebrations, commemorations, and ceremonies be implemented within the Grade 1 "Life in Our Country" unit of the life science course. This finding demonstrates that the Türkiye curriculum adopts an approach aimed at integrating course content with the national and cultural context and supporting learning experiential practices. Moreover, this result is consistent with the study's previous findings.

In this study, the extent to which the instructional situation dimension is specified in the 2018 Türkiye and 2021 Turkmenistan life science course curricula was examined. Within this scope, explanations related to teaching-learning processes, examples of activities, and explanatory statements regarding learning outcomes and activities were analyzed. When the curricula were compared in terms of the inclusion of explanations related to teaching-learning processes, whereas they are not included in the Turkmenistan curriculum. In the Türkiye Life Science Course Curriculum, comprehensive explanations regarding teaching-learning processes emphasize the importance of in-school and out-of-school practices, student-centered activities, learning connected to real life, research and presentation activities, the use of experiments and instructional materials, linking instruction to specific days and weeks, addressing individual differences and special educational needs, and promoting values education alongside the development of basic life skills. In this context, the findings indicate that the Türkiye curriculum assumes a guiding and directive function for the instructional process, while the Turkmenistan curriculum exhibits a more general and framework-oriented structure. The inclusion of explanations related to teaching-learning processes in the curriculum can be considered a factor that contributes to the development of shared instructional understanding among teachers and supports students' active participation and the integration of learning with real-life experiences.

The study found that neither the Türkiye nor the Turkmenistan life science course curricula include examples of instructional activities. While the Türkiye curriculum provides "explanatory notes" for some learning outcomes, though not for all, the Turkmenistan curriculum does not include explanations for learning outcomes. One of the findings of the study is that the Turkmenistan Life Science Course Curriculum text does not directly present explanations related to learning outcomes or instructional activities. However, detailed explanation an example regarding how learning outcomes should be implemented in the instructional process are provided in the teachers' guidebook prepared for the life science course in Turkmenistan. This guidebook presents activity examples, implementation suggestions, and explanatory notes that support the instructional process in a comprehensive manner. Within this framework, the Turkmenistan life science teachers' guidebook reflects the adoption of a wide range of instructional methods extending from passive to active approaches. In addition to lecturing and reading, the use of audiovisual materials, demonstrations, group discussions, hands-on activities, role-playing, and peer teaching is emphasized to support

students' active participation and enhance learning retention. Consequently, in terms of activity examples and instructional explanations, it can be concluded that the Turkmenistan life science instructional materials demonstrate a more comprehensive structure.

An analysis of the assessment dimension reveals that the Türkiye life science curriculum articulates 7 principles related to measurement and evaluation. The curriculum underscores the adaptation of an approach characterized by maximum diversity and flexibility in assessment practices. Within this framework, assessment is conceptualized as a process-oriented, multidimensional, and adaptable system that prioritizes continuous monitoring and support of students' learning and developmental progress.

By comparison, the Life Science Course Curriculum of Turkmenistan evaluates students' academic achievement and knowledge levels through a five-point grading system. Students' performance is systematically recorded in portfolios, and the academic year is organized into four quarters. At the end of each quarter, students' overall course achievement is determined based on portfolio evidence, with written examinations and homework assignments administered throughout the instructional period likewise assessed using the same grading scale and incorporated into portfolio records. From this perspective, the principal divergence between the two curricula lies in the educational role assigned to assessment. Whereas the Türkiye curriculum frames assessment as a formative and pedagogically supportive mechanism intended to inform and enhance the learning process, the Turkmenistan curriculum positions assessment as a more standardized, summative, and outcome-oriented system primarily focused on documenting academic attainment.

Recommendations

The findings of this study indicate that the Türkiye Life Science Course Curriculum addresses individuals' cognitive, affective, social, and values-related dimensions holistically, whereas the objectives of the Turkmenistan curriculum are largely limited to health and safe life skills. Accordingly, it is recommended that the Turkmenistan curriculum place greater emphasis on objectives that support students' social development, values education, and citizenship awareness, in line with the nature and aims of the life science course.

The study also revealed that skills such as "problem solving", "perceiving change and continuity", and "career awareness development" are not included in the Turkmenistan Life Science Course Curriculum. Incorporating these skills into the curriculum is recommended to support students' long-term development and their adaptation to social life.

In addition, the findings showed that "entrepreneurship" skills are addressed to a limited extent in the life science curricula of both Türkiye and Turkmenistan. In this regard, learning outcomes and activities aimed at fostering entrepreneurship awareness from an early age could be integrated into life science course curricula.

This study conducted a comparative analysis of the life science course curricula of Türkiye and Turkmenistan. Future research may focus on comparative analyses of curricula from different subject areas in Türkiye and Turkmenistan, as well as comparative studies of life science curricula between Türkiye and other countries.

Finally, while this study compared life science courses based on curriculum documents, future studies may adopt a broader perspective by conducting comparative research based on textbooks, as well as teachers' and students' views.

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Türkiye (2018) ve Türkmenistan (2021) Hayat Bilgisi Dersi Öğretim Programlarının Karşılaştırılması

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Özet

Farklı ülkelerde okutulan hayat bilgisi dersi öğretim programlarının karşılaştırmalı olarak ele alınması, eğitim yaklaşımlarındaki benzerlik ve farklılıkların anlaşılmasına katkı sağlayarak program geliştirme çalışmalarına yol gösterici nitelik taşımaktadır. Bu araştırmanın amacı, 2018 Türkiye ve 2021 Türkmenistan hayat bilgisi dersi öğretim programlarının karşılaştırmalı olarak incelenmesidir. Çalışma nitel araştırma yöntemlerinden durum çalışması ile yürütülmüştür. Ülkelerin hayat bilgisi dersi öğretim programları araştırmanın veri kaynağını oluşturmuştur. Öğretim programlarından elde edilen veriler doküman analizine tâbi tutulmuştur. Araştırma bulguları, Türkiye hayat bilgisi dersi öğretim programında program yaklaşımına yer verilirken Türkmenistan programında yer verilmediğini; hedeflerin Türkiye programında daha kapsamlı bir yapıda, Türkmenistan programında sağlık ve güvenli yaşam odağında yapılandırıldığını; kazanımlar, beceri, değer ve kavramlar açısından Türkiye programının daha yoğun olduğunu göstermektedir. Türkiye programında beceri, değer ve kavramlar daha çok bireyin çok yönlü gelişimi, kültürel kimlik bilinci ve toplumsal yaşama etkin katılımı; Türkmenistan programında ise bireyin sağlık, güvenlik ve toplumsal kurallara uyumu etrafında şekillenmiştir. Türkiye programında belirli gün ve haftaları da içeren öğrenme öğretme süreci açıklamalarına yer verilirken Türkmenistan programında verilmemiştir. Her iki programda etkinlik örnekleri doğrudan yer almamakla birlikte, Türkmenistan programında öğretmenler el kitabında ayrıntılı etkinlik ve uygulama açıklamaları sunulmaktadır. Değerlendirme boyutunda ise Türkiye programının süreç temelli ve esnek, Türkmenistan programının ise not ve portfolyo temelli bir yaklaşım benimsediği tespit edilmiştir. Erken yaşlarda girişimcilik farkındalığını destekleyecek içeriklerin her iki ülkenin hayat bilgisi dersi öğretim programına entegre edilmesi önerilmektedir.

Anahtar Kelimeler: Türkiye, Türkmenistan, hayat bilgisi dersi, öğretim programı, karşılatırmalı eğitim.

Giriş

Hayat bilgisi dersi, çocuğun içinde yaşadığı doğayı deneyime dayalı olarak keşfetmesini ve ortak değerlerle uyum içinde kendi kişiliğini oluşturmasını destekleyerek topluma istenilen niteliklere sahip bireyler kazandırmak amacıyla benimsenen iyi vatandaş yetiştirme hedefine hizmet etmektedir (Çoban vd., 2025; Güleryüz, 2008). Bahsi geçen niteliklere sahip bireyler yetiştirmek için, bireysel ve toplumsal ihtiyaçlara göre tasarlanmış öğretim programının etkili bir şekilde uygulanması gerekmektedir (Demir vd., 2025).

Öğretim programları, eğitim ve öğretimin temelini oluşturması ve bu faaliyetlerin hangi çerçevede yürütüleceğini göstermesi bakımından önemlidir (Melanlıoğlu, 2008). Programlarda yer alan unsurlar, ülkelerin eğitim felsefelerini ve toplumsal önceliklerini yansıtan önemli göstergeler arasında değerlendirilebilir. Dolayısıyla öğretim programlarının

incelenmesinin eğitim sisteminin genel yönelimlerini anlamaya katkı sunacağı öne sürülebilir. Bu yönelimlerin daha kapsamlı biçimde değerlendirilebilmesi, farklı ülkelerin öğretim programlarının birlikte ele alınmasını gerektirmektedir. Bu bağlamda karşılaştırmalı eğitim çalışmalarının, öğretim programlarının farklı ülke bağlamlarında sistematik biçimde incelenmesine imkân tanıyan önemli bir yaklaşım olarak öne çıktığı ifade edilebilir.

Karşılaştırmalı eğitim, eğitim konusunda farklı politikaları, eğitimle ilgili yasaları, eğitimin finansal kaynaklarını ve yapıları, diplomaları, amaç, içerik, yöntemler, araç-gereçler, öğretim materyalleri, değerlendirme, öğrenci, öğretmen, yönetici, veli, denetici ile ilgili tüm soruları inceler (Türkoğlu, 2020). Karşılaştırmalı eğitim yaklaşımı, programların amaçları, içerik düzenlemeleri ve pedagojik yaklaşımları arasındaki ilişkileri ortaya koyarak etkili uygulamaların belirlenmesine olanak tanıyabilir. Bu doğrultuda hayat bilgisi dersi öğretim programlarının uluslararası bağlamda değerlendirilmesi hem ulusal programların geliştirilmesini hem de eğitim alanındaki ortak eğilimlerin ve özgün uygulamaların daha iyi anlaşılmasını sağlayabilir.

Alan yazını incelendiğinde Türkiye'deki hayat bilgisi dersi öğretim programının Almanya (Baysal vd., 2018), Azerbaycan (Aydemir & Palancıoğlu, 2023), Singapur, Hong-Kong ve Kanada (Gök, 2022), Yunanistan (Bekiroğlu & Ütkür Güllühan, 2023), Rusya (Ütkür Güllühan & Guseinova, 2021) ve Kuzey Kıbrıs Türk Cumhuriyeti'ndeki [KKTC] (Ütkür Güllühan & Bekiroğlu, 2022) öğretim programları ile karşılaştırıldığı çalışmaların olduğu görülmektedir. Türkiye ile ortak tarihî, kültürel ve dilsel bağlara sahip Türkmenistan'daki hayat bilgisi dersi öğretim programlarını birlikte ele alan bir çalışmanın hem alan yazınına katkı sunacağı hem de benzer kültürel temellere sahip eğitim sistemlerinde dersin nasıl yapılandırıldığını ortaya koyacağı düşünülmektedir. İki ülkenin hayat bilgisi öğretim programlarının, programın bileşenleri açısından karşılaştırmalı olarak incelenmesi, dersin eğitim sistemleri içindeki rolünün daha bütüncül biçimde anlaşılmasına katkı sağlayacaktır. Çalışma, Türkmenistan ve Türkiye hayat bilgisi dersi öğretim programlarının karşılaştırmalı olarak incelenmesi ile programlar arasındaki benzerlikleri ve farklılıkları ortaya koyma amacı taşımaktadır. Bu doğrultuda araştırmada "Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programları arasındaki benzerlik ve farklılıklar nelerdir?" problemi doğrultusunda alt problemler oluşturulmuştur.

1. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında program yaklaşımına yer verilmiş midir?

2. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programı programlarında hedefler boyutu belirtilmiş midir?

2.1. Türkiye ve Türkmenistan hayat bilgisi programlarında hedefler belirtilmiş midir?

2.2. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında kazanımlara nasıl yer verilmiştir?

3. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında içerik boyutu nasıl belirtilmiştir?

3.1. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında becerilere yer verilmiş midir?

3.2. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında değerlere yer verilmiş midir?

3.3. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında kavramlara yer verilmiş midir?

3.4. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında belirli gün ve haftalara yer verilmiş midir?

4. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında eğitim durumları boyutu belirtilmiş midir?

4.1. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında öğrenme öğretme süreçlerine ilişkin açıklamalara yer verilmiş midir?

4.2. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında etkinlik örneklerine yer verilmiş midir?

4.3. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında kazanımlar ve etkinlikler için açıklamalara yer verilmiş midir?

5. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında değerlendirme boyutu belirtilmiş midir?

Yöntem

Çalışmada nitel araştırma yaklaşımı benimsenmiştir. Nitel araştırma, nesnelerin taşıdığı anlam, kavram, tanım, özellik, mecaz, sembol ve tariflere gönderme yapan bir süreci ifade eder (Berg & Lune, 2019). Araştırmada hayat bilgisi dersi öğretim programlarının programın bileşenleri bakımından incelenmesinin amaçlanması, nitel araştırma yaklaşımının benimsenmesine yol açmıştır.

Araştırma Deseni

Araştırmada durum çalışması deseni kullanılmıştır. Durum çalışması, sınırlı bir sistemin kendi doğal bağlamı içinde nasıl ve neden işlediğini ortaya koymayı amaçlamaktadır (Chmiliar, 2010). Bu çalışmada ülkelerin öğretim programları, programların vizyon, program yaklaşımı, hedef içerik, eğitim durumları ve değerlendirme bileşenler açısından derinlemesine incelenmiştir. Araştırmaya konu olan öğretim programları resmî belge niteliğinde dokümanlardan biri olduğundan araştırma doküman incelemesi ile yürütülmüştür. Doküman inceleme, bir dokümanın içeriğini analiz etmeyi ve çoğu zaman tarihsel veya çağdaş bir bağlamda dokümanın amacını, niyetini ve motivasyonunu incelemeyi içerir (Harvey, 2024).

Veri Kaynağı

Araştırmanın veri kaynaklarını Türkiye 2018 Hayat Bilgisi Dersi Öğretim Programı ile Türkmenistan 2024 I-X. Sınıflar için Hayat Bilgisi Ders Programı oluşturmaktadır.

Araştırma Süreci

Araştırmada O'leary (2004) tarafından önerilen doküman analizi adımları (planlama, toplama, gözden geçirme, sorgulama, düşün/iyileştir, veri analizi) takip edilmiştir. Planlama adımında araştırmanın amacına uygun olarak dokümanlar tespit edilmiştir. Doküman olarak belirlenen öğretim programları kamuya açık olarak yayımlandığı için etik onay gerektirmemektedir. Toplama adımında Türkiye Hayat Bilgisi Dersi Öğretim Programı'na Millî Eğitim Bakanlığının resmî genel ağ sayfasından ulaşılmıştır. 2021 Türkmenistan Hayat Bilgisi Dersi Öğretim Programı Türkmenistan'ın Lebap eyaletindeki bir okulda görev yapmakta olan sınıf öğretmeni aracılığıyla elde edilmiştir. Bu durum dokümanın orijinalliğinin ele alındığı gözden geçirme adımında, dokümanların orijinalliğinin bir göstergesi olarak kabul edilmiştir. Sorgulama adımında içeriği keşfetmek amacıyla öğretim programları tekrar tekrar okunmuş ve sorgulanmıştır. Düşün/iyileştir adımında alan yazını taramaları ve dokümanların içeriğinin keşfedilmesiyle ulaşılan yeni bilgiler ile çalışma planı sürekli olarak yenilenmiştir. Son adım olan veri analizi adımında veriler doküman analizine tabi tutulmuştur. Programlarda beceriler ve değerlerin yer alma durumuna ilişkin analizlerde Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda yer alan beceri ve değerler baz alınarak var olan bir kategori sistemini alarak kayıt birimlerini buna göre gruplandırma işlemi olan kapalı kodlama (Bilgin, 2006), kullanılmıştır. Diğer analizlerde mesaj öğeleri ele alınıp gözden geçirildikçe kategorilerin belirlendiği açık yaklaşım tercih edilmiştir (Bilgin, 2006). Araştırmacı ile birlikte hayat bilgisi ve öğretim programları ile ilgili çalışmaları bulunan bir uzman, kodlamaları gerçekleştirmiştir. Araştırmacıların kodlamaları arasındaki uyum katsayısı Miles ve Huberman'ın (1994) güvenirlik formülü ile .85 olarak hesaplanmıştır.

Araştırmanın Etik İzinleri:

Bu çalışmada "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında uyulması gerektiği belirtilen tüm kurallara uyulmuştur. Yönergenin ikinci bölümü olan "Bilimsel Araştırma ve Yayın Etiğine Aykırı Eylemler" başlığı altında belirtilen eylemlerin hiçbiri gerçekleştirilmemiştir.

Etik Kurul İzin Bilgileri:

Araştırma, kamuya açık dokümanlarla gerçekleştirildiği için etik kurul onayı gerektirmemektedir.

Bulgular

Türkiye ve Türkmenistan hayat bilgisi programlarında program yaklaşımına yer verilme durumuna yönelik bulgulara göre Türkiye'deki Hayat Bilgisi Dersi Öğretim Programı'nın yaklaşımı için "ünite temelli yaklaşım" ve "sarmal yaklaşım" ifadelerinin kullanıldığı görülürken Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda yaklaşım ifadelerine yer verilmediği tespit edilmiştir. Ancak Türkmenistan Hayat Bilgisi Dersi Öğretim Programı incelendiğinde programın sarmal yaklaşıma göre tasarlandığı görülmüştür.

Çalışmada Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında hedefler boyutunun belirtilme durumu araştırılmıştır. Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda hedefler "Hayat Bilgisi Dersi Öğretim Programı'nın Özel Amaçları" başlığı altında Türk Millî Eğitimi'nin Genel Amaçları esas alınarak 14 maddede hazırlanmıştır. Ayrıca

her bir sınıf düzeyi öncesinde o sınıf düzeyinde kazandırılmak istenen amaçlara yer verilmiştir. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda ise "Açıklayıcı Not" kısmında programın hedefi ile ilgili ifadelerinin olduğu tespit edilmiş, ek olarak sınıf düzeyleri için kazandırılmak istenen amaçlara yer verilmediği görülmüştür. Ayrıca iki ülkenin hayat bilgisi dersi öğretim programlarında benzer anlamlar içeren hedeflerin olduğu tespit edilmiştir.

Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında kazanımlara nasıl yer verildiği incelendiğinde Türkiye Hayat Bilgisi Dersi Öğretim Programı'nın her sınıf düzeyinde altı üniteden oluştuğunu ve birinci sınıfta 53, ikinci sınıfta 50 ve üçüncü sınıfta 45 kazanım olduğu anlaşılmıştır. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda ise ünite yerine konular yer almış; konu sayısı birinci, üçüncü ve dördüncü sınıflarda 6, ikinci sınıfta 5 olarak yapılandırılmıştır. Her bir sınıf düzeyindeki kazanım sayısı 34'tür. İlkokul düzeyinde hayat bilgisi dersi Türkiye öğretim programında 3, Türkmenistan öğretim programında 4 olmakla birlikte Türkiye Hayat Bilgisi Dersi Öğretim Programı'nın kazanım sayısı açısından öne çıktığı görülmektedir. Kazanımların sınıf düzeylerine dağılımı Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda ufak farklılıklar gösterirken Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda dengeli bir yapıya sahiptir.

Araştırmada üzerinde durulan bir diğer konu Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında içerik boyutunun nasıl ele alındığıdır. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında becerilere yer verilme durumu incelendiğinde Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda 23 becerinin 233 yerde geçtiği ve en sık tekrar eden becerinin "kendini koruma" ile "millî ve kültürel değerleri tanıma" olduğu anlaşılmaktadır. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda 20 beceri toplam 86 yerde kullanılmış ve en sık ifade edilen beceri "sağlığını koruma" ile "kendini koruma" olmuştur. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda değerler ve beceriler aynı başlık altında verilmiştir. İnceleme esnasında araştırmacı tarafından beceriler ve değerler birbirinden ayırt edilmiştir.

Türkiye ve Türkmenistan Hayat Bilgisi Dersi Öğretim Programlarında değerlere yer verilme durumuna ilişkin bulgular, Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda "Kök değerler" başlığı altında sunulan sekiz değerin, programda 79 yerde geçtiğini ortaya koymaktadır. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda ise değerlerin toplam 27 yerde karşılığını bulduğu belirlenmiştir. Her iki ülkenin hayat bilgisi dersi öğretim programında en fazla yer verilen "sorumluluk" değeri olmuştur. Ancak bu değerin yinelenme sıklığı bakımından Türkiye programı daha baskın bir yoğunluğa sahiptir. Türkmenistan programında "sabır" ve "sevgi" değerlerinin bulunmadığı saptanmıştır.

Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında kavramlara yer verilme durumu ele alındığında Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda 51 kavramın toplam 354 yerde, Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda 47 kavramın toplam 258 yerde geçtiği görülmektedir. Özellikle "çevre", "okul", "aile" ve "arkadaş" kavramları Türkiye programında yüksek bir frekansla yer bulmuştur. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda, "kural" ve "davranış kuralları" kavramları daha sık kullanılmıştır. Türkiye programında "felaket" ve "görme"; Türkmenistan programında "bilinçli

tüketici", "Cumhuriyet", "dayanışma", "görüş", "harita" ve "ihtiyaç" kavramlarına yer verilmediği ortaya konmuştur.

Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında belirli gün ve haftalara yer verilip verilmediği incelenmiştir. Elde edilen bulgular, Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda belirli gün ve haftalarla ilgili açıklamalara yer verildiğini, Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda yer verilmediğini ortaya koymaktadır. Türkiye öğretim programında söz konusu açıklamalar "Hayat Bilgisi Dersi Öğretim Programı'nın Uygulanmasında Dikkat Edilecek Hususlar" başlığı altında verilmiştir.

Araştırmada Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında eğitim durumları boyutunun belirtilme durumu incelenmiştir. Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında öğrenme öğretme süreçlerine ilişkin açıklamalar göz önünde bulundurulduğunda Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda öğrenme öğretme süreçlerine ilişkin açıklamalara yer verilirken Türkmenistan programında yer verilmediği görülmektedir. Türkiye programında öğrenme öğretme süreçlerine ilişkin açıklamalar programın "Hayat Bilgisi Dersi Öğretim Programı'nın Uygulamasında Dikkat Edilecek Hususlar" başlığı altında 11 madde halinde sunulmuştur.

Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında etkinlik örneklerinin yer almadığı görülmektedir. Bununla birlikte Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda bazı kazanımlar için kazanım açıklamalarının yer aldığı tespit edilmiştir. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı incelendiğinde program metninde kazanımlar ve etkinliklere yönelik açıklamalara doğrudan yer verilmediği görülmektedir. Diğer yandan, kazanımların öğretim sürecinde nasıl uygulanacağına ilişkin ayrıntılı açıklamalar ve örnekler, hayat bilgisi dersi için hazırlanmış öğretmenler el kitabında yer almaktadır. Öğretmenler el kitabında, kazanımların öğretim sürecine aktarılmasına yönelik etkinlik örnekleri, uygulama önerileri ve öğretim sürecini destekleyici açıklamalar ayrıntılı biçimde sunulmuştur.

Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarında değerlendirme boyutuna ilişkin yapılan karşılaştırmalara göre, Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda değerlendirme boyutu ile ilgili olarak "Öğretim Programlarında Ölçme ve Değerlendirme Yaklaşımı" başlığı altında yedi maddeye yer verildiği tespit edilmiştir. Ölçme ve değerlendirme sürecinde azami çeşitlilik ve esneklik anlayışıyla hareket edilmesi gerektiği vurgulanmıştır. Bu doğrultuda program, süreç değerlendirmesini esas alan, çok odaklı ve esnek bir ölçme-değerlendirme yaklaşımını benimsemektedir. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda değerlendirme aşamasında öğrencilerin başarıları ve bilgi düzeyleri beşlik not sistemi üzerinden değerlendirilmektedir. Öğrencilerin aldıkları notlar portfolyolara kaydedilmektedir. Eğitim-öğretim yılı toplam dört çeyrekten oluşmakta olup, her çeyrek sonunda öğrencinin ders ortalama puanı portfolyolar esas alınarak belirlenmektedir. Dönem içerisinde yapılan yazılı sınavlar ve verilen ödevler de aynı puanlama sistemi kullanılarak portfolyolara yansıtılmaktadır.

Tartışma ve Sonuç

Bu araştırmada 2018 Türkiye ve 2021 Türkmenistan hayat bilgisi dersi öğretim programları karşılaştırmalı olarak incelenerek aralarındaki benzerlikler ve farklılıklar tespit edilmiştir. Karşılaştırmada ilk olarak program yaklaşımları ele alınmıştır. Türkiye programında "ünite temelli yaklaşım" ve "sarmal yaklaşım" benimsendiği belirtilirken Türkmenistan programında program yaklaşımına yer verilmediği tespit edilmiştir. Her ne kadar belirtilmemiş olsa da Türkmenistan programının da sarmal yaklaşıma göre tasarlandığı görülmüştür.

Çalışmada Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programları hedefler boyutu açısından karşılaştırılmıştır. Türkiye hayat bilgisi dersi öğretim programında hedeflerin; bireyin kendisini ve yaşadığı çevreyi tanıması, aile ve toplum değerlerini benimsemesi, kişisel gelişim ve öz bakım becerileri kazanması, ülkesine karşı sevgi ve sorumluluk duygusu geliştirmesi ile bilimsel süreç becerilerini edinmesi gibi çok yönlü bir bakış açısıyla ele alındığı tespit edilmiştir. Türkmenistan hayat bilgisi dersi öğretim programında ise hedeflerin daha sınırlı bir çerçevede ele alındığı, özellikle sağlık, sağlıklı yaşam ve güvenli davranışlara ilişkin bilgi ve becerilerin kazandırılmasına odaklanıldığı görülmüştür. Bu bağlamda Türkiye programının bireyi sosyal, duyuşsal, bilişsel ve değerler eğitimi boyutlarıyla bütüncül bir şekilde ele aldığı; Türkmenistan programının ise daha çok koruyucu ve önleyici bir eğitim anlayışıyla temel yaşam becerilerine ağırlık verdiği söylenebilir. Hayat bilgisi dersi, öğrencilerin yaşadıkları çevreyi tanımalarını ve bu çevreyle bütünleşerek çevreye etkin biçimde uyum sağlamalarını, zihinsel açıdan güçlü, fiziksel ve ruhsal açıdan sağlıklı, demokratik tutumlara sahip, vatanına ve milletine bağlı, ulusal ve evrensel değerlerle donanmış bireyler olarak yetişmelerini amaçlamaktadır (Sabancı & Şahin, 2005). Buradan hareketle Türkiye programında belirtilen amaçlar, dersin çok yönlü işlevini güçlendiren bir unsur olarak değerlendirilebilir.

2018 Türkiye ve 2021 Türkmenistan hayat bilgisi dersi öğretim programlarının içerik boyutu açısından karşılaştırılmasında beceriler, değerler, kavramlar ile belirli gün ve haftalar inceleme konusu edinilmiştir. Türkiye programında 23 becerinin program genelinde toplam 233 kez yer aldığı belirlenmiş, en sık tekrar eden becerilerin "kendini koruma" ve "millî ve kültürel değerleri tanıma" olduğu tespit edilmiştir. Bu durum, Türkiye programında bireyin hem güvenli yaşam becerilerini kazanmasına hem de kültürel kimlik ve değerler bilincinin geliştirilmesine eş zamanlı olarak önem verildiğini göstermektedir. Türkmenistan programında ise 20 becerinin toplam 86 yerde kullanıldığı ve en sık ifade edilen becerilerin "sağlığını koruma" ile "kendini koruma" olduğu görülmüştür. Bu sonuç, Türkmenistan programında sağlık ve güvenlik temelli bir içerik anlayışının belirgin biçimde öne çıktığını göstermektedir. Bununla birlikte Türkmenistan programında "değişim ve sürekliliği algılama", "kariyer bilinci geliştirme" ve "sorun çözme" gibi becerilere yer verilmemesi, programın bireyin uzun vadeli gelişimini ve toplumsal yaşama uyumunu destekleyen bazı üst düzey beceriler açısından sınırlı kaldığını düşündürmektedir. Öğrencilerin toplumu, yaşadıkları kültürü ve kendilerini tanıyabilmeleri için geçmiş-bugün-gelecek ilişkisini içselleştirmeleri gerektiği (Çakmakcı & Ütkür Güllühan, 2025); erken yaşlarda kariyer bilincinin geliştirilmesinin, bireylerin uzun vadeli kariyer hedeflerine ulaşmalarına ve meslek seçimlerine önemli katkı

sağladığı (Demirtaş & Erol, 2024), sorun çözme becerisinin çocuğun sosyal-duygusal gelişimi ve sağlıklı bir toplumsal yaşam açısından oldukça önemli görüldüğü (Uzunkol & Özdemir Yılmaz, 2018) belirtilmektedir. Bu bağlamda söz konusu becerilerin hayat bilgisi dersinde önemli ve işlevsel bir konuma sahip olduğu görülebilir. Öte yandan "girişimcilik" becerisinin her iki ülkenin programında da en az yer bulan beceri olması, hayat bilgisi dersinin erken sınıf düzeylerinde ekonomik ve üretken rollerden çok temel yaşam becerileri ve değerler eğitimine odaklandığını ortaya koymaktadır. Erken yaşta ve girişimcilik eğitimlerinin uygulanması, öğrencilerin gelecekteki girişimci kariyerlerinde etkili olacağından (Chell, 2015), bu bulgu her iki program için de geliştirilmeye açık bir alan olarak değerlendirilebilir.

Öğretim programlarının değerler açısından karşılaştırılmasıyla elde edilen bulgular, Türkiye programında sekiz değerin 79 yerde, Türkmenistan programında ise bu değerlerden altısının 27 yerde karşılığını bulduğunu göstermektedir. Her iki ülkenin hayat bilgisi dersi öğretim programında en fazla vurgulanan değerin "sorumluluk" olması, öğrencilerin erken yaşlardan itibaren görev bilinci, özdenetim ve toplumsal kurallara uyum gibi beceriler kazanmalarının ortak bir öncelik olarak görüldüğünü düşündürmektedir. "Dostluk" ve "dürüstlük" değerlerinin her iki programda da en az yer verilen değerlerdir.

Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programları içerdikleri kavramlar yönünden karşılaştırılmıştır. Sonuçlar, kavram sayısı ve kullanım sıklığı açısından Türkiye programının daha belirgin bir ağırlığa sahip olduğunu göstermektedir. Türkiye programında özellikle "çevre", "okul", "aile" ve "arkadaş" gibi kavramların yüksek frekansla kullanılması, dersin öğrencinin yakın çevresinden hareket eden ve sosyal ilişkiler temelinde yapılandırılan bir anlayışı benimsediğini göstermektedir. Bu durum, hayat bilgisi dersinin bireye görelik, yerellik, yakından uzağa, yaşama yakınlık gibi ilkelerinin (Cebeci Topcubaşı & Tay, 2021) yansıması olarak görülebilir. Buna karşılık Türkmenistan programında "kural" ve "davranış kuralları" kavramlarının daha sık tekrar edilmesi, programın bireyin toplumsal düzene uyumunu ve kurallara uygun davranış geliştirmesini önceleyen bir yaklaşım benimsediğini düşündürmektedir.

Çalışmadan elde edilen sonuçlar, Türkiye Hayat Bilgisi Dersi Öğretim Programı'nda belirli gün ve haftalara yönelik açıklamalara yer verildiğini, buna karşılık Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda bu tür düzenlemelerin bulunmadığını göstermektedir. Türkiye öğretim programında, bazı kazanımların belirli gün ve haftalarla ilişkilendirilerek ele alınması gerektiği vurgulanmaktadır. Bu sonuç, Türkiye programında öğrenmenin yaşantısal olarak desteklenmesini amaçlayan bir yaklaşımın benimsendiğini ortaya koymaktadır.

Bu araştırmada 2018 Türkiye ve 2021 Türkmenistan hayat bilgisi dersi öğretim programlarında eğitim durumları boyutunun belirtilme durumu incelenmiştir. Bu kapsamda öğrenme öğretme süreçlerine ilişkin açıklamalar, etkinlik örnekleri, kazanımlar ve etkinlikler için açıklamalar ele alınmıştır. Öğretim programları öğrenme öğretme süreçlerine ilişkin açıklamalara yer verme durumu açısından karşılaştırıldığında Türkiye programında öğrenme öğretme süreçlerine ilişkin açıklamalara yer verilirken Türkmenistan programında yer verilmediği ortaya konmuştur. Bu bağlamda elde edilen bulgular, Türkiye Hayat Bilgisi Dersi Öğretim Programı'nın öğretim sürecine yönelik rehberlik edici ve yönlendirici bir işlev

üstlendiğini; Türkmenistan programının ise daha genel ve çerçeve niteliğinde bir yapı sergilediğini göstermektedir.

Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarının her ikisinde de etkinlik örneklerinin yer almadığı araştırmada tespit edilmiştir. Türkiye programında her kazanım için olmasa da bazı kazanımlar için kazanım açıklamaları yer alırken Türkmenistan programında kazanım açıklamaları yer almamıştır. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı metninde kazanımlar ve etkinliklere yönelik açıklamalara doğrudan yer verilmediği araştırmanın sonuçlarındandır. Bununla birlikte kazanımların öğretim sürecinde nasıl uygulanacağına ilişkin ayrıntılı açıklamalar ve örnekler, hayat bilgisi dersi için hazırlanmış öğretmenler el kitabında yer almaktadır. Öğretmenler el kitabında, kazanımların öğretim sürecine aktarılmasına yönelik etkinlik örnekleri, uygulama önerileri ve öğretim sürecini destekleyici açıklamalar ayrıntılı biçimde sunulmaktadır. Sonuç olarak etkinlik örnekleri ve açıklamaları açısından Türkmenistan programının daha kapsamlı bir yapıya sahip olduğu anlaşılmaktadır.

Öğretim programları değerlendirme boyutu açısından karşılaştırıldığında Türkiye programında 7 maddeye yer verildiği tespit edilmiştir. Ölçme ve değerlendirme sürecinde azami çeşitlilik ve esneklik anlayışıyla hareket edilmesi gerektiği vurgulanmıştır. Bu doğrultuda program, süreç değerlendirmesini esas alan, çok odaklı ve esnek bir ölçme-değerlendirme yaklaşımını benimsemektedir. Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda değerlendirme aşamasında öğrencilerin başarıları ve bilgi düzeyleri beşlik not sistemi üzerinden değerlendirilmektedir. Türkiye programında değerlendirme, öğrencinin öğrenme sürecindeki gelişimini izlemeye ve desteklemeye yönelik esnek bir araç olarak ele alınırken Türkmenistan programında değerlendirme, öğrencinin akademik başarısını belirlemeye yönelik daha yapılandırılmış ve sonuç odaklı bir mekanizma olarak konumlandırılmaktadır.

Öneriler

Çalışmada Türkmenistan Hayat Bilgisi Dersi Öğretim Programı'nda "sorun çözme", "değişim ve sürekliliği algılama" ve "kariyer bilinci geliştirme" gibi becerilere yer verilmediği tespit edilmiştir. Söz konusu becerilerin öğretim programına dâhil edilmesi, öğrencilerin uzun vadeli gelişimleri ve toplumsal yaşama uyumları açısından önerilmektedir.

Araştırmada, Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programlarının her ikisinde de girişimcilik becerisine sınırlı düzeyde yer verildiği görülmüştür. Erken yaşlarda girişimcilik farkındalığını destekleyecek etkinlik ve kazanımlar hayat bilgisi dersi öğretim programlarına entegre edilebilir.

Bu araştırmada Türkiye ve Türkmenistan hayat bilgisi dersi öğretim programları karşılaştırmalı olarak incelenmiştir. Türkiye ve Türkmenistan'daki farklı derslerin öğretim programlarının, Türkiye ile farklı ülkelerin hayat bilgisi dersi öğretim programlarının karşılaştırıldığı benzer araştırmalar yürütülebilir.

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SCIM-C Strategy in the 2024 Life Science Course Curriculum

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Abstract

The importance of accessing primary sources in order to shed light on history brings the SCIM-C strategy to the forefront. The SCIM-C strategy was developed to help students make sense of historical documents and develop historical thinking skills. It can be stated that the use of the SCIM-C strategy enables students to access information from primary sources, enhances their historical thinking skills, contributes to their critical and structured thinking, and particularly facilitates the interpretation of historical materials for students whose abstract thinking skills are not yet sufficiently developed. For students in the first three grades of primary school, where abstract thinking skills are still in the developmental stage, the use of the SCIM-C strategy may be significant in fostering the understanding of historical materials, accessing information from primary sources, and developing historical, critical, and structured thinking skills within the scope of the life science course. In this context, it is considered that the SCIM-C strategy can be used in achieving the learning outcomes of the life science course. Determining in which learning outcomes of the 2024 life science curriculum and how the SCIM-C strategy can be used constitutes the aim of this study. A qualitative research method was adopted in the study, and document analysis was employed. The data source of the research consisted of the 2024 life science curriculum. The data were analyzed by following the steps of document analysis. As a result of the study, it was determined that the SCIM-C strategy can be used in the learning areas of the life science course at the 1st, 2nd, and 3rd grade levels. It was identified that the strategy can be used in 7 learning outcomes at the 1st grade level, 10 at the 2nd grade level, and 11 at the 3rd grade level. It was observed that the learning area in which the SCIM-C strategy can be used most extensively is "My Place and My Country." Accordingly, it may be recommended to utilize the SCIM-C strategy particularly in the "My Place and My Country" learning area.

Keywords: Life science course, 2024 life science course curriculum, SCIM-C strategy.

Introduction

Education can be described as a comprehensive process that prepares children for the responsibilities, challenges, and social roles they will encounter in different areas of life. As a fundamental building block in the development of a society and the shaping of its future, education represents one of the most powerful tools that elevate societies to the level of contemporary civilization and enable individuals to be raised as conscious, productive, and responsible members of society (Uyar, 2022). The harmony and coherence among all components of this process are considered important for societal progress. The education system in Türkiye consists of three main structures: primary, secondary, and higher education. These three main structures form an integrated whole both within themselves and in relation to one another. One of the courses in primary education that prepares children for the responsibilities, challenges, and social roles they will encounter in different areas of life is the life science course. The distribution of learning outcomes in the life science course across different taxonomic domains reveals that the course has a multidimensional structure aimed at preparing individuals for life, enabling interaction with their environment, and instilling fundamental values (Ütkür Güllühan & Bekiroğlu, 2022; Yılmaz & Yarar Kaptan, 2023).

Developed based on the principle of integration and possessing an interdisciplinary understanding within the framework of the themes of human, nature, and society, the content of the life science course consists of social science, natural science, art, thought, and values (Tay, 2017). It can be stated that numerous knowledge areas, skills, and values are expected to be acquired through this content. Some of these knowledge areas, skills, and values are related

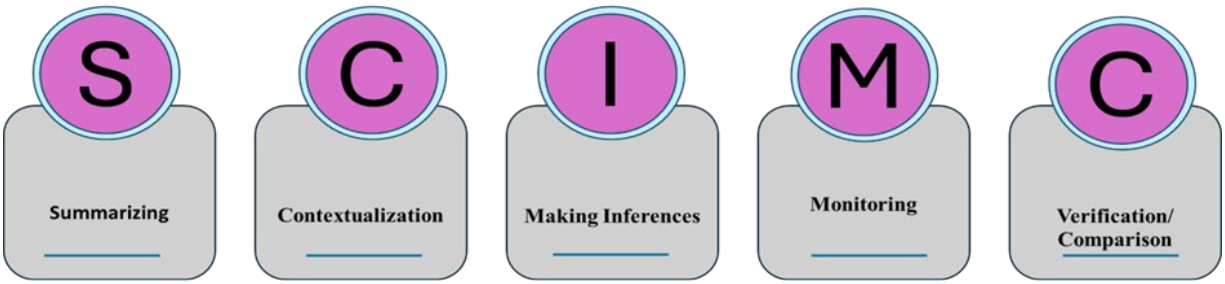
to history as a social science discipline. According to Demircioğlu (2015), history is not only a field of scientific inquiry but also holds a significant place as one of the fundamental social science disciplines taught in schools. Through historical content, it is aimed that students directly access primary sources, develop historical awareness regarding the places they live in or visit, and establish connections between the past and the present. In the life science curriculum, which was restructured in line with the "Türkiye Century Education Model," it is observed that many of the topics within the scope of the course are related to history. Within the scope of the life science course, particularly in the learning area titled "My Place and My Country," students are expected to recognize the place they live in and develop awareness regarding the importance of protecting historical sites and natural beauties. Considering that humans, objects, and nature possess a past, the inclusion of material culture education in the life science course and its examination of human natural and social life from past to present demonstrate that history holds fundamental importance within the life science course.

History is the art of systematically interpreting and making sense of events that occurred in the past. Acquiring historical knowledge means learning to view events critically and understanding the methods of questioning the past. Understanding history is a complex and multidimensional process. In order to make this process more effective, the SCIM-C [Summarizing, Contextualizing, Inferring, Monitoring, Corroborating] strategy was developed to assist teachers in supporting students in analyzing primary sources and constructing meaningful wholes by bringing together different historical narratives (Hicks et al., 2004). At this point, it is considered that the SCIM-C strategy, developed to structure historical thinking, will stand out as an important tool for teachers. When used in life science instruction, this strategy may enable students to make sense of historical documents, develop critical thinking skills, access historical knowledge, and engage in inquiry-based thinking.

The SCIM-C strategy, developed by David Hicks, is a five-stage approach that guides students in analyzing primary sources and structuring their historical thinking skills (Yetişensoy, 2021). In the first four stages of this strategy, students examine different historical sources within the framework of specific guiding questions; in the final stage, they make comparisons among these sources and reach synthesis-based historical conclusions (as cited in Yetişensoy, 2021). Given its historical content, the life science course is considered suitable for the use of the SCIM-C strategy. The stages of the SCIM-C strategy are presented in Figure 1.

Figure 1.

Stages of the SCIM-C Strategy



The first stage of the SCIM-C strategy is summarizing. In this stage, the student objectively summarizes the content of the examined historical source, and answers to the following questions are sought:

• What does the source say?

• What type of information does it contain?

• By whom, when, and for what purpose was it produced?

The second stage of the strategy is described as contextualizing. The main focus of this stage is addressing the historical context in which the source was produced. This stage enables the evaluation of the source within a broader historical framework. For this purpose, answers to the following questions are sought:

• To which historical event or period does this source belong?

• What does it signify in social, political, and cultural terms?

• What developments were taking place during the period in which the source was produced?

In the third stage of the strategy, inferring, inferences are made regarding meanings, intentions, and assumptions that are not explicitly stated in the source. The student is expected to interpret what is implied in the source. Example questions are as follows:

• What value judgments does the source imply?

• What might be the purpose of the source?

• What kinds of assumptions or tendencies does it contain?

The fourth stage of this strategy is monitoring. In this stage, the student questions the consistency and basis of their interpretations. Answers to the following questions are sought in order to foreground self-assessment and critical thinking:

• Which ideas or images in the source need to be identified?

• Are my inferences supported by the data?

• Am I able to recognize my own biases?

• Is the method I am using reliable?

In the final stage of the SCIM-C strategy, corroborating, the student evaluates the accuracy and reliability of sources by comparing them with other sources. In this stage, answers to the following questions are sought, thereby completing all stages of the strategy:

• Do other sources support this information?

• How do different perspectives provide coherence?

• How can the reliability of the source be measured?

The use of the SCIM-C strategy, which consists of five stages, has various advantages. According to Hicks et al. (2004) and Hicks et al. (2016), this strategy guides teachers in

effectively using primary sources in the classroom. The strategy contributes to students' accurate identification of the essential characteristics of primary sources and encourages them to approach these sources with a critical perspective. This process supports students in developing the habit of questioning historical sources and encourages them to actively participate in the historical inquiry process. Additionally, the SCIM-C strategy develops students' abilities to think like historians, evaluate historical events within the conditions of their period, analyze and interpret primary sources. Furthermore, by systematizing the process of establishing meaningful connections among different sources and evidence, it helps students generate evidence-based inferences (as cited in Yetişensoy, 2021). In this respect, the SCIM-C strategy contributes to the development of historical understanding by providing a systematic structure for summarizing, contextualizing, and drawing inferences from documents (Lee & Clarke, 2004). Van Hover et al. (2008) describe this strategy as an important instructional strategy that teaches students to participate in the construction of history and enables them to learn how historical inquiry is conducted.

The primary reason for the importance of the SCIM-C strategy in education is that it contributes to students' ability to make sense of historical documents and develop historical thinking skills (Hicks et al., 2004). This strategy allows students to examine and interpret historical documents through an inquiry-based approach. When students use historians' methods and ways of thinking, they gain an understanding of how historical knowledge is produced; this, in turn, contributes to their awareness of the nature and interpretive character of historical knowledge (Nalbantoğlu, 2022). When the stages of the SCIM-C strategy are examined, it is observed that students whose critical and creative thinking skills develop are able to evaluate their own learning processes and question the reliability and validity of historical sources by comparing them with different forms of evidence. This process supports students in approaching historical events from a critical, impartial, and multidimensional perspective. In this respect, the SCIM-C strategy moves instruction away from passive knowledge transmission and provides a structure that engages students in active thinking, consistent with contemporary educational approaches. However, in our country, the limited number of class hours and the intensity of instructional content may constitute a limitation in the effective implementation of the SCIM-C strategy. On the other hand, considering the learning outcomes and process components of the 2024 life science curriculum, it is believed that the use of the SCIM-C strategy may provide a significant contribution. Indeed, the extent to which the methods, techniques, strategies, and materials used in instruction reflect or model real life is of great importance in terms of the permanence of learning (Aykaç, 2011). In this context, it can be stated that the SCIM-C strategy, which is compatible with the constructivist approach, active learning, and inquiry-based instruction, has significant potential, particularly in developing source-based inquiry skills and creating effective learning environments in life science education.

When the literature is examined, it is observed that the SCIM-C strategy has been addressed in science related to history, social science, and providing practical recommendations for teachers' classroom practices (Hicks et al., 2004; Yetişensoy, 2021). As a result of the literature review, it has been determined that science addressing this issue within the context of the life science course are insufficient. This study, which aims to describe the

usability of the SCIM-C strategy in the 2024 life science curriculum and how it can be implemented in the learning outcomes where it is determined to be applicable, is considered to contribute to the relevant literature and fill an important gap.

When the life science curriculum is examined, its principles emphasize placing research and inquiry at the center in order for students to construct their knowledge and skills, and focusing on holistic development through the combined use of knowledge, skills, dispositions, and values (Ministry of National Education [MoNE], 2024b). These principles may render the use of the SCIM-C strategy important in the life science course. In this context, it is considered that the SCIM-C strategy will be compatible with the learning outcomes and process components of the 2024 life science curriculum and will support student-centered learning. In contemporary education systems, it is believed that acquiring information from multiple sources and verifying this information enables students to develop awareness regarding the reliability of information and enhances their critical thinking skills. Accordingly, the main research problem of this study, which aims to describe in which learning outcomes and process components of the 2024 life science curriculum the SCIM-C strategy can be used and how it can be implemented, is formulated as follows: "What is the applicability of the SCIM-C strategy within the learning outcomes and process components of the life science curriculum?" Within the scope of this main problem, answers were sought to the following sub-problems:

1. What is the applicability of the SCIM-C strategy within the first-grade learning outcomes and process components of the life science curriculum?

2. What is the applicability of the SCIM-C strategy within the second-grade learning outcomes and process components of the life science curriculum?

3. What is the applicability of the SCIM-C strategy within the third-grade learning outcomes and process components of the life science curriculum?

Method

Research Design

In this study, which aims to determine the applicability of the SCIM-C strategy within the learning outcomes and process components of the life science course, a qualitative research approach was employed. Qualitative research is an approach that examines a specific program, practice, or setting in detail and seeks to understand the nature of relationships, actions, situations, and materials (Fraenkel et al., 2012; Mertens, 2010). Document analysis, one of the data collection methods used in qualitative research, involves the systematic and detailed examination of written materials related to the phenomenon or phenomena under investigation (Creswell, 2013; Yıldırım & Şimşek, 2011). In this context, the 2024 life science curriculum, which constituted the data source of the study, was treated as a document and examined. During the examination process, the learning outcomes and process components included in the curriculum were evaluated in terms of the applicability of the SCIM-C strategy.

Data Source

The data source of the research was determined through criterion sampling, one of the purposive sampling methods. In qualitative research, purposive sampling refers to the

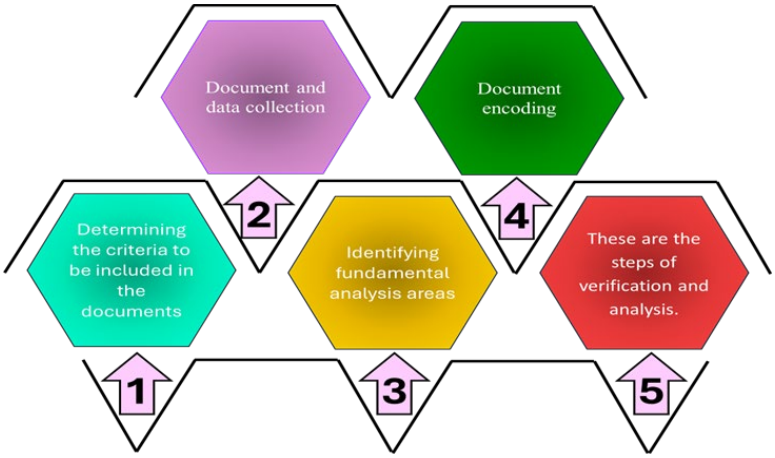
selection of information-rich cases appropriate to the purpose of the study (Sönmez & Alacapınar, 2014; Yağar & Dökme, 2018), whereas criterion sampling involves selecting and reviewing cases that meet predetermined criteria (Patton, 2014). In this context, the reason for examining the 2024 life science curriculum in this study is that it is the current curriculum implemented in the 2024–2025 academic year, and this condition was considered as a criterion.

Research Process

In the study, the five-step document analysis method developed by Altheide (1996) was used. These steps are presented in Figure 2.

Figure 2.

Steps of Document Analysis



In the first step, determining the criteria to be included in the documents, the document was selected by considering screening criteria and inclusion criteria. Rather than including all life science curricula developed during the Republican period, only the most recently developed and currently implemented 2024 life science curriculum was included in the study. The screening criterion was defined as the life science curriculum, and the inclusion criterion was defined as the currently implemented curriculum. In the document and data collection step, since the applicability of the SCIM-C strategy was to be examined within the selected document, the literature was reviewed in the context of the SCIM-C strategy, the fundamental characteristics of the strategy were identified, and the data collection process from the document was initiated. In determining the basic units of analysis, the entire 2024 life science curriculum was not examined; instead, the learning outcomes and process components were identified as the main units of analysis. In the fourth step, coding the document, all learning outcomes and process components at the 1st, 2nd, and 3rd grade levels in the curriculum were examined, and coding was conducted in line with the applicability of the SCIM-C strategy. The suitability of the learning outcomes and process components for the SCIM-C strategy was determined based on the stages of the strategy. Accordingly, learning outcomes that included at least one of the following skills were coded as appropriate for the SCIM-C strategy: analyzing historical sources, evaluating them within their context, making evidence-based inferences, and establishing relationships among sources. In addition, learning outcomes and process components that required students to express knowledge, evaluate events, phenomena, and

situations within their own context, make inferences, establish relationships, and develop appropriate attitudes and behaviors based on the knowledge they acquired were also evaluated as applicable within the scope of the SCIM-C strategy due to their alignment with the cognitive processes included in the strategy. Finally, within the verification and analysis step, the accuracy of the coding generated in the previous steps was tested. During the data coding process, the researcher, a life science education expert, and a classroom teacher independently conducted the coding. The reliability of the coding was calculated using the reliability formula developed by Miles and Huberman (1994). As a result of the calculation, the inter-rater agreement coefficient was found to be .95, indicating a high level of reliability in the coding. The analysis results were presented through tables, and direct quotations related to the learning outcomes and process components were included.

Ethical Permits of Research:

In this study, all the rules specified to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were complied with. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics", which is the second part of the directive, have been taken.

Ethics Committee Permission Information:

Since the research was conducted using publicly available documents, ethics committee approval was not required.

Findings

In this study, it was determined in which learning outcomes and process components of the 2024 life science curriculum the SCIM-C strategy can be used and how it can be implemented. In Table 1, the applicability of the SCIM-C strategy in the learning areas of the life science curriculum is presented according to grade levels.

Table 1.

Applicability of the SCIM-C Strategy in the Learning Areas of the Life Science Course Curriculum

	Learning outcomes in which the SCIM-C strategy can be used		
Learning areas	1st grade	2st grade	3st grade
1. Me and My School	HB.1.1.2	-	HB.3.1.1/HB.3.1.2
2. My Health and Safety	-	-	HB.3.2.1
3. My Family and Society	-	HB.2.3.1	HB.3.3.3
4. My Place of Residence and My Country	HB.1.4.1/HB.1.4.2/ HB.1.4.3/HB.1.4.4/ HB.1.4.5	HB.2.4.1/ HB.2.4.2/HB.2.4.3/ HB.2.4.4/HB.2.4.5	HB.3.4.1/ HB.3.4.2/HB.3.4.3/ HB.3.4.4
5. Nature and the Environmt	-	HB.2.5.2	-
6. Science, Technology and Art	HB.1.6.2	HB.2.6.1/ HB.2.6.2/ HB.2.6.3	HB.3.6.1/HB.3.6.2/ HB.3.6.3
Total number of learning outcomes in which the SCIM-C strategy can be used	7	10	11
Total number of learning outcomes in the curriculum	23	23	20

In the 2024 life science curriculum, it was determined that the SCIM-C strategy can be used in a total of seven learning outcomes at the first-grade level. It is observed that the strategy can be used in five learning outcomes in the "My Place of Residence and My Country" learning area and in one learning outcome each in the "Me and My School" and "Science, Technology, and Art" learning areas. However, it was determined that there are no learning outcomes in the "My Health and Safety," "My Family and Society," and "Nature and Environment" learning areas in which the SCIM-C strategy can be used.

At the second-grade level, it was determined that the SCIM-C strategy can be used in a total of ten learning outcomes. It is observed that this strategy can be used in five learning outcomes in the "My Place of Residence and My Country" learning area, three in the "Science, Technology, and Art" learning area, and one each in the "My Family and Society" and "Nature and Environment" learning areas. In contrast, it was determined that there are no learning outcomes in the "Me and My School" and "My Health and Safety" learning areas in which the SCIM-C strategy can be used.

At the third-grade level, it was determined that the SCIM-C strategy can be used in a total of eleven learning outcomes. It is observed that this strategy can be used in four learning outcomes in the "My Place of Residence and My Country" learning area, three in the "Science, Technology, and Art" learning area, two in the "Me and My School" learning area, and one each in the "My Health and Safety" and "My Family and Society" learning areas. However, it was determined that there are no learning outcomes in the "Nature and Environment" learning area in which the SCIM-C strategy can be used. The learning outcomes and process components in which the SCIM-C strategy can be used in the "Me and My School" learning area of the first-grade life science course are presented in Table 2.

Table 2.

Learning Outcomes and Process Components in the 1st Grade "Me and My School" Learning Area in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcome
1. Me and My School	HB.1.1.2. Recognizing the school environment a) Recognizes their classroom, school sections, and school staff that are new to them. b) Expresses their observations regarding the school environment and staff.

In the learning outcome "HB.1.1.2 Recognizing the school environment," an activity example can be created in the "Me and My School" learning area by using observations related to school staff that constitute primary sources regarding school personnel. An activity example for the use of the SCIM-C strategy in this learning outcome may be structured as follows: In the learning outcome HB.1.1.2 Recognizing the school environment, in the first step of the strategy, summarizing, students are provided with the history of the school, if available. Information is obtained about who founded the school and when. A school tour is conducted, and students are asked to express their observations regarding school staff, which constitute primary sources. In the contextualizing stage, past developments that occurred in the school are examined. In the inferring stage, students make short statements about their observations. In the monitoring stage, students are asked the question, "Which sections did you visit at school today, and what did you do?" and awareness about the topic is developed. In the final

stage, corroborating, in order to provide students with different perspectives, the historical comparison of the school and home environments is conducted. The learning outcomes in which the SCIM-C strategy can be used in the "My Place of Residence and My Country" learning area of the first-grade life science course are presented in Table 3.

Table 3.

Learning Outcomes and Process Components in the 1st Grade 4th Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
4. My Place of Residence and My Country	HB.1.4.1. Explaining the general characteristics of the place where one lives and of our country HB.1.4.2. Expressing the importance of the Turkish Flag and the National Anthem HB.1.4.3. Expressing information about the life of Mustafa Kemal Atatürk HB.1.4.4. Expressing the feelings experienced on national days and holidays HB.1.4.5. Expressing the feelings experienced on religious days and holidays

In the "My Place of Residence and My Country" learning area, activity examples related to the SCIM-C strategy can be provided for five learning outcomes: HB.1.4.1, HB.1.4.2, HB.1.4.3, HB.1.4.4, and HB.1.4.5. In the HB.1.4.1 learning outcome, historical information introducing the local environment (province, district, village) is presented through photographs, videos, or drawings, and the activity example is continued in accordance with the stages of the strategy. In the HB.1.4.2 learning outcome, information is shared about how the flag and the National Anthem were formed in the past, the story of the poetry competition, and related visuals, thus enabling the SCIM-C strategy to guide the effective use of primary sources in the classroom environment. In the HB.1.4.3 learning outcome, historical visuals, short videos, and storybooks related to Atatürk's childhood are presented. These different primary sources provided through the SCIM-C strategy develop students' analysis and interpretation skills. In the HB.1.4.4 and HB.1.4.5 learning outcomes, by showing a short video related to a national day or holiday and explaining what is done during religious holidays and the activities carried out today, students are enabled not only to correctly identify the basic characteristics of primary sources but also to develop the ability to evaluate past historical conditions within their contextual framework.

Regarding the use of the SCIM-C strategy for the HB.1.4.1 learning outcome, the following activity example was created based on the SCIM-C strategy: In the summarizing stage, historical information introducing the local environment (province, district, village) is provided through photographs, videos, or drawings. In the contextualizing stage, the location of the place lived in within the country is shown on a physical and relief map as a primary source. A relationship is established between the geographical location of the place lived in and the country. In the inferring stage, the lives of children living in other places are compared with the student's own life. In the monitoring stage, the student observes the characteristics of the place they live in through a trip for several days. In the final stage, corroborating/comparing, the student compares the place they live in with the places observed by their classmates. The activity example developed in line with the SCIM-C strategy for the HB.1.4.2 learning outcome may be structured as follows: In the summarizing stage, information is shared about how the

flag and the National Anthem were formed in the past, along with the story and visuals of the poetry competition. In the contextualizing stage, a short story or cartoon is shown about why the flag and the anthem are important in a cultural context. Students understand why our flag is valuable to us and why we listen to our anthem standing. In the inferring stage, a discussion is held about how one would feel if respect were not shown to the flag or the anthem. In the monitoring stage, students are asked to notice and record where they see or hear the flag and the anthem during a week. They become aware of where they encounter these symbols in daily life. In the final stage, corroborating/comparing, the flags and anthems of different countries are introduced. By comparing them with our own flag, students develop a sense of national identity.

In order to support the HB.1.4.3 learning outcome, an activity example based on the SCIM-C strategy is presented: In the summarizing stage, historical visuals, short videos, and storybooks related to Atatürk's childhood are presented as sources. In the contextualizing stage, the conditions of the period in which Atatürk lived are explained. In the inferring stage, students think about Atatürk's actions and make inferences such as "What would have happened if he had not existed?" In the monitoring stage, the student notices the places where they see Atatürk's name (school name, statue, poster, etc.) during a week. In the final stage, corroborating/comparing, Atatürk's childhood is compared with the student's own childhood, and the student takes Atatürk as a role model.

Regarding the use of the SCIM-C strategy in the context of the HB.1.4.4 learning outcome, an activity example illustrating how the strategy can be implemented is presented: In the summarizing stage, a short video related to national days and holidays is shown to the student. Visuals about how the holiday was formed and how it was celebrated in previous years are presented. In the contextualizing stage, the reasons why holidays are celebrated and the historical meaning of these days are questioned. Answers are sought to questions such as "Why is today special? Why do we celebrate?" By making the inference that the day was gifted to children, students are asked to imagine a day when the holiday is not celebrated at all. The question "What would be missing if there were no national holidays?" is asked. In the monitoring stage, students are asked to draw pictures about what they feel during national holidays throughout the day. In the corroborating/comparing stage, they compare their own drawings with those of their classmates based on the feelings expressed.

For the HB.1.4.5 learning outcome, the activity example prepared by benefiting from the SCIM-C strategy is as follows: In the summarizing stage, students explain what was done in religious holidays in the past and what is done today: Eid prayer, visiting elders, holiday sweets, etc. In the contextualizing stage, the meaning of the holiday is explained in child language: sharing, joy, togetherness. In the inferring stage, students are asked to imagine a day when religious days and holidays do not exist or are not celebrated. In the monitoring stage, students observe and then explain what they feel during the holiday. In the corroborating/comparing stage, everyone in the class tells their holiday memory and emotions are compared. What was done in past holidays and what is done today is schematized using the hourglass technique. The learning outcome in which the SCIM-C strategy can be used in

the "Science, Technology, and Art" learning area of the first-grade life science course is presented in Table 4.

Table 4.

Learning Outcomes in the 1st Grade 6th Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
6. Science, Technology and Art	HB.1.6.2. Asking questions about what they are curious about related to technology Asks questions about a presented technological topic that they are curious about.

In the "Science, Technology, and Art" learning area, it is observed that HB.1.6.2 is used in one learning outcome. Here, by showing educational content such as documentaries, animations, and videos about a technological development or product, meaningful connections are established between different sources and evidence through historical documentaries about technological tools used in the past. The activity example for the use of the SCIM-C strategy in the HB.1.6.2 learning outcome may be structured as follows: In the summarizing stage, students are shown educational content such as documentaries, animations, or videos about a technological development or product. Historical documentaries about technological tools used in the past are shown, and in the contextualizing stage, connections are established with present-day tools. In the inferring stage, students generate ideas about what kinds of problems would be experienced today in education, transportation, communication, and health if technological tools used in these fields did not exist. In the monitoring stage, they are expected to explain their observations from the educational content they watched. In the corroborating/comparing stage, how technology has progressed from past to present is made noticeable. The learning outcome in which the SCIM-C strategy can be used in the "My Family and Society" learning area of the second-grade life science course is presented in Table 5.

Table 5.

Learning Outcomes and Process Components in the 2nd Grade 3rd Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
3. My Family and Society	HB.2.3.1. Interpreting the importance of the family a) Examines examples given regarding the importance of the family. b) Expresses in their own words the inferences they make regarding the importance of the family.

In the HB.2.3.1 learning outcome within the "My Family and Society" learning area, an imaginary but realistic short letter written by a grandmother to her grandchild is presented, and it is emphasized that this letter is a primary source. The activity example developed by benefiting from this source enables students to evaluate historical events within the framework of the conditions of the past period. Regarding the use of the SCIM-C strategy for the HB.2.3.1 learning outcome, the following activity example was created based on the SCIM-C strategy: Students are given an imaginary but realistic short letter written by a grandmother to her grandchild. It is emphasized that this letter is a primary source. In the summarizing stage, the letter is read to obtain information about what the grandmother explains in the letter. In the contextualizing stage, questions are asked to understand why elders in the family are valuable. In the inferring stage, what students understand about the importance of the family from this

letter is discussed. In the monitoring stage, when rereading the letter, the student notices whether they have any prejudices regarding the importance of the family. In the corroborating/comparing stage, the student is asked to provide a similar example from their own family. The learning outcome in which the SCIM-C strategy can be used in the "My Place of Residence and My Country" learning area of the second-grade life science course is presented in Table 6.

Table 6.

Learning Outcomes and Process Components in the 2nd Grade 4th Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
4. My Place of Residence and My Country	HB.2.4.1. Identifying historical sites and natural beauties in their immediate environment a) Notices historical sites and natural beauties in their immediate environment. b) Expresses the basic characteristics of historical sites and natural beauties in their immediate environment. HB.2.4.2. Gathering information from sources about the administrative units of the place where they live a) Finds information from sources about the administrative units of the place where they live. b) Records the information found about the administrative units of the place where they live. HB.2.4.3. Interpreting memories related to Mustafa Kemal Atatürk's student years a) Examines memories related to Mustafa Kemal Atatürk's student years. b) Expresses memories related to Mustafa Kemal Atatürk's student years. HB.2.4.4. Interpreting the importance of national days and holidays a) Shares experiences related to national days and holidays. b) Expresses the importance of national days and holidays. HB.2.4.5. Interpreting the importance of religious days and holidays a) Shares experiences related to religious days and holidays. b) Expresses the importance of religious days and holidays.

The SCIM-C strategy was determined to be used in five learning outcomes within the "My Place of Residence and My Country" learning area. Within the scope of the HB.2.4.1 learning outcome, a field trip to primary sources such as a mosque or a castle is provided to students through the SCIM-C strategy, and it is noticed by whom, when, and for what purpose these sources were produced. In the HB.2.4.2 learning outcome, a question that can be asked to the mayor or the headman is prepared, and primary sources are obtained from this. In the HB.2.4.3 learning outcome, a short memory from Atatürk's student years is used to establish a relationship between that period and today's school conditions, and inferences are made. In the HB.2.4.4 and HB.2.4.5 learning outcomes, first-hand sources such as pictures, posters, short stories, or videos related to national days and holidays are shown. It is emphasized that religious days and holidays are national values and important and special days when people visit one another and offer treats to their guests.

The activity prepared based on the SCIM-C strategy within the scope of the HB.2.4.1 learning outcome is presented as follows: In this learning experience, a field trip to places such as a mosque or a castle is provided to students. First, in the summarizing stage, students become familiar with historical and natural places in their city through pictures or videos. In the contextualizing stage, what historical sites were used for in the past and by whom they were

built are explained in simple language. In the inferring stage, the basic characteristics of these places are discussed. The purpose for which these places were built is determined from primary sources. In the monitoring stage, the student examines whether the information in the primary source they analyzed about the historical site or natural beauty aligns with their own inferences. Finally, in the corroborating/comparing stage, they compare the places known by their classmates with the places they know. The reliability of the primary sources is measured. A "Let's Get to Know Our Environment" corner is created in the classroom. The activity example adapted to the HB.2.4.2 learning outcome in line with the SCIM-C strategy is as follows: In the summarizing stage, students prepare a question that can be asked to the mayor or the headman. The responses received are read in class, and students directly learn about the duties of administrators. They find answers to questions such as "What is a municipality? What does a headman do?" In the contextualizing stage, the purposes of these administrative units are explained. In the inferring stage, possible problems that would occur if there were no administrative units are discussed. During the monitoring stage, news and announcements related to the municipality or headman are followed and shared in class. In the corroborating/comparing stage, different students compare the administrative units of the places where they live.

The activity example reflecting the use of the SCIM-C strategy for the HB.2.4.3 learning outcome is as follows: In the summarizing stage, students are given a short memory from Atatürk's student years (for example, he loved mathematics very much and his teacher gave him the name "Kemal"). In the contextualizing stage, questions such as "What was education like in Atatürk's time?" and "What is your favorite subject?" are asked to establish a relationship between that period and today's school conditions. In the inferring stage, students try to understand what kind of person Atatürk was. Examples from Atatürk's student memories are given, or educational content such as videos and animations related to these memories is shown, and students are asked to make inferences. In the monitoring stage, Atatürk's house in Thessaloniki, Anıtkabir, etc., are shown to students through a virtual museum tour. In the corroborating/comparing stage, Atatürk's student memories are compared with students' own experiences. Students are asked to interpret one of the memories given in the content through activities such as drawing, writing poetry, or dramatization.

The activity example designed in accordance with the HB.2.4.4 learning outcome for the use of the SCIM-C strategy is presented: In the summarizing stage, first-hand sources such as pictures, posters, short stories, or videos related to national days and holidays are shown. In the contextualizing stage, the historical reasons and social impacts of the holidays are explained. In the inferring stage, questions such as "What would we lose if there were no holidays?" and "How would you feel if there were no holidays?" are asked to analyze the social impact of holidays. In the monitoring stage, activities carried out on different national days are observed. Students examine primary source writings of Atatürk related to different national holidays and take notes. In the corroborating/comparing stage, comparisons are made with other holidays (for example, religious holidays). Questions such as "Is there a difference between national holidays and religious holidays? What is the similarity?" are asked to build a bridge between learning areas. The activity example developed by benefiting from the SCIM-C strategy in the context of the HB.2.4.5 learning outcome is presented: In the summarizing

stage, it is emphasized that religious days and holidays are national values and important and special days when people visit one another and offer treats to their guests. The importance of religious days and holidays is explained through materials such as visuals, videos, short films, poems, songs, and posters related to these days. In the contextualizing stage, why the holiday is celebrated and how it has continued from the past to the present are explained. In the inferring stage, the impact of the holiday on people is discussed. The question "What would be missing if there were no holidays?" is examined. In the monitoring stage, students explain their holiday experiences within their own families. In the corroborating/comparing stage, national and religious holidays are compared. Questions such as "What is the difference between Ramadan Feast and April 23?" are compared. In this way, students realize that each holiday has its own importance. The learning outcome in which the SCIM-C strategy can be used in the "Nature and Environment" learning area of the second-grade life science course is presented in Table 7.

Table 7.

Learning Outcomes and Process Components in the 2nd Grade 5th Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
5. Nature and Environment	HB.2.5.2. Being able to determine direction by benefiting from nature

In the "Nature and Environment" learning area, within the HB.2.5.2 learning outcome, an activity example was provided by presenting a simplified short narration from Evliya Çelebi's work Seyahatname (Book of Travels) and focusing on what a work written under the conditions of that period conveys. The activity example for the use of the SCIM-C strategy for the HB.2.5.2 learning outcome may be structured as follows: In the summarizing stage, a simplified short narration from Evliya Çelebi's work Seyahatname (Book of Travels) is presented. When moving to the contextualizing stage, it is emphasized that there was no compass in the past, whereas today there is. In the inferring stage, attention is drawn to the relationship between direction finding and natural indicators such as the position of the Sun, moss, ant nests, and the North Star. Emphasis is placed on students learning ways to access accurate and reliable information and being open to various ideas and new information. In the monitoring stage, a course is set up in the classroom or schoolyard, and students are assigned the task of walking in the direction where a specific object is located. In the corroborating/comparing stage, students are guided by providing signs with arrows indicating the cardinal directions so that they can state in which direction the object is located. The learning outcome in which the SCIM-C strategy can be used in the "Science, Technology, and Art" learning area of the second-grade life science course is presented in Table 8.

Table 8.

Learning Outcomes and Process Components in the 2nd Grade 6th Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
6. Science, Technology and Art	HB.2.6.1. Being able to gather information from the provided resources regarding scientists' contributions to science a) Finds information regarding scientists' contributions to science. b) Records information regarding scientists' contributions to science. HB.2.6.2. Being able to compare the change of a technological product used in daily life over time a) Determines the change of a technological product over time. b) Lists the similar and different aspects of the change of a technological product over time. HB.2.6.3. Being able to determine the place of art in daily life

In the "Science, Technology, and Art" learning area, it is possible to create an activity example for the HB.2.6.1 learning outcome by providing students with short information cards about scientists from primary sources, based on the SCIM-C strategy's contribution to enabling students to think like historians across three learning outcomes. In the HB.2.6.2 learning outcome, an activity example can be created by presenting examples of technological tools used in the past to the class and thereby enabling students to develop the ability to use primary sources effectively. In the HB.2.6.3 learning outcome, visual materials related to different branches of art from the past can be presented to establish meaningful connections between different sources and evidence.

An activity example based on the SCIM-C strategy for the HB.2.6.1 learning outcome is presented as follows: In the summarizing stage, students are given short information cards from primary sources about scientists such as Ali Kuşçu, Uluğ Bey, El-Cezerî, Jale İnan, Alper Gezeravcı, Vecihi Hürkuş, Afet İnan, Engin Arık, Fuat Sezgin, Cahit Arf, Halil İnalcık, Albert Einstein (Albırt Aynştayn), Marie Curie (Mery Köri), Thomas Edison (Tamıs Edison), Alexander Graham Bell (Aleksandır Grahem Bel). In the contextualizing stage, information is presented regarding what kinds of contributions these scientists made to humanity during the periods in which they lived. In the inferring stage, students are divided into small groups and write their own inferences by discussing contributions to science. In the monitoring stage, the teacher observes students' information-gathering and inference processes and corrects incomplete or incorrect understandings. In the corroborating/comparing stage, students are asked to create a product such as a poster or presentation by using the data they obtained about how sources related to science in the past are reflected today and by using the information they collected on the topic.

The activity example developed in line with the SCIM-C strategy for the HB.2.6.2 learning outcome may be structured as follows: In the summarizing stage, examples of technological tools used in the past are presented to the class and emphasis is placed on how these products have changed over time. In the contextualizing stage, a short film is shown explaining how a technological product used in daily life has changed over time and what developments occurred in the period in which it was produced. In the inferring stage, examples of domestic and national technologies that are of great importance for the future of our country are provided. In the monitoring stage, the student takes notes on the features observed in past

technological products in the short film. It is examined whether the inferences made about the importance of technological products for the future are supported by data. In the corroborating/comparing stage, the student explains by comparing how technology has changed from past to present. In order to support the HB.2.6.3 learning outcome, an activity example based on the SCIM-C strategy is presented: In the summarizing stage, visual materials related to different branches of art from the past are presented. In the contextualizing stage, changes from past to present in fields reflecting our culture such as literature, music, painting, marbling art (ebru), theatre, and cinema are examined. In the inferring stage, the purpose of these artistic works is discussed. In the monitoring stage, students are asked to provide examples of reflections of art in daily life, such as the melody in a bird's song or the pattern created by a drop of water. In the corroborating/comparing stage, students are asked to carry out activities such as writing poems, stories, creating drawings, or rhythm science that include their feelings and thoughts about where art appears in daily life. The learning outcome in which the SCIM-C strategy can be used in the "Me and My School" learning area of the third-grade life science course is presented in Table 9.

Table 9.

Learning Outcomes and Process Components in the 3rd Grade 1st Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
1. Me and My School	HB.3.1.1. Being able to make a plan regarding the area in which they want to improve themselves a) Identifies an area in which they want to improve themselves. b) Examines similar experiences related to the area identified. c) Determines their short- and long-term plans regarding what needs to be done in the area in which they want to improve themselves HB.3.1.2. Being able to behave in accordance with their rights and responsibilities at school

It was determined that the SCIM-C strategy can be used in two learning outcomes within the "Me and My School" learning area. In the HB.3.1.1 learning outcome, students are asked to research success stories of well-known individuals in their field such as scientists, athletes, and artists who have made history. An activity example illustrating how the SCIM-C strategy can be implemented in the context of the HB.3.1.1 learning outcome is presented: In the summarizing stage, students are asked to research success stories of well-known individuals in their field such as scientists, athletes, and artists who have made history (e.g., Barış Manço – music, İdil Biret – piano, Mete Gazoz – archery). They are asked which of these fields is the area in which they want to improve themselves. In the contextualizing stage, it is explained with examples that individuals who achieved success worked in a planned manner from a young age. In the inferring stage, the experiences of individuals who were successful in this field are predicted and a mind map is created. In the monitoring stage, it is examined whether the inferences regarding the experiences of individuals who improved themselves are supported by the data in the past source. In the corroborating/comparing stage, the student makes a plan to improve themselves and compares this plan with the plan of a person who improved themselves in the past. In the HB.3.1.2 learning outcome, students are asked to conduct a mini interview with an adult from the school such as a teacher, the school principal/vice principal, a guidance counselor, a school cleaner, or a school security officer. In

the interview, students learn what the rights and responsibilities of these individuals are. The activity example prepared by benefiting from the SCIM-C strategy for the acquisition of the HB.3.1.2 learning outcome is as follows: In the summarizing stage, students are asked to conduct a mini interview with a person from the school. In the interview, the rights and responsibilities of these individuals are learned. In the contextualizing stage, students perform a drama about rights and responsibilities. In the inferring stage, they try to understand the importance of exhibiting behaviors appropriate to these rights and responsibilities. In the monitoring stage, they determine which rights and responsibilities they pay attention to in their behaviors at school. In the corroborating/comparing stage, they compare the accuracy of the information obtained in the interview with the inferences they made. The learning outcome in which the SCIM-C strategy can be used in the "My Health and Safety" learning area of the third-grade life science course is presented in Table 10.

Table 10.

Learning Outcomes and Process Components in the 3rd Grade 2nd Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
2. My Health and Safety	HB.3.2.1. Being able to regulate behaviors aimed at protecting one's health a) Notices behaviors aimed at protecting one's health. b) Makes changes in behaviors that are not appropriate for protecting one's health.

In the "My Health and Safety" learning area, within the HB.3.2.1 learning outcome, the lesson is introduced by emphasizing the importance of our health, and documentaries about the tuberculosis epidemic/COVID-19 in past periods are used as primary sources. An activity example based on the SCIM-C strategy for the HB.3.2.1 learning outcome is presented as follows: The teacher introduces the lesson by emphasizing the importance of our health. In the summarizing stage, documentaries about the tuberculosis epidemic/COVID-19 in past periods are used as primary sources. In the contextualizing stage, it is determined which period the documentary belongs to. In the inferring stage, students are asked to share their opinions about the presented content and evaluate their behaviors related to protecting their health. In the monitoring stage, the difference between the behaviors they exhibit to protect their own health and the behaviors that should be exhibited is identified. In the corroborating/comparing stage, at the end of the documentary, what we should do to protect our health is shared in the classroom using the brainstorming method. The learning outcome in which the SCIM-C strategy can be used in the "My Family and Society" learning area of the third-grade life science course is presented in Table 11.

Table 11.

Learning Outcomes and Process Components in the 3rd Grade 3rd Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
3. My Family and Society	HB.3.3.3. Interpreting the importance of occupations in social life a) Examines examples given regarding the importance of occupations in social life. b) Expresses in their own words the inferences they make regarding the importance of occupations in social life.

In the "My Family and Society" learning area, within the HB.3.3.3 learning outcome, the student selects a primary source and determines an occupation to observe. Occupations that students can observe inside or outside the school are listed. With this activity example, using the SCIM-C strategy may be important in developing students' historical, critical, and structural thinking skills, as students who understand by observing historical materials and access information from primary sources can develop historical, critical, and structured thinking skills. A timeline showing how occupations have changed over time is provided. The activity example developed in line with the SCIM-C strategy for the HB.3.3.3 learning outcome may be structured as follows: In the summarizing stage, the student selects a primary source and determines an occupation to observe. Occupations that students can observe inside or outside the school are listed. A timeline showing how these occupations have changed over time is provided. In the contextualizing stage, it is determined which periods the timeline belongs to. In the inferring stage, it is determined what kinds of benefits these occupations provided in that period. In the monitoring stage, a documentary related to occupations is shown and the student notices how the importance of occupations in society has changed from past to present. In the corroborating/comparing stage, in order to provide the student with a different perspective, school–parent cooperation is established and parents with various occupations are invited to the classroom to provide information about their occupations. The learning outcome in which the SCIM-C strategy can be used in the "My Place of Residence and My Country" learning area of the third-grade life science course is presented in Table 12.

Table 12.

Learning Outcomes and Process Components in the 3rd Grade 4th Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
4. My Place of Residence and My Country	HB.3.4.1. Being able to recognize the importance of protecting historical sites and natural beauties in the immediate environment HB.3.4.2. Being able to gather information from sources regarding the form of government of our country a) Finds information from sources regarding the form of government of our country. b) Records the information found regarding the form of government of our country. HB.3.4.3. Being able to analyze the personality traits of Mustafa Kemal Atatürk a) Identifies the personality traits of Mustafa Kemal Atatürk. b) Identifies the achievements of Mustafa Kemal Atatürk. c) Establishes a relationship between the personality traits and achievements of Mustafa Kemal Atatürk. HB.3.4.4. Being able to explain the contributions of our national unity and solidarity to social life

It was determined that the SCIM-C strategy can be used in four learning outcomes within the "My Place of Residence and My Country" learning area. In the HB.3.4.1 learning outcome, students are shown a map or visual indicating the locations of historical sources in the immediate environment. The class discusses by whom and for what purpose historical sites and natural beauties such as museums, mosques, and castles were built. In order to support the HB.3.4.1 learning outcome, an activity example based on the SCIM-C strategy is presented: In the summarizing stage, the teacher shows students a map or visual indicating the locations of historical sources in the immediate environment. The class discusses by whom and for what

purpose historical sites and natural beauties such as museums, mosques, and castles were built. In the contextualizing stage, the student selects a historical structure or natural area. They examine which period these sources belong to using present-day evidence. In the inferring stage, the student understands the importance of the region where these historical sites and natural beauties are located. It is emphasized that these places should be protected by ensuring behaviors such as not littering and not causing damage. In the monitoring stage, a promotional video or poster of the municipality related to these places is shown to students. It is examined whether what the student observed and the presented informative sources are the same. In the corroborating/comparing stage, the student who realizes that these beauties should be protected compares how their perspective has changed from the awareness at the beginning of the lesson to the perspective at the end of the lesson.

In the HB.3.4.2 learning outcome, a photograph of the first establishment of the Grand National Assembly of Türkiye [TBMM] and Atatürk's speech are used as primary sources. An activity example illustrating how the SCIM-C strategy can be implemented in the context of the HB.3.4.2 learning outcome is presented: In the summarizing stage, a photograph of the first establishment of the TBMM and Atatürk's speech are used as primary sources. Information such as "The Republic of Türkiye is a republic governed by representatives elected by the people. The President is at the head of the state. The first President is Atatürk. Members of parliament serve in the Assembly. The people participate in governance through elections" is obtained from primary sources. In the contextualizing stage, students identify which period the information they found from sources regarding the form of government of our country belongs to. In the inferring stage, they recognize the importance of our form of government, namely the Republic. In the monitoring stage, they determine the accuracy of their inferences about the importance of the Republic from primary sources. In the corroborating/comparing stage, students are also asked to create a concept map based on the new information they learned about the form of government. In the HB.3.4.3 learning outcome, information is presented to students by benefiting from primary sources such as quotations, photographs, memories, and documentaries that highlight Atatürk's personality traits and the achievements attained together with our nation. The activity example prepared by benefiting from the SCIM-C strategy for the acquisition of the HB.3.4.3 learning outcome is as follows: In the summarizing stage, information is presented to students by benefiting from primary sources such as quotations, photographs, memories, and documentaries that highlight Atatürk's personality traits and the achievements attained together with our nation. In the contextualizing stage, students are enabled to establish a relationship between his achievements and traits such as being forward-looking, hardworking, having analytical thinking skills, being perseverant, and being determined in that period. In the inferring stage, students are enabled to make inferences regarding the relationship between Atatürk's personality traits such as being fair, honest and reliable, having a positive perspective, and being solution-oriented, and his achievements. In the monitoring stage, the student reviews their own learning and determines which personality traits of Atatürk they can associate with achievement. In the corroborating/comparing stage, the teacher asks students to develop the mind map by conducting research and comparisons using other primary sources that describe Atatürk's personality traits. In the HB.3.4.4 learning outcome, students are asked to notice

events that strengthen our national unity and solidarity. Educational content such as documentaries and short films about events in which society is united and in solidarity—national days and holidays, competitions involving national teams, domestic and national technological developments, disasters and emergencies—is shown. An activity example based on the SCIM-C strategy for the HB.3.4.4 learning outcome is presented as follows: In the summarizing stage, students are asked to notice events that strengthen our national unity and solidarity. Educational content such as documentaries and short films about events in which society is united and in solidarity—national days and holidays, competitions involving national teams, domestic and national technological developments, disasters and emergencies—is shown. In the contextualizing stage, primary sources related to the War of Independence reflecting national unity and solidarity experienced in the past are used. Based on these sources, the contribution of this solidarity to social life in that period is identified. In the inferring stage, it is emphasized that individuals, as citizens, are a valuable part of society and play an important role in the development of society. It is emphasized that behaving sensitively toward national and spiritual values will contribute to the development of mutual respect among individuals in society. In the monitoring stage, the student determines which contributions of national unity and solidarity to society they already knew. In the corroborating/comparing stage, different primary sources are used to strengthen the sense of unity and solidarity. Students are asked to write in their memoir notebooks their experiences during the process and their views on the contributions of being in unity and solidarity to social life as a result of these experiences. The learning outcome in which the SCIM-C strategy can be used in the "Science, Technology, and Art" learning area of the third-grade life science course is presented in Table 13.

Table 13.

Learning Outcomes and Process Components in the 3rd Grade 6th Learning Area of the Life Science Course in Which the SCIM-C Strategy Can Be Used

Learning area	Learning outcomes
6. Science, Technology and Art	HB.3.6.1. Being able to interpret the impact of scientific developments on daily life a) Examines the impact of scientific developments on daily life. b) Expresses the impact of scientific developments on daily life HB.3.6.2. Being able to analyze the impact of technological developments on daily life a) Identifies the impact of technological developments on daily life. b) Establishes a relationship between technological developments and daily life. HB.3.6.3. Being able to gather information from the provided resources regarding artists' contributions to art a) Finds information regarding artists' contributions to art. b) Records information regarding artists' contributions to art.

In the "Science, Technology, and Art" learning area, the SCIM-C strategy is used in three learning outcomes. In the HB.3.6.1 learning outcome, examples of scientific developments are provided, such as the fact that treatments have been found today for many diseases that were once thought to be untreatable, and early warning systems against disasters. The activity example developed in line with the SCIM-C strategy for the HB.3.6.1 learning outcome may be structured as follows: In the summarizing stage, examples of scientific developments are provided, such as the fact that treatments have been found today for many

diseases that were once thought to be untreatable, and early warning systems against disasters. Information is provided on what these scientific developments do in solving social problems. In the contextualizing stage, a brief explanation is given about which need each scientific development emerged from and how it affects life. In the inferring stage, the question "What would be missing in our lives if this scientific development did not exist?" is discussed. In the monitoring stage, students are encouraged to ask questions about the impact of scientific developments on human life. In the corroborating/comparing stage, volunteer students talk in class about the scientific development they chose. In the HB.3.6.2 learning outcome, information about what technological tools used in the past were used for and where they are used today is presented through different means such as animations, posters, brochures, and public service announcements. In order to support the HB.3.6.2 learning outcome, an activity example based on the SCIM-C strategy is presented: In the summarizing stage, information about what technological tools used in the past were used for and where they are used today is presented through different means such as animations, posters, brochures, and public service announcements. In the contextualizing stage, it is determined which historical period the technological development belongs to. In the inferring stage, brainstorming is conducted about the purpose for which this development emerged in that period. In the monitoring stage, it is examined whether the ideas put forward are supported by the available data. In the corroborating/comparing stage, emphasis is placed on the need to pay attention to the purpose and duration of use when using technological tools. In the HB.3.6.3 learning outcome, educational content such as informative texts, animations, and documentaries regarding artists' contributions to art is presented, and information is obtained about what kinds of contributions they made in the past. An activity example illustrating how the strategy can be implemented in the context of the HB.3.6.3 learning outcome is presented: In the summarizing stage, educational content such as informative texts, animations, and documentaries regarding the contributions of artists such as Muzaffer Sarısözen, Afife Jale, Neşet Ertaş, Barış Manço, Vincent Van Gogh (Vinsınt Van Gog), and Leonardo Da Vinci (Leonardo Da Vinci) is presented, and information is obtained about what kinds of contributions they made in the past. In the contextualizing stage, students find information about what developments occurred in the period in which the artists lived, related to the presented content. In the inferring stage, emphasis is placed on the need to appreciate those who represent their country in the fields of art and culture. In the monitoring stage, students are expected to record information regarding artists' contributions to art. In the corroborating/comparing stage, each student gives a short presentation about the artist they chose using the information they recorded.

Discussion and Conclusion

This research investigated the usability of the SCIM-C strategy in the learning outcomes and process components of the 2024 life science curriculum. It was determined that the strategy can be used in the learning outcomes and process components at the first, second, and third-grade levels. Within the scope of the research, it was determined that the SCIM-C strategy can be used in 7 learning outcomes at the first-grade level, 10 at the second-grade level, and 11 at the third-grade level in the life science curriculum, showing that the strategy can be associated with more learning outcomes, especially as the grade level progresses. This situation can be explained by the fact that the learning outcomes in the life science course are structured

to include higher-order thinking skills such as questioning, using evidence, interpreting, and making inferences as the grade level increases. Supporting this result, it is stated that the content of student achievements related to history in the life science curriculum expands as the grade level increases (Akhan, 2020).

The SCIM-C strategy; It has been determined that the SCIM-C strategy can be used in the following learning outcomes and process components: five in the first and second grades and four in the third grade in the “My Place and Country” learning area; one in the first grade and three in the second and third grades in the “Science, Technology and Art” learning area; one in the first grade and two in the third grades in the “Me and My School” learning area; one in the second and third grades in the “My Family and Society” learning area; one in the third grade in the “My Health and Safety” learning area; and one in the second grade in the “Nature and Environment” learning area. In addition, it was found that there were no learning outcomes where the SCIM-C strategy could be used in the “My Health and Safety”, “My Family and Society”, and “Nature and Environment” learning areas in the first-grade life science Curriculum; “Me and My School” and “My Health and Safety” in the second grade; and “Nature and Environment” in the third grade.

The SCIM-C strategy is an approach that enables students to analyze primary sources and construct historical thinking skills using these sources (Hicks et al., 2004). Because of this characteristic of the strategy, its applicability to the "My Place and Country" learning area is considered more feasible. Because the topics covered in the first grade learning area, such as “Our Place of Residence and General Characteristics of Our Country, Turkish Flag and National Anthem, Life of Mustafa Kemal Atatürk, National and Religious Days and Holidays,” the second grade learning area, such as “Historical Places and Natural Beauties, Administrative Units of the Place Where He Lived, Mustafa Kemal Atatürk's Student Years, Importance of National and Religious Days and Holidays,” and the third grade learning area, such as “Historical Places and Natural Beauties, Form of Government of Our Country, Personality Traits of Mustafa Kemal Atatürk, and National Unity and Solidarity” (MoNE, 2024b), are suitable for the use of primary sources and include a historical dimension, the SCIM-C strategy has been found to be applicable. For example, in the HB.1.4.3 learning outcome in the “My Place of Residence and Country” learning area, it is requested that historical visuals, short videos, and storybooks about Atatürk's childhood years be presented. Since these sources constitute primary sources, the use of the SCIM-C strategy is deemed appropriate. In this context, the use of the SCIM-C strategy is expected to improve students’ analytical and interpretive skills by presenting them with these different primary sources. Indeed, Hicks et al. (2004) and Hicks et al. (2016) state that the SCIM-C strategy improves students’ analytical and interpretive skills by presenting them with different primary sources (cited in Yetişensoy, 2021). As mentioned, the activity aims to concretize the subject matter using materials as primary sources. In addition, the activity conducted within the framework of the SCIM-C strategy encourages students to use primary sources as required by the strategy. In this context, Şentuna (2014) stated that the use of primary sources facilitates the transfer of information to long-term memory and improves students’ critical and historical thinking skills. Therefore, the use of primary sources is considered important in the relevant learning outcome. The activity example prepared for the HB.1.4.3 learning outcome shows that the SCIM-C strategy can

contribute to students learning historical information in a more meaningful and concrete way through the use of primary sources in the life science lesson. The use of visuals, identity documents, and period materials related to Atatürk's life during the activity supports the active participation of students in the learning process, allowing historical content to transform from mere transmitted information into a meaningful learning experience. This situation demonstrates how the SCIM-C strategy enables students to develop historical empathy, better understand the past, and view historical figures as role models. This shows that it offers a teaching process that can contribute to learning. Therefore, it can be said that SCIM-C based activities using primary sources in life science lessons can support both the cognitive and affective learning of students.

According to Hicks et al. (2004) and Hicks et al. (2016), the SCIM-C strategy supports students' ability to think like a historian (cited in Yetişensoy, 2021). Within the scope of the HB.2.4.1 learning outcome in the "My Place and Country" learning area for second-grade students, the SCIM-C strategy provides students with a field trip experience to places such as mosques and castles in their place of residence, and they become aware of who produced the sources, when, and for what purpose. The learning outcome can be achieved through local history teaching presented with direct observation. Indeed, it has been concluded that using field trip and observation techniques in local history teaching increases students' interest in the lesson (Işık, 2002). In this context, learning outcome HB.2.4.1 allows for the use of the local history method in the teaching process of life science lessons, in addition to benefiting from the advantages offered by primary sources. Learning outcome HB.3.4.4, located in the "Family and Society" learning area, aims to explain to students the contributions of national unity and solidarity to social life. In this learning outcome, the SCIM-C strategy is considered appropriate because of its feature that allows historical events to be evaluated within the context of the conditions of the past (Hicks et al., 2016, cited in Yetişensoy, 2021). In other words, this characteristic of the learning outcome can be used because of the SCIM-C strategy's feature that allows historical events to be evaluated within the context of the conditions of the past. Furthermore, through the SCIM-C strategy used in this learning outcome, the student will gain a historical perspective and learn to evaluate events by considering the conditions of the period in which they occurred.

The curriculum includes the following topics in the "Science, Technology, and Art" learning area: First grade content focuses on "questions about technology"; second grade content on "the contributions of scientists to science, the evolution of technological products over time, and the place of art in daily life"; and third grade content focuses on "the impact of scientific developments on daily life, the impact of technological developments on daily life, and the contributions of artists to art" (MoNE, 2024b). In the "Science, Technology, and Art" learning area, the first-grade learning outcome HB.1.6.2 involves establishing connections between tools used in the past and those used today using the SCIM-C strategy. Second-grade learning outcome HB.2.6.2 involves making comparisons with the present day, particularly in the contextualization phase of the SCIM-C strategy, taking into account the developments that occurred during the period in which the historical source was produced. In the third-grade learning outcome HB.3.6.3, students are provided with informative texts, animations, documentaries, and similar educational content about artists' contributions to art, enabling

them to understand the implied value judgments of the source using the SCIM-C strategy and gain knowledge about past contributions.

The content framework in the "Me and My School" learning area is structured as "school environment and classroom" in the first grade and "personal development and rights in school" in the third grade (MoNE, 2024b). Learning outcome HB.3.1.1 in this learning area aims to develop students' ability to set goals in their area of interest and prepare step-by-step plans to achieve these goals. In this process, students create roadmaps for their own development and proceed in a planned manner, aware of the steps they take. Acting in a planned manner both increases the efficiency of the educational process and contributes positively to the student's personal development (Temiz & Yavuz, 2025). In this context, students are asked which area they want to improve in, using the stages of the SCIM-C strategy, which utilizes the success stories of individuals who have made history and developed themselves in different fields to create personal development plans. The student makes a plan for self-improvement and compares this plan with the plan of someone who has developed themselves in the past. In this way, students' sensitivity towards Turkish history also increases. Furthermore, according to Keskin and Öğretici (2013), it was observed that the awareness levels of students increased after the activity aimed at "sensitivity towards Turkish history and Turkish greats". In this context, it can be said that the activity in question both supports individual development planning and allows students to internalize historical values. Therefore, the inclusion of the life practices of historical figures in the learning process can be considered an effective tool in terms of the SCIM-C strategy.

This is the second-year student in the "Family and Society" learning area. The content framework for the first grade is structured as "the importance of family" and the content framework for the third grade is "occupations in social life" (MoNE, 2024b). Within these topics, using the SCIM-C strategy, the aim is for students to gain the ability to interpret the importance of professions in social life within the context of past conditions. As Kuzgun (2013) emphasizes, supporting individuals from a young age within the scope of vocational guidance contributes to their identification of professional fields suitable to their abilities and characteristics and their guidance towards the right profession. In this context, a profession can be defined as an area of activity based on knowledge and skills acquired as a result of a specific educational process, with rules determined by society, where people produce goods or services useful to society and earn income in return. In the "Family and Society" learning areas, in the HB.3.3.3 learning outcome, the student selects a primary source and determines a profession to observe. Students are given a list of professions they can observe inside or outside the school. A timeline is provided showing how these professions have changed over time. The benefits of these professions in that period are determined. In the final stage of the SCIM-C strategy, to provide students with a different perspective, school-parent collaboration involves inviting parents from various professions to the classroom to share information about their careers. This serves as an example of an activity related to this strategy. In this context, reading stories with career themes allows children to become familiar with different professional fields. Through these stories, they can experience suitable role models at a cognitive level. The role models presented through the characters in the stories support children's identification processes, potentially guiding their career choices in the future (Özgür & Çelik, 2018).

Within the content framework for the third-grade students in the "My Health and Safety" learning area, the topic of "health protection" (MoNE, 2024b) requires students to possess health knowledge in order to regulate their behaviors aimed at protecting their health. In this context, according to Yalçın (2025), students need to have health knowledge for a healthy society because healthy individuals are crucial for the future and continuity of society. In the HB.3.2.1 learning outcome, when considering the usability of the SCIM-C strategy, documentaries about the tuberculosis epidemic/COVID-19 are used as primary sources. The COVID-19 pandemic has led to significant changes in education and has further highlighted the role of educational institutions in health education. Health education aims to instill in students hygiene behaviors, healthy lifestyle habits, and ways to prevent diseases. In this context, schools can provide guidance on topics such as handwashing, mask use, healthy eating, and active living. Furthermore, the pandemic has shown that psychological health is at least as important as physical health. Therefore, educational institutions can contribute to holistic health development by supporting students in areas such as stress management and emotional awareness (Akson et al., 2023).

The content framework for the second-grade students in the "Nature and Environment" learning area focuses on "finding direction using nature" (MoNE, 2024b). In learning outcome HB.2.5.2, a simplified short narrative from Evliya Çelebi's Seyahatname (Book of Travels) is given, providing an example activity based on what a work written under the conditions of that period describes. The use of the SCIM-C strategy for learning outcome HB.2.5.2 could be exemplified as follows: A simplified short narrative from Evliya Çelebi's Seyahatname (Book of Travels) (an example related to navigation) is given. The fact that compasses did not exist in the past but do exist today is emphasized. The activity draws attention to the relationship between natural features like the North Star and navigation. Sky observation is related not only to astronomy but also to subjects like physics and geography. For example, the North Star helps us find our north direction at night (Özenoğlu et al., 2022). Furthermore, the activity emphasizes navigational methods such as the position of the Sun, moss, and ant nests.

It has been determined that the SCIM-C strategy can be used in all learning areas included in the life science lesson. According to Hicks et al. (2004), the SCIM-C strategy enables students to examine and understand historical documents in a questioning manner, making inferences about the conditions of the past period, and developing their skills in analyzing and interpreting primary sources. In this context, it can be effectively used in life science lessons, which aim to cultivate individuals who can analyze the past, interpret the present, and make inferences for the future; individuals who possess critical thinking, inquiry, and experience-based knowledge construction skills. This strategy provides both teachers and students with a valuable learning experience in the classroom. The Bible provides guidance on the effective use of sources (Yetişensoy, 2021). This makes evidence-based thinking processes more accessible. The evidence-based learning approach allows students to understand history topics in the life science course in depth and meaningfully. Within this approach, students encounter different historical evidence, developing critical thinking skills and gaining multifaceted perspectives. Thus, permanent and meaningful learning processes are supported (Kabapınar & Başpınar, 2023). For these reasons, it can be said that the use of the SCIM-C strategy in the life science course is necessary and important.

Recommendations

This study identifies the learning outcomes and process components in the 2024 life science curriculum where the SCIM-C strategy can be used, and presents examples of activities demonstrating how the strategy can be applied to these learning outcomes and process components. Accordingly, it is recommended that the SCIM-C strategy be utilized in teaching these learning outcomes and that the activity examples created within the scope of this research be considered in the implementation process.

The study determined that the learning area where the SCIM-C strategy can be most effectively used in the 2024 life science curriculum is 'My Place of Residence and My Country'. Therefore, it is recommended that emphasis be placed on the use of the strategy in this learning area and that research be conducted examining its impact on students' cognitive and affective development.

Since this study is limited to the analysis of the 2024 life science curriculum through document review, future science may conduct applied research on classroom implementations of the SCIM-C strategy in the life science course, based on teacher and student perspectives.

In this study, the usability of the SCIM-C strategy was addressed within the scope of the life science curriculum. The usability of the SCIM-C strategy in the curricula of different subjects can be taken as a research topic.

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Notice of Use of Artificial Intelligence

The author did not utilise any artificial intelligence tool for the research, authorship and publication of this article.

2024 Hayat Bilgisi Dersi Öğretim Programı'nda SCIM-C Stratejisi

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Özet

Tarihe ışık tutabilmek amacıyla birincil kaynaklara ulaşmanın önemi, SCIM-C stratejisini ön plana çıkarmaktadır. SCIM-C stratejisi öğrencilerin tarihsel belgeleri anlamlandırmasına ve tarihsel düşünme becerileri geliştirmesine yardımcı olmak amacıyla geliştirilmiş bir stratejidir. SCIM-C stratejisinin kullanılmasının, öğrencilerin birincil kaynaklardan bilgiye ulaşmalarını sağladığı, tarihsel düşünme becerilerini geliştirdiği, eleştirel ve yapılandırılmış düşünmelerine katkı sunduğu ve özellikle soyut düşünme becerileri yeterince gelişmemiş öğrencilerin tarihsel materyalleri anlamlandırmalarını kolaylaştırdığı söylenebilir. Soyut düşünme becerilerinin henüz gelişim aşamasında olduğu ilkokulun ilk üç sınıfındaki öğrencilerde, hayat bilgisi dersi kapsamında kazandırılması hedeflenen tarihsel materyalleri anlama, birincil kaynaklardan bilgiye ulaşma ile tarihsel, eleştirel ve yapılandırılmış düşünme becerilerinin geliştirilmesinde SCIM-C stratejisinin kullanılması önemli olabilir. Bu bağlamda hayat bilgisi dersinin öğrenme çıktılarına ulaşmada SCIM-C stratejisinin kullanılabileceği düşünülmektedir. 2024 Hayat Bilgisi Öğretimi Programı'nda yer alan öğrenme çıktılarının hangilerinde SCIM-C stratejisinin nasıl kullanılabileceğinin belirlenmesi araştırmanın amacını oluşturmuştur. Çalışmada nitel araştırma yöntemi benimsenmiş ve doküman incelemesi kullanılmıştır. Araştırmanın veri kaynağını,2024 Hayat Bilgisi Dersi Öğretim Programı oluşturmuştur. Veriler doküman analizi adımları takip edilerek analiz edilmiştir. Araştırma sonucunda, SCIM-C stratejisinin hayat bilgisi dersi 1., 2. ve 3. sınıf düzeylerindeki öğrenme alanlarında kullanılabileceği belirlenmiştir. Stratejinin 1. sınıf düzeyinde 7, 2. sınıf düzeyinde 10 ve 3. sınıf düzeyinde ise 11 öğrenme çıktısında kullanılabileceği tespit edilmiştir. SCIM-C stratejisinin en fazla kullanılabileceği öğrenme alanının "Yaşadığım Yer ve Ülkem" olduğu görülmektedir. Bu doğrultuda, özellikle "Yaşadığım Yer ve Ülkem" öğrenme alanında SCIM-C stratejisinden yararlanılması önerilebilir.

Anahtar Kelimeler: Hayat bilgisi dersi, 2024 hayat bilgisi dersi öğretim programı, SCIM-C stratejisi.

Giriş

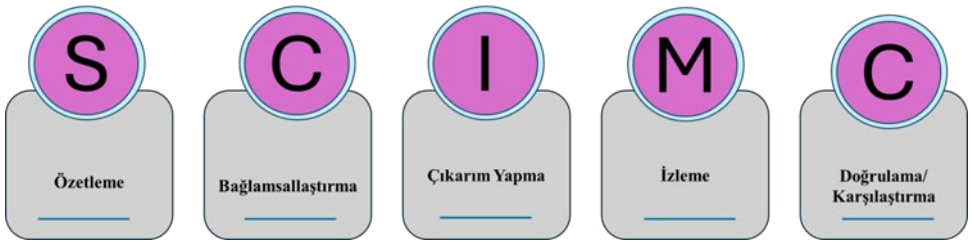
Toplulaştırma ilkesinden hareketle oluşturulmuş, insan, doğa ve toplum konu alanı çerçevesinde disiplinlerarası bir anlayışa sahip olan hayat bilgisi dersinin içeriği; sosyal bilimler, fen bilimleri, sanat, düşünce ve değerlerden oluşmaktadır (Tay, 2017). Bu içerik ile kazandırılması beklenen birçok bilgi, beceri ve değer olduğu söylenebilir. Bu bilgi, beceri ve değerlerden bir kısmı sosyal bilimlerden biri olan tarih bilimi ile ilgilidir. Demircioğlu'na (2015) göre tarih, yalnızca bilimsel bir araştırma alanı olmakla kalmayıp aynı zamanda okullarda eğitimi verilen temel sosyal bilim disiplinlerinden biri olarak da önemli bir yer tutmaktadır. Tarih içeriği ile öğrencilerin birincil kaynaklara doğrudan erişim sağlamaları, yaşadıkları ya da ziyaret ettikleri mekânlara yönelik tarihsel farkındalık geliştirmeleri, geçmiş ile günümüz arasında bağ kurabilmeleri amaçlanmaktadır. "Türkiye Yüzyılı Maarif Modeli"

doğrultusunda yeniden oluşturulan Hayat Bilgisi Dersi Öğretim Programı'nda dersin kapsamında yer alan birçok konunun tarih ile bağlantılı olduğu da görülmektedir. Hayat bilgisi dersi kapsamında ele alındığında "Yaşadığım Yer ve Ülkem" adlı öğrenme alanıyla öğrencilerin yaşadıkları yeri tanımaları, tarihî mekân ve doğal güzelliklerin korunmasının önemine ilişkin farkındalık oluşturmaları beklenmektedir. İnsanın, eşyanın ve doğanın bir geçmişe sahip olduğu dikkate alındığında, hayat bilgisi dersinin eşya eğitimini de içerecek biçimde insanın doğal ve toplumsal yaşamını geçmişten günümüze ele alması, tarih biliminin hayat bilgisi dersi açısından temel bir öneme sahip olduğunu göstermektedir.

David Hicks tarafından geliştirilen SCIM-C stratejisi, öğrencilerin birincil kaynakları analiz etme ve tarihsel düşünme becerilerini yapılandırma süreçlerine rehberlik eden beş aşamalı bir yaklaşımdır (Yetişensoy, 2021). Öğrenciler bu stratejinin ilk dört aşamasında farklı tarihsel kaynakları belirli anahtar sorular çerçevesinde incelemekte, son aşamada ise bu kaynaklar arasında karşılaştırmalar yaparak senteze dayalı tarihsel çıkarımlarda bulunmaktadır (akt. Yetişensoy, 2021). Sahip olduğu tarihsel içerik ile hayat bilgisi dersinin, SCIM-C stratejisini kullanmada uygun olduğu düşünülmektedir. SCIM-C stratejisinin aşamaları Şekil 1'deki gibidir.

Şekil 1.

SCIM-C Stratejisinin Aşamaları



Alan yazını incelendiğinde SCIM-C stratejisi tarih, sosyal bilgiler ve öğretmenlerin sınıf içi uygulamaları için pratik öneriler sunma ile ilgili çalışmalara konu edindiği (Hicks vd., 2004; Yetişensoy, 2021) görülmektedir. Yapılan alan yazını taraması sonucunda, hayat bilgisi dersi bağlamında bu konuyu ele alan çalışmalara yeterince yer verilmediği görülmüştür. 2024 Hayat Bilgisi Dersi Öğretim Programı'nda SCIM-C stratejisinin kullanılabilirliğini ve kullanılabileceği belirlenen öğrenme çıktıları bağlamında nasıl uygulanabileceğini betimlemeyi amaçlayan bu çalışmanın, ilgili alan yazına katkı sağlayarak önemli bir boşluğu dolduracağı düşünülmektedir.

Hayat bilgisi öğretim programı incelendiğinde öğrencilerin bilgi ve becerilerini yapılandırması için araştırma ve sorgulamayı merkeze alması ile bilgi, beceri, eğilim ve değerleri birlikte kullanarak bütüncül gelişime odaklanması (Milli Eğitim Bakanlığı [MEB], 2024b) şeklindeki program ilkeleri, SCIM-C stratejisinin hayat bilgisi dersinde kullanılmasını önemli kılabilir. Bu bağlamda ilkeleriyle SCIM-C stratejisinin 2024 Hayat Bilgisi Dersi Öğretim Programı'nın öğrenme çıktıları ve süreç bileşenleriyle uyumlu olacağı, öğrenci merkezli öğrenmeyi destekleyeceği düşünülmektedir. Çağdaş eğitim sistemlerinde, özellikle çoklu kaynaklardan bilgi edinme ve bu bilgileri doğrulama süreçlerinin, öğrencilerin bilginin güvenilirliğine ilişkin farkındalık kazanmalarını ve eleştirel düşünme becerilerini

geliştirmelerini sağladığı düşünülmektedir. Bu doğrultuda, SCIM-C stratejisinin2024 Hayat Bilgisi Dersi Öğretim Programı'nda yer alan hangi öğrenme çıktıları ve süreç bileşenlerinde nasıl kullanılabileceğini betimlemeyi amaçlayan bu çalışmanın ana problemini "Hayat Bilgisi Dersi Öğretim Programı'nın öğrenme çıktıları ve süreç bileşenlerinde SCIM-C stratejisinin kullanılabilme durumu nasıldır?" sorusu oluşturmaktadır. Bu ana problem kapsamında aşağıdaki alt problemlere yanıt aranmıştır:

1. Hayat Bilgisi Dersi Öğretim Programı'nın birinci sınıf öğrenme çıktıları ve süreç bileşenlerinde SCIM-C stratejisinin kullanılabilme durumu nasıldır?

2. Hayat Bilgisi Dersi Öğretim Programı'nın ikinci sınıf öğrenme çıktıları ve süreç bileşenlerinde SCIM-C stratejisinin kullanılabilme durumu nasıldır?

3.Hayat Bilgisi Dersi Öğretim Programı'nın üçüncü sınıf öğrenme çıktıları ve süreç bileşenlerinde SCIM-C stratejisinin kullanılabilme durumu nasıldır?

Yöntem

Araştırmanın Modeli

SCIM-C stratejisinin hayat bilgisi dersi öğrenme çıktıları ve süreç bileşenlerinde kullanılabilme durumunun belirlenmesinin amaçlandığı bu çalışmada nitel araştırma yaklaşımı kullanılmıştır. Nitel araştırmalarda kullanılan veri toplama yöntemlerinden biri olan doküman incelemesi, araştırılan olgu veya olgulara ilişkin yazılı materyallerin sistematik ve ayrıntılı biçimde analiz edilmesini içermektedir (Creswell, 2013; Yıldırım & Şimşek, 2011). Bu doğrultuda, araştırmanın veri kaynağını oluşturan 2024 Hayat Bilgisi Dersi Öğretim Programı bir doküman olarak ele alınmış ve incelenmiştir. İnceleme sürecinde öğretim programında yer alan öğrenme çıktıları ve süreç bileşenleri, SCIM-C stratejisinin kullanılabilirliği açısından değerlendirilmiştir.

Veri Kaynağı

Araştırmanın veri kaynağı amaçlı örnekleme yöntemlerinden ölçüt örnekleme ile belirlenmiştir. Bu bağlamda, araştırmada 2024 Hayat Bilgisi Dersi Öğretim Programı'nın incelenme nedeni, 2024-2025 eğitim-öğretim yılında uygulanan güncel program olması ve bu durumun bir ölçüt olarak dikkate alınmasıdır.

Araştırmada Süreç

İlk aşamada dokümanlara dâhil edilecek ölçütler belirlenmiş; kriter tarama ölçütü olarak hayat bilgisi dersi öğretim programı, içerme ölçütü olarak ise yürürlükte bulunan program esas alınmıştır. Bu doğrultuda Cumhuriyet dönemi programlarının tamamı yerine yalnızca 2024 Hayat Bilgisi Dersi Öğretim Programı çalışmaya dâhil edilmiştir. Doküman ve veri toplama sürecinde SCIM-C stratejisinin kullanılabilirliği incelendiğinden, alan yazını bu strateji bağlamında taranmış ve temel özellikleri belirlenmiştir. Analiz alanı olarak programın bütünü değil; öğrenme çıktıları ve süreç bileşenleri esas alınmıştır. Kodlama sürecinde 1., 2. ve 3. sınıf düzeylerindeki öğrenme çıktıları ve süreç bileşenleri, SCIM-C stratejisinin aşamaları doğrultusunda değerlendirilmiştir. Tarihsel kaynak analizi, bağlamsal değerlendirme, kanıta dayalı çıkarım ve kaynaklar arası ilişki kurma becerilerinden en az birini içeren kazanımlar stratejiye uygun olarak kodlanmıştır. Ayrıca bilgiyi ifade etme, bağlam içinde değerlendirme,

çıkarım yapma, ilişki kurma ve uygun tutum geliştirme gibi bilişsel süreçleri içeren kazanımlar da strateji kapsamında değerlendirilmiştir. Doğrulama aşamasında kodlamalar bağımsız olarak üç araştırmacı tarafından gerçekleştirilmiş ve güvenirlik, Miles ve Huberman (1994) formülü ile hesaplanmıştır. Değerlendiriciler arası uyum katsayısı .95 olarak bulunmuş ve bu sonuç yüksek düzeyde güvenirlik göstermiştir. Bulgular tablolarla sunulmuş ve doğrudan alıntılarla desteklenmiştir.

Araştırmanın Etik İzinleri:

Bu çalışmada "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında uyulması gerektiği belirtilen tüm kurallara uyulmuştur. Yönergenin ikinci bölümü olan "Bilimsel Araştırma ve Yayın Etiğine Aykırı Eylemler" başlığı altında belirtilen eylemlerin hiçbiri gerçekleştirilmemiştir.

Etik Kurul İzin Bilgileri:

Araştırma, kamuya açık dokümanlarla gerçekleştirildiği için etik kurul onayı gerektirmemektedir.

Bulgular

Bu çalışmada 2024 Hayat Bilgisi Dersi Öğretim Programı'nda hangi öğrenme çıktısı ve süreç bileşenlerinde SCIM-C stratejisinin nasıl kullanılabileceği belirlenmiştir. Tablo 1'de Hayat Bilgisi Dersi Öğretim Programı'ndaki öğrenme alanlarında SCIM-C stratejisinin kullanılabilirlik durumu sınıf düzeylerine göre verilmiştir.

2024 Hayat Bilgisi Dersi Öğretim Programı'nda SCIM-C stratejisinin birinci sınıf düzeyinde toplam yedi öğrenme çıktısında kullanılabileceği belirlenmiştir. SCIM-C stratejisinin "Yaşadığım Yer ve Ülkem" öğrenme alanında beş, "Ben ve Okulum" ile "Bilim, Teknoloji ve Sanat" öğrenme alanlarında ise birer öğrenme çıktısında kullanılabileceği görülmektedir. Bununla birlikte, "Sağlığım ve Güvenliğim", "Ailem ve Toplum" ile "Doğa ve Çevre" öğrenme alanlarında SCIM-C stratejisinin kullanılabileceği herhangi bir öğrenme çıktısının bulunmadığı tespit edilmiştir.

Programda, ikinci sınıf düzeyinde SCIM-C stratejisinin toplam on öğrenme çıktısında kullanılabileceği belirlenmiştir. Bu stratejinin "Yaşadığım Yer ve Ülkem" öğrenme alanında beş, "Bilim, Teknoloji ve Sanat" öğrenme alanında üç, "Ailem ve Toplum" ile "Doğa ve Çevre" öğrenme alanlarında ise birer öğrenme çıktısında kullanılabileceği görülmektedir. Buna karşın, "Ben ve Okulum" ile "Sağlığım ve Güvenliğim" öğrenme alanlarında SCIM-C stratejisinin kullanılabileceği herhangi bir öğrenme çıktısına yer verilmediği tespit edilmiştir.

Üçüncü sınıf düzeyinde ise SCIM-C stratejisinin toplam on bir öğrenme çıktısında kullanılabileceği belirlenmiştir. Bu stratejinin "Yaşadığım Yer ve Ülkem" öğrenme alanında dört, "Bilim, Teknoloji ve Sanat" öğrenme alanında üç, "Ben ve Okulum" öğrenme alanında iki, "Sağlığım ve Güvenliğim" ile "Ailem ve Toplum" öğrenme alanlarında ise birer öğrenme çıktısında kullanılabileceği görülmektedir. Bununla birlikte, yalnızca "Doğa ve Çevre" öğrenme alanında SCIM-C stratejisinin kullanılabileceği herhangi bir öğrenme çıktısının bulunmadığı tespit edilmiştir.

Tartışma ve Sonuç

SCIM-C stratejisinin, birincil kaynakları kullanarak öğrencilerin bu kaynakları analiz etme ve tarihsel düşünme becerilerini yapılandırmasını sağlayan bir yaklaşımdır (Hicks, Doolittle & Ewing, 2004). Stratejinin bu özelliğinden dolayı "Yaşadığım Yer ve Ülkem" öğrenme alanında kullanılabilirliği daha mümkün görülmektedir. Çünkü söz konusu öğrenme alanında yer alan birinci sınıftaki "yaşadığımız yer ve ülkemizin genel özellikleri, Türk Bayrağı ve İstiklâl Marşı, Mustafa Kemal Atatürk'ün hayatı, millî gün ve bayramlar ile dinî gün ve bayramlar", ikinci sınıftaki "tarihî mekânlar ve doğal güzellikler, yaşadığı yerin yönetim birimleri, Mustafa Kemal Atatürk'ün öğrencilik yılları, millî gün ve bayramların önemi ile dinî gün ve bayramların önemi" ve üçüncü sınıftaki "tarihî mekân ve doğal güzellikler, ülkemizin yönetim şekli, Mustafa Kemal Atatürk'ün kişilik özellikleri ile millî birlik ve beraberlik" (MEB, 2024b) konularının birincil kaynak kullanımına elverişli olması ve tarihsel bir boyut içermesi ile SCIM-C stratejisinin kullanılabilir olduğu tespit edilmiştir. Örneğin "Yaşadığım Yer ve Ülkem" öğrenme alanındaki HB.1.4.3 öğrenme çıktısında Atatürk'ün çocukluk yıllarına dair tarihi görseller, kısa videolar, hikâye kitapları sunulması istenmektedir. Bu kaynaklar birincil kaynakları oluşturduğundan SCIM-C stratejisinin kullanımı uygun görülmektedir. Bu bağlamda SCIM-C stratejisinin kullanımı, öğrencilere sunulan bu farklı birincil kaynaklar ile öğrencilerin analiz etme ve yorumlama becerilerini geliştirmesi beklenmektedir. Nitekim Hicks vd., (2004) ve Hicks vd., (2016), SCIM-C stratejisi ile öğrencilere sunulan farklı birincil kaynakların onların analiz etme ve yorumlama becerilerini geliştirdiğini belirtmektedir (akt. Yetişensoy, 2021). Belirtildiği gibi etkinlikte de birincil kaynak olarak kullanılan materyaller ile konunun somutlaştırılması amaçlanmıştır. Ayrıca SCIM-C stratejisi çerçevesinde yapılan etkinlik ile stratejinin gereği olarak öğrencilerin birincil kaynakları kullanmaları teşvik edilir. Bu kapsamda Şentuna (2014), birincil kaynakların kullanımının bilgilerin kalıcı hafızaya alınmasını kolaylaştırdığını ve öğrencilerin eleştirel ile tarihsel düşünme becerilerini geliştirdiğini belirtmiştir. Dolayısıyla, ilgili öğrenme çıktısında birincil kaynaklardan yararlanılması önemli görülmektedir. HB.1.4.3 öğrenme çıktısına yönelik hazırlanan etkinlik örneği, SCIM-C stratejisinin hayat bilgisi dersinde birincil kaynakların kullanımıyla öğrencilerin tarihsel bilgileri daha anlamlı ve somut bir şekilde öğrenmelerine katkı sağlayabileceğini göstermektedir. Etkinlik sürecinde Atatürk'ün yaşamına ilişkin görseller, kimlik belgesi ve döneme ilişkin materyallerin kullanılması, öğrencilerin öğrenme sürecine aktif katılımını destekleyerek tarihsel içeriğin yalnızca aktarılan bir bilgi olmaktan çıkıp anlamlandırılan bir öğrenme deneyimine dönüşmesine olanak sağlamaktadır. Bu durum, SCIM-C stratejisinin öğrencilerin tarihsel empati kurmalarına, geçmişi daha iyi kavramalarına ve tarihsel kişilikleri rol model olarak değerlendirmelerine katkı sağlayabilecek bir öğretim süreci sunduğunu göstermektedir. Dolayısıyla, hayat bilgisi dersinde birincil kaynak kullanımına dayalı SCIM-C temelli etkinliklerin, öğrencilerin hem bilişsel hem de duyuşsal öğrenmelerini destekleyebilecek nitelikte olduğu söylenebilir.

Hicks vd. (2004) ve Hicks vd.'ne göre (2016) SCIM-C stratejisi öğrencilerin bir tarihçi gibi düşünme becerilerini desteklemektedir (akt. Yetişensoy, 2021). İkinci sınıf "Yaşadığım Yer ve Ülkem" öğrenme alanındaki HB.2.4.1 öğrenme çıktısı kapsamında da SCIM-C stratejisi ile birincil kaynak olan öğrencilerin yaşadığı yerdeki cami, kale gibi yerlere gezi deneyimi öğrencilere sunulur ve kaynakların kim tarafından, ne zaman ve hangi amaçla üretilmiş olduğu

fark edilir. Öğrenme çıktısı doğrudan bir gözlem ile sunulan yerel tarih öğretimi ile gerçekleştirilebilir. Nitekim yerel tarih öğretiminde gezi ve gözlem tekniğinin kullanılmasının öğrencilerin derse yönelik ilgisini artırdığı sonucuna ulaşılmıştır (Işık, 2002). Bu kapsamda HB.2.4.1 öğrenme çıktısında, birincil kaynakların sunduğu avantajlardan yararlanılmasının yanı sıra, hayat bilgisi dersinin öğretim sürecinde yerel tarih yönteminin kullanılması da mümkün olacaktır.

"Bilim Teknoloji ve Sanat" öğrenme alanında yer alan birinci sınıftaki içerik çerçevesi "teknoloji ile ilgili merak edilenler", ikinci sınıftaki "bilim insanlarının bilime katkıları, teknolojik ürünlerin zaman içerisindeki değişimi ile sanatın günlük yaşamdaki yeri", üçüncü sınıftaki içerik çerçevesi "bilimsel gelişmelerin günlük yaşama etkisi, teknolojik gelişmelerin günlük yaşama etkisi ile sanatçıların sanata katkıları" (MEB, 2024b) olan konular programda yer almaktadır."Bilim, Teknoloji ve Sanat" öğrenme alanında, birinci sınıf öğrenme çıktısı olan HB.1.6.2'de SCIM-C stratejisi kullanılarak geçmişte kullanılan araçlar ile günümüz araçları arasında bağ kurulabilir. İkinci sınıf öğrenme çıktısı olan HB.2.6.2 kapsamında ise SCIM-C stratejisinin özellikle bağlamsallaştırma aşamasında, tarihsel kaynağın üretildiği dönemde yaşanan gelişmeler dikkate alınarak günümüzle karşılaştırmalar yapılabilir. Üçüncü sınıf öğrenme çıktısı olan HB.3.6.3'te ise öğrencilerin SCIM-C stratejisini kullanarak kaynağın ima ettiği değer yargılarını anlamlandırmaları amacıyla, sanatçıların sanata katkılarına yönelik bilgilendirici metinler, animasyonlar, belgeseller ve benzeri eğitici içerikler sunularak geçmişteki katkılara ilişkin bilgi edinmeleri sağlanabilir.

"Ailem ve Toplum" öğrenme alanında yer alan ikinci sınıf içerik çerçevesi "ailenin önemi" ve üçüncü sınıf içerik çerçevesi "toplumsal yaşamda meslekler" (MEB, 2024b) olarak yapılandırılmıştır. Bu konular kapsamında SCIM-C stratejisi kullanılarak öğrencilerin, mesleklerin toplumsal yaşamdaki önemini geçmiş dönemin koşulları çerçevesinde yorumlayabilme becerisi kazanmaları amaçlanmaktadır. Kuzgun'un (2013) da vurguladığı üzere, bireylerin küçük yaşlardan itibaren mesleki rehberlik kapsamında desteklenmesi, kendi yetenek ve özelliklerine uygun meslek alanlarını tanımalarına ve doğru mesleğe yönlendirilmelerine katkı sağlar. Bu bağlamda meslek; insanların topluma yararlı mal ya da hizmet üretmek ve bunun karşılığında gelir elde etmek amacıyla, belirli bir eğitim süreci sonucunda kazanılan bilgi ve becerilere dayanan ve kuralları toplum tarafından belirlenen bir etkinlik alanı olarak tanımlanabilir. "Ailem ve Toplum" öğrenme alanlarında HB.3.3.3 öğrenme çıktısında öğrenci birincil kaynağı seçer ve gözlemlemek üzere bir meslek belirler. Öğrencilere okul içinde ya da dışında gözlem yapabilecekleri meslekler listelenir. Bu mesleklerin zaman içerisinde nasıl değiştiğine dair bir zaman çizelgesi verilir. Bu mesleklerin o dönemde ne gibi faydalarının olduğu belirlenir. SCIM-C stratejinin son aşamasında öğrenciye farklı bir bakış açısı kazandırmak için okul-veli iş birliği yapılarak çeşitli meslek sahibi velilerin sınıfa gelmeleri ve mesleklerine ilişkin bilgi vermeleri istenir ve böylece bu stratejiye ait bir etkinlik örneği verilebilir. Bu doğrultuda, çocukların meslek temalı öyküler okuması, onların farklı meslek alanlarını tanımalarına olanak verir. Öyküler aracılığıyla kendilerine uygun rol modelleri bilişsel düzeyde deneyimlemelerine zemin hazırlayabilir. Öykülerdeki kahramanlar aracılığıyla sunulan rol modeller, çocukların özdeşim kurma süreçlerini destekleyerek ilerleyen dönemlerde meslek seçimlerine yön verici bir etki oluşturabilir. (Özgür & Çelik, 2018).

"Sağlığım ve Güvenliğim" öğrenme alanında yer alan üçüncü sınıftaki içerik çerçevesi "sağlığı koruma" (MEB, 2024b) konuları içerisinde öğrencilerin sağlığını korumaya yönelik davranışlarını düzenleyebilmesi amacıyla sağlık bilgisine sahip olması gerekmektedir. Bu bağlamda Yalçın'a (2025) göre sağlıklı bir toplum için öğrencilerin sağlık bilgisine sahip olması gerekir, çünkü sağlıklı bireyler, toplumun geleceği ve devamlılığı açısından önemlidir. HB.3.2.1 öğrenme çıktısında SCIM-C stratejisinin kullanılabilirliğine bakıldığında yaşanan verem salgınına/ COVİD19 yönelik belgeseller birincil kaynak olarak kullandırılır. Covid-19 pandemisi, eğitim alanında önemli değişimlere yol açmış ve eğitim kurumlarının sağlık eğitimindeki rolünü daha da ön plana çıkarmıştır. Sağlık eğitimi; hijyen davranışları, sağlıklı yaşam alışkanlıkları ve hastalıklardan korunma yollarının öğrencilere kazandırılmasını hedefler. Bu kapsamda okullar, el yıkama, maske kullanımı, sağlıklı beslenme, hareketli yaşam gibi konularda rehberlik edebilir. Ayrıca pandemi, psikolojik sağlığın da en az fiziksel sağlık kadar önem taşıdığını göstermiştir. Bu nedenle eğitim kurumları, öğrencilere stres yönetimi ve duygusal farkındalık gibi konularda destek vererek bütüncül sağlık gelişimine katkı sağlayabilir (Akson vd., 2023).

Öneriler

Bu çalışmada 2024 yılı Hayat Bilgisi Dersi Öğretim Program'ında SCIM-C stratejisinin kullanılabileceği öğrenme çıktıları ve süreç bileşenleri belirlenmiş, bu öğrenme çıktıları ve süreç bileşenlerinde stratejinin nasıl kullanılabileceğine ilişkin etkinlik örnekleri sunulmuştur. Bu doğrultuda, söz konusu öğrenme çıktılarının öğretiminde SCIM-C stratejisinden yararlanılması ve bu araştırma kapsamında oluşturulan etkinlik örneklerinin uygulama sürecinde dikkate alınması önerilmektedir.

Araştırmada 2024 yılı Hayat Bilgisi Dersi Öğretim Program'ında SCIM-C stratejisinin en fazla kullanılabileceği öğrenme alanının 'Yaşadığım Yer ve Ülkem' olduğu belirlenmiştir. Bu nedenle, bu öğrenme alanında stratejinin kullanımına ağırlık verilmesi ve öğrencilerin bilişsel ve duyuşsal gelişimleri üzerindeki etkisini inceleyen araştırmaların yapılması önerilmektedir.

Bu araştırma, yalnızca 2024 Hayat Bilgisi Dersi Öğretim Programı'nın doküman incelemesi yoluyla analiz edilmesiyle sınırlı olduğundan, gelecekte yapılacak araştırmalarda SCIM-C stratejisinin hayat bilgisi dersindeki sınıf içi uygulamalarına, öğretmen ve öğrenci görüşlerine dayalı uygulamalı çalışmalar gerçekleştirilebilir.

Bu araştırmada SCIM-C stratejisinin kullanılabilirliği Hayat Bilgisi Dersi Öğretim Program kapsamında ele alınmıştır. Farklı derslerin öğretim programlarında SCIM-C stratejisinin kullanılabilirliği araştırma konusu edinilebilir.

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Biomimicry Technique in the 2024 Life Science Course Curriculum

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Abstract

Biomimicry (imitation of life) technique, as it involves the process of developing designs inspired by nature, may enable students to use their scientific process skills, acquire knowledge from different disciplines, and develop environmental awareness. Life science course, taught in the first three years of primary school, plays an important role in equipping children with the knowledge, skills, values, attitudes, and habits necessary for their adaptation to natural and social environment. The fact that part of the content of the life science is derived from the field of science demonstrates the course's relationship with nature. In this context, it is considered that the biomimicry technique can be utilized in the learning outcomes of the life science course. Determining in which learning outcomes of 2024 life science curriculum the biomimicry technique can be utilized and how it can be applied constitutes the aim of this study. In this study, a qualitative research method was adopted and document analysis model was employed. Data source of research was the 2024 life science course curriculum, which was analyzed by following the steps of document analysis. As a result of the study, it was determined that the biomimicry technique can be utilized in all learning domains at the 1st, 2nd, and 3rd grade levels of the life science course. The "Nature and Environment" learning domain is the area in which the biomimicry technique can be utilized most extensively. It can be recommended that biomimicry technique be particularly utilized in science-related learning outcomes of life science course.

Keywords: Life science course, curriculum, biomimicry technique.

Introduction

The life science course, in addition to being a subject taught in primary schools, is a course drawn from life itself and related to daily living. This course enables students to discover their sense of self and to become good citizens and responsible individuals. In this regard, it serves the aim of countries to raise citizens with the desired qualities for society (Çoban et al., 2025). Delivered within the framework of a structured curriculum, the life science course plays a crucial role in helping children understand real-life situations, solve potential problems they may encounter, and acquire the knowledge and skills necessary for daily life (Turan, 2024). In this regard, it supports students' cognitive, affective, and psychomotor development (Değirmenci & Çevik Kansu, 2022). One of the significant features of the course is the inclusion of activities that are appropriate to students' developmental characteristics, based on concrete experiences, and that provide opportunities for learning by doing and experiencing. Furthermore, this course is among the main courses where values education is implemented, instilling fundamental values in students and preparing them for life (Şen & Tay, 2023; Yılmaz & Yarar Kaptan, 2023).

The concepts of human, nature, and society, which constitute the scope of the life science course, form a holistic structure encompassing social sciences related to society, natural sciences related to nature, and arts, thought, and values related to human beings (Tay, 2017). Similarly, it is stated that the life science course provides a foundation for children in various disciplines such as social sciences, natural sciences, health education, tourism, environmental studies, and nature sciences (Aydemir & Palancıoğlu, 2023). In this context, life science, with its structure drawing from different disciplines, serves as a fundamental course that enables students to perceive humans, nature, and society as a whole, supports their multifaceted and balanced development by establishing a direct connection with daily life.

One of the teaching techniques that can be used in teaching topics related to the nature dimension within the scope of the life science course is biomimicry. Biomimicry means the imitation of life. It is an approach that makes use of nature to solve problems encountered in daily life, taking as a model or imitating the solution strategies of non-human living organisms in nature (Yakışan & Velioğlu, 2019). It involves generating new designs by discovering and imitating the creative solutions found in nature (Bayram & Topbaş, 2024).

It is observed that the biomimicry technique not only involves imitating nature but also aims to understand the philosophy underlying the functioning of nature and to produce environmentally friendly and sustainable solutions. It is important both theoretically and practically in that it has the potential to generate solutions based on sustainability principles by drawing inspiration from nature. In this context, it can be stated that the biomimicry technique has significant potential in the development of innovative designs and technologies, especially in a period when environmental crises are intensifying.

The biomimicry technique involves an application process consisting of five stages. According to Çoban and Coştu (2023), these stages are, respectively, observe, explore, imitate, design, and. These stages are explained below.

Observe: Students carefully observe living organisms and systems in nature. The examination may involve either direct observation of nature or investigation through technological tools. At this stage, the relationships between the structures and functions of living organisms are examined. For example, the relationship between a bird's wing structure and its ability to fly is investigated.

Explore: Based on the information obtained through observation, solutions and mechanisms in nature are identified. At this stage, the focus is on how nature solves the problems it encounters. In other words, students establish connections. For example, how a spider constructs its web and the durability of this web are examined.

Imitate: This stage involves drawing inspiration from nature to solve a problem. The natural solutions identified are adapted to human-made systems. At this stage, emphasis is placed on how natural mechanisms can be integrated into technical designs. For example, durable and lightweight materials are developed by imitating the structure of a spider web.

Design: New products or systems are designed based on the imitated natural principles. At this stage, students create their own designs and develop prototypes. For example, a water harvesting system inspired by nature may be designed.

Share: The developed designs and acquired knowledge are shared with others. At this stage, students present their projects, receive feedback, and engage in knowledge exchange within the community.

The application of the biomimicry technique has various advantages and limitations. Some of the advantages reported in studies on biomimicry are as follows: Değirmenci and Çevik Kansu (2022) state that this technique enables students to develop nature-inspired solutions to problems encountered in daily life by using their imagination and creativity; that it allows students to actively engage multiple intelligences and contributes to the structuring

of their cognitive process skills; that it increases interest and motivation toward both nature and the course, thereby supporting the development of positive attitudes; that the biomimicry technique contributes to the development of students' scientific process skills while enabling them to move beyond conventional patterns of thinking; and that it brings together different scientific disciplines through a holistic approach and supports peer learning, respect, communication skills, and the development of self-confidence through collaborative learning. Ergül (2023) discusses the advantages of the biomimicry technique; according to her, biomimicry is a powerful science education tool that encourages both children and adults to develop new and creative solutions by modeling the living systems around them. Including biomimicry studies in the school curriculum increases children's awareness of nature, their perspective, observation skills, and knowledge; such applications may help children who spend extensive time in virtual environments reconnect with nature and return to the real world; and biomimicry, which regards nature as a guide, offers a creative approach to engaging children in construction, design, and learning about nature by translating theoretical knowledge into practice. In addition, Avcı (2019) states that the widespread implementation of biomimicry projects at all levels of education will improve students' perspectives toward nature while also supporting the development of scientific thinking, creativity, and productivity skills, and that integrating biomimicry into the educational process in schools where children-the architects of the future-are educated will bring the spirit of science inspired by life into the present. When these statements are evaluated, it can be stated that incorporating the biomimicry technique into the educational process may contribute to the development of children's observation, scientific thinking, communication, creativity, productivity, and other skills, as well as their self-confidence, imagination, and various areas of intelligence.

The limitations of the biomimicry technique can be evaluated in terms of potential situations that may arise during the teaching process and the teacher's influence on implementation. These disadvantages include the possibility of adaptation difficulties for some students due to the diversity of student profiles in crowded classrooms; the emergence of differences in proficiency levels within the class if content selection is not aligned with developmental levels; the time-consuming nature of the implementation; and the reluctance of some students to participate in activities. This situation necessitates effective guidance by the teacher and efficient time management (Değirmenci & Çevik Kansu, 2022).

The 2024 life science curriculum has been prepared based on a skill-based curriculum approach. Therefore, instead of memorizing information, students are expected to solve problems they may encounter in daily life by employing higher-order thinking skills. Since biomimicry is a technique that attempts to solve problems by drawing inspiration from nature, it is considered that it may be particularly helpful in teaching topics related to nature. The usability of the biomimicry technique within the learning outcomes of the 2024 life science curriculum is important in terms of supporting teachers in implementing skill-based instruction. Furthermore, it is observed that studies addressing biomimicry are mostly conducted in the fields of architecture and engineering (Eryılmaz, 2015; Fıstıkçı & Gündüz, 2021; Sevim & Eser, 2025), whereas in the field of education, they are predominantly examined within the scope of science courses (Kandemir et al., 2022; Yakışan & Velioğlu, 2019; Yıldırım, 2019). The literature indicates that no studies have been conducted on the biomimicry

technique within the scope of the life science course. In this context, this study, which aims to determine how and in which learning outcomes the biomimicry technique can be used in the 2024 life science curriculum, is considered to possess original value and to be significant for the literature. In line with the research objective, an answer was sought to the following research question: "What is the extent to which the biomimicry technique can be used in the learning outcomes of the 2024 life science course curriculum?"

Method

This study, which aimed to determine the applicability of the biomimicry technique in the learning outcomes of the 2024 life science course curriculum, adopted a qualitative research approach. Qualitative research is an approach that addresses phenomena and events in a realistic and holistic manner through the use of qualitative data collection techniques such as field notes, observations, diary entries, interviews, life histories, artifacts, and documents (Cohen et al., 2007; Hoy & Adams, 2015). Accordingly, this study was conducted using the document analysis method, one of the qualitative research models in which written and oral materials containing information about the research topic are examined (Altunkaynak, 2020), and the applicability of the biomimicry technique within the curriculum, which constitutes a written document, was analyzed.

Data Source

The data source of the study consists of the "life science curriculum (grades 1, 2, and 3)" published in 2024. The applicability of the biomimicry technique within the curriculum was examined with a focus on the learning outcomes of the program, and process components and learning–teaching experiences were also considered within the scope of the learning outcomes.

Data Analysis

The findings of the study were analyzed through document analysis. According to Forster (1995; as cited in Yıldırım & Şimşek, 2016), document analysis is conducted in five stages: accessing documents, verifying authenticity, understanding the documents, analyzing the data, and using the data.

Accessing documents: The document of the study was the 2024 life science curriculum. The document was accessed through the official website of the Board of Education and Discipline.

Verifying authenticity: The 2024 life science course curriculum, obtained from the official website of the Ministry of National Education [MoNE], was accepted as authentic.

Understanding the documents: At this stage, the learning outcomes, process components, and learning–teaching experiences of the 2024 life science course curriculum were examined by taking into account the characteristics of the biomimicry technique.

Analyzing the data: When evaluating the suitability of a learning outcome for the use of the biomimicry technique, the process components of the relevant learning outcome and the learning–teaching experiences suggested in the curriculum for that learning outcome (basic assumptions, pre-assessment, bridging, learning–teaching practices) were also examined. The

activity examples were developed within this framework. The data were analyzed by categorizing them under the headings of grade levels, learning areas, learning outcomes, process components, and learning–teaching experiences. An open approach was adopted in the analysis of the data. In order to ensure the reliability of the analyses, the codings conducted independently by the researchers were compared with their respective categories, and the free-marginal kappa coefficient was calculated as .94. This value is considered sufficient for reliability.

Using the data: The results of the analysis were utilized in a manner corresponding to each learning outcome and learning-teaching experience. The findings obtained in this way are presented in tables. References to learning outcomes, process components, and learning-teaching experiences are included.

Ethical Permits of Research:

In this study, all the rules specified to be followed within the scope of "Higher Education Institutions Scientific Research and Publication Ethics Directive" were complied with. None of the actions specified under the heading "Actions Contrary to Scientific Research and Publication Ethics", which is the second part of the directive, have been taken.

Ethics Committee Permission Information:

Since the research was conducted with publicly available documents, it does not require ethics committee approval.

Findings

This study aimed to determine how biomimicry technique can be used in the learning outcomes of the 2024 life science curriculum. Table 1 presents the applicability of biomimicry technique within the learning areas of the 1st, 2nd, and 3rd grade levels of the life science curriculum.

Table 1.

Distribution of Learning Outcomes in the Life Science Course Curriculum (Grades 1, 2, and 3) in Which the Biomimicry Technique Can Be Used, by Learning Areas

Learning area name	Learning outcomes where biomimicry techniques can be used.		
	1st grade	2st grade	3st grade
Me and My School		HB.2.1.2	
My Health and Safety	HB.1.2.1/ HB.1.2.2	HB.2.2.2	HB.3.2.3
My Family and Community	HB.1.3.1		
My Place and My Country			HB.3.4.1
Nature and Environment	HB.1.5.1/ HB.1.5.2	HB.2.5.1/HB.2.5.2/ HB.2.5.3/ HB.2.5.4	HB.3.5.1/ HB.3.5.3
Science, Technology, and Art		HB.2.6.3	HB.3.6.3
The total number of learning outcomes for which biomimicry techniques can be used.	5	7	5
The total number of learning outcomes in the program.	23	23	20

An examination of Table 1, which presents the applicability of the biomimicry technique within the learning areas and learning outcomes of the 2024 life science curriculum at Grades

1, 2, and 3, indicates that the biomimicry technique can be used in the "Nature and Environment" and "My Health and Safety" learning areas at all grade levels; in the "Science, Technology, and Art" learning area at Grade 2; and in the "Me and My School," "My Family and Community," and "My Place and My Country" learning areas at Grade 1. When the learning outcomes are examined, it is observed that the biomimicry technique can be applied in five out of 23 learning outcomes in Grade 1, seven out of 23 learning outcomes in Grade 2, and five out of 20 learning outcomes in Grade 3. In total, the biomimicry technique is applicable in 17 out of 66 learning outcomes across Grades 1, 2, and 3.

In the 2024 life science curriculum, the biomimicry technique is applicable in five learning outcomes at Grade 1. The biomimicry technique is included in two learning outcomes within the "Nature and Environment" and "My Health and Safety" learning areas, and in one learning outcome within the "My Family and Community" learning area. However, there are no suitable learning outcomes for the application of the biomimicry technique in the "Me and My School," "My Place and My Country," and "Science, Technology, and Art" learning areas.

In the 2024 life science curriculum, biomimicry technique is applicable in seven learning outcomes at Grade 2. It is included in four learning outcomes within the "Nature and Environment" learning area, and in one learning outcome each within the "Me and My School," "My Health and Safety," and "Science, Technology, and Art" learning areas. However, there are no suitable learning outcomes for the application of the biomimicry technique in the "My Family and Community" and "My Place and My Country" learning areas.

In the 2024 life science curriculum, the biomimicry technique is applicable in five learning outcomes at Grade 3. It is included in two learning outcomes within the "Nature and Environment" learning area, and in one learning outcome each within the "My Health and Safety," "My Place and My Country," and "Science, Technology, and Art" learning areas. However, there are no suitable learning outcomes for the application of the biomimicry technique in the "Me and My School" and "My Family and Community" learning areas.

The learning outcomes in which the biomimicry technique can be used within the "My Health and Safety" learning area at Grade 1 are presented in Table 2.

Table 2.

Learning Outcomes in the Grade 1 "My Health and Safety" Learning Area of the Life Science Course Curriculum in Which the Biomimicry Technique Can Be Used

Learning area	Learning outcomes
My Health and Safety	HB.1.2.1. Identifies what needs to be done for healthy growth and development
	HB.1.2.2. Identifies to boundaries of personal space

According to Table 2, in the learning outcome (HB.1.2.1) related to the "My Health and Safety" learning area, the concept of growth, which is a common characteristic of all living organisms, is taken as the foundation. Within the learning–teaching experiences, students are asked to examine what they need to do through the examples provided. The presentation of documentaries and visual materials is suggested. Based on the learning–teaching experiences that align with the biomimicry technique, application stages have been developed. In another learning outcome (HB.1.2.2), an activity example has been developed based on the idea that,

like humans, other living organisms may also have their own living spaces and boundaries. Within the learning–teaching experiences, the presentation of various case examples, digital content, and materials related to the topic is suggested. This learning outcome is particularly suitable for the observation and exploration stages of the biomimicry technique. The lesson content, which is recommended to be presented through case examples, can be structured in accordance with a lesson process incorporating the stages of the biomimicry technique. The activity examples developed based on the learning outcomes, process components, and learning–teaching experiences are presented below.

For learning outcome HB.1.2.1, during the observation stage—the first stage of the biomimicry technique—it is suggested that students watch a video showing a flower growing under proper care. In the exploration stage, students may be guided to recognize that healthy growth and development are possible. In the imitation stage, students may be supported in identifying what needs to be done for healthy growth and development in humans, similar to the growth process of the flower. In the design stage, they may be asked to list what needs to be done for healthy growth and development. In the sharing stage, it is suggested that they present their lists to their classmates and share them with their families at home.

For learning outcome HB.1.2.2, during the observation stage of the activity, it is suggested that students examine a turtle that has clear personal space boundaries. In the exploration stage, students may be guided to recognize that the turtle has a personal space due to its shell. In the imitation stage, students may be supported in defining their own personal space boundaries based on the example of the turtle. In the design stage, they may be asked to draw a representation of their personal space, and in the sharing stage, they may present their drawings to their classmates.

The learning outcome in which the biomimicry technique can be used in the "My Family and Community" learning area of the Grade 1 life science course is presented in Table 3.

Table 3.

Learning Outcomes in the Grade 1 "My Family and Community" Learning Area of the Life Science Course Curriculum in Which the Biomimicry Technique Can Be Used

Learning area	Learning outcomes
My Family and Community	HB.1.3.1. Identifies the importance of being a family

According to Table 3, the biomimicry technique can be used to support students in recognizing the importance of family, as stated in the learning outcome (HB.1.3.1) of the "My Family and Community" learning area. Within the biomimicry technique, students are guided to recognize knowledge independently. It can be stated that the elements targeted in the learning outcome and the learning–teaching experiences are structured within the framework of the concept of nature; in this context, the concept of family observed in animals may be considered as an activity example. The example stages of the biomimicry technique are presented below.

During the observation stage of the biomimicry technique, it is suggested that students watch a video showing a kangaroo carrying its young in its pouch. In the exploration stage, students may be encouraged to make inferences about why the kangaroo carries its young in its pouch. In the imitation stage, students may reflect on their own family members and review

their feelings about them for the preparation of the family album requested in the learning–teaching experience. In the design stage, students may design a family album with the support of their families, and in the sharing stage, they may present their family album in the classroom.

The learning outcomes and process components in which the biomimicry technique can be used within the "Nature and Environment" learning area of the Grade 1 life science course are presented in Table 4.

Table 4.

Learning Outcomes in the Grade 1 "Nature and Environment" Learning Area of the Life Science Course Curriculum in Which the Biomimicry Technique Can Be Used

Learning area	Learning outcomes
Nature and Environment	HB.1.5.1. Observes entities in nature within their immediate surroundings a. Collects data regarding entities in nature within their immediate surroundings b. Classifies the data collected regarding entities in nature within their immediate surroundings.
	HB.1.5.2. Compares celestial bodies through models a. Identifies the characteristics of celestial bodies (Sun, Earth, and Moon) through models b. Lists the similarities and differences among celestial bodies (Sun, Earth, and Moon) through models

Table 4 shows the concept of nature included in the learning outcomes and process components of the "Nature and Environment" learning area, as understood from the title of the learning area, constitutes the fundamental basis of the biomimicry technique. In the learning–teaching experiences specified in the 2024 life science course curriculum for learning outcome HB.1.5.1 and its process components, students are given the opportunity to observe entities in nature in the schoolyard and in their immediate surroundings. Students are asked to provide examples of entities in nature. Data are collected through note-taking, drawing, taking photographs, and similar activities. The data are classified. Students are asked to prepare a product. These explanations are compatible with all stages of the biomimicry technique. In the learning–teaching experiences related to learning outcome HB.1.5.2 and its process components, the presentation of educational content such as short films, documentaries, photographs, and visuals is specified, and students are asked to prepare products. The process components include examining celestial bodies and listing their characteristics, similarities, and differences. Based on the given learning outcomes (HB.1.5.1 and HB.1.5.2), activity examples have been created, as they enable observation of living organisms and nature. The created activity examples are as follows:

In the observation stage, it is suggested that students observe the areas specified in the learning–teaching experiences (HB.1.5.1). In the exploration stage, they may be asked to discover the characteristics of the selected entity in nature, collect data, and classify them. In the imitation stage, students may be guided to adapt the collected data to the product they will create. In the design stage, they may be asked to design the product they wish to create, and in the sharing stage, they may be asked to introduce the product they created inspired by nature to their classmates.

In the observation stage, it is suggested that students watch documentaries, short films, or clips accompanied by songs related to celestial bodies, as indicated in the learning–teaching experiences (HB.1.5.2). In the exploration stage, students may be asked to examine the characteristics of the planets related to the presented problem situation and to list their similarities and differences. In the imitation stage, they may attempt to adapt their solution to the problem by drawing inspiration from celestial bodies. In the design stage, they may be asked to transform their solution into a three-dimensional design, and in the sharing stage, they may present their design during a classroom activity.

Tables 5, 6, 7, and 8 present the applicability of the biomimicry technique in the learning areas included in the Grade 2 life science course curriculum. It is observed that the biomimicry technique can be used in four of the Grade 2 learning areas and in seven learning outcomes in the 2024 life science course curriculum. The learning outcomes and process components in which the biomimicry technique can be used in the "Me and My School" learning area of the Grade 2 life science course are presented in Table 5.

Table 5.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 2 "Me and My School" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
Me and My School	HB.2.1.2. Identifies areas of strength and areas open the development a. Collects Gathers information about areas of strength and areas for improvement b. Generates options regarding areas of strength and areas open to development c. Evaluates options regarding areas of strength and areas open to development

According to Table 5, within the scope of the learning outcome and process components (HB.2.1.2.) of the "Me and My School" learning area, students are asked to examine accessible resources such as books and documentaries related to the subject, and an example activity based on the biomimicry technique is presented by drawing on the strong and distinctive characteristics of animals. Based on this explanation, the following stages can be applied:

In the observation stage, it is suggested that students watch videos demonstrating that all living beings possess a strong attribute. For example, videos showing kangaroos' ability to jump effectively, ants' industriousness, and cheetahs' ability to run very fast may be presented. In the exploration stage, students may be guided to discover how entities in nature achieve the strengths they identify in themselves or how they develop areas they wish to improve. For example, they may explore how a cheetah is able to run so fast. Students who collect information about their strengths and areas open to development and generate options may evaluate these options in the imitation stage and attempt to adapt examples drawn from nature to themselves in relation to the area they wish to improve. In the design stage, students may be asked to draw what they can do to improve their own strengths and areas open to development. In the sharing stage, they may present enactments of the drawings they created to their classmates in the schoolyard or classroom (HB.2.1.2).

The learning outcome in which the biomimicry technique can be used in the "My Health and Safety" learning area of the Grade 2 life science course is presented in Table 6.

Table 6.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 2 "My Health and Safety" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
My Health and Safety	HB.2.2.2. Protects the boundaries of personal space

In the description of the learning outcome (HB.2.2.2) in the "My Health and Safety" learning area in Table 6, students are expected to be aware of the importance of protecting their personal boundaries, participate in activities, and be presented with case examples related to the topic. The requirement to present such case examples allows the biomimicry technique to be applied through examples drawn from nature. An activity example prepared in accordance with the stages of the biomimicry technique is provided below.

In the observation stage, students may be asked to examine a hedgehog that protects its personal space boundaries through its spines. In the exploration stage, students may be guided to recognize that the hedgehog protects its personal space by means of its spines. In the imitation stage, students may be encouraged to determine how they can protect their own personal space boundaries based on the hedgehog example. In the design stage, they may be asked to draw a representation of their idea for protecting their personal space boundaries, and in the sharing stage, they may present their drawings to their classmates (HB.2.2.2).

The learning outcomes and process components in which the biomimicry technique can be used in the "Nature and Environment" learning area of the Grade 2 life science course are presented in Table 7.

Table 7.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 2 "Nature and Environment" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
Nature and Environment	HB.2.5.1. Analyze the relationship between weather events and seasons a. Identifies the characteristics of weather events b. Identifies the characteristics of seasons c. Identifies the relationship between weather events and seasons
	HB.2.5.2. Determines direction by making use of nature
	HB.2.5.3. Collects information regarding precautions to be taken against disasters a. Find information regarding precautions to be taken against disasters b. Record information regarding precautions to be taken against disasters
	HB.2.5.4. Evaluates the importance of using resources economically a. Reviews their behavior while using resources b. Draws inferences regarding the economical use of resources

In the explanations of the learning outcomes and process components (HB.2.5.1 and HB.2.5.2) of the "Nature and Environment" learning area, it is stated that students are expected to make observations. They are asked to take notes on their observations and to conduct examinations according to specific criteria. They are encouraged to be inquisitive and questioning. These explanations allow for the implementation of the stages of the biomimicry technique. Furthermore, the weather events, seasons, and determining direction by making

use of nature included in the learning outcomes are related to the concept of nature that underlies the biomimicry technique. The learning outcomes and process components of HB.2.5.3 and HB.2.5.4, which concern natural disasters and the economical use of resources, include the effects of what nature offers. In addition, the product creation mentioned in the explanation of the learning outcomes is compatible with the design stage of the biomimicry technique. Based on these explanations, the activity examples prepared are presented below in sequence.

As stated in the learning–teaching experiences, in the observation stage, students may be shown short films related to weather events and seasons, polar bears that do not feel cold in winter due to their fur, and camels that store water in hot weather, and they may be asked to examine a mushroom sample brought into the classroom. In the exploration stage, students may be asked to make observations and take notes on significant points. In the imitation stage, they may compare their own knowledge and observations with the precautions taken by living organisms in relation to seasons and weather conditions. In the design stage, they may be asked to design an umbrella or clothing inspired by nature and based on sustainable materials in order to protect themselves from rain, cold, or hot weather. In the sharing stage, the designs may be presented in the classroom, and the design receiving the most votes may be displayed on the classroom board (HB.2.5.1).

In the observation stage, based on the expression in the learning–teaching experiences stating that "direction is determined according to natural features such as the position of the Sun, moss, ant nests, and the North Star," students may be asked to examine the relationship between direction and the mentioned indicators. In the exploration stage, students may explore how these natural indicators help in determining direction. They may be supported in this exploration through a documentary. In the imitation stage, students may develop plans regarding what kind of design they can create for navigation by drawing inspiration from nature. In the design stage, they may be asked to create a compass or a similar navigation tool inspired by nature, and in the sharing stage, they may present their designs by organizing a classroom fair (HB.2.5.2).

In the observation stage, students may observe nature through documentaries or short videos and recognize the signs that occur before natural disasters. For example, they may examine the receding of water before a tsunami or unusual bird behavior before an earthquake, as well as the effects that occur during and after such disasters. In the exploration stage, they may be asked to find and record information regarding precautions that can be taken based on the occurrence of natural disasters. In the imitation stage, they may attempt to adapt these precautions to their own designs by drawing inspiration from nature. In the design stage, they may create a three-dimensional or pictorial design related to the identified precaution, and in the sharing stage, they may present their designs to their classmates at a fair (HB.2.5.3).

In the observation stage, students may examine the damage that occurs when resources are not used economically. For example, they may examine environmental damage such as the drying of lakes or the burning of forests resulting from inefficient use of resources. In the exploration stage, they may draw inferences about how such damage occurs and review their own behavior. In the imitation stage, they may draw inspiration from nature—for example,

how dried lakes begin to recover with rainfall—and consider what actions can be taken. In the design stage, they may create a design promoting economical resource use, and in the sharing stage, they may present their design in the classroom (HB.2.5.4).

The learning outcome in which the biomimicry technique can be used in the "Science, Technology, and Art" learning area of the Grade 2 life science course is presented in Table 8.

Table 8.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 2 "Science, Technology, and Art" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
Science, Technology and Art	HB.2.6.3. Identifies the place of art in daily life

In the learning–teaching applications of the learning outcome (HB.2.6.3.) within the "Science, Technology, and Art" learning area, students are expected to examine the place of art in daily life, to analyze materials and artworks from different branches of art, and to provide examples of reflections of art in daily life, such as the melody in a bird's song or the pattern formed by a drop of water encountered in nature. An example activity developed through the biomimicry technique is presented as follows:

In the observation stage, students may observe examples reflecting the presence of art in daily life, such as the melody in a bird's song or the pattern formed by a drop of water. In the exploration stage, they may discover in artworks that paintings and musical pieces are inspired by nature. In the imitation stage, they may select materials from nature that can be used in their artwork (such as leaf printing, potato printing, dried flowers, etc.). In the design stage, they may create a drawing using the selected materials, and in the sharing stage, they may exhibit their artwork in a classroom exhibition (HB.2.6.3).

Tables 9, 10, 11, and 12 present the applicability of the biomimicry technique in the learning areas included in the Grade 3 life science curriculum. It is observed that the biomimicry technique can be used in four of the learning areas and in five learning outcomes in the 2024 life science course curriculum. The learning outcomes and process components in which the biomimicry technique can be used in the "My Health and Safety" learning area of the Grade 3 life science course are presented in Table 9.

Table 9.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 3 "My Health and Safety" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
My Health and Safety	HB.3.2.3. Creates original products regarding the importance of obeying traffic rules a. Identifies the importance of obeying traffic rules b. Establishes a relationship between obeying traffic rules and safety c. Creates an original product regarding the importance of obeying traffic rules

In the learning outcome and process components of the "My Health and Safety" learning area (HB.3.2.3.), students are expected to create original products related to the importance of obeying traffic rules. The creation of original products is consistent with the stages of producing original outcomes through inspiration, as indicated in the biomimicry

technique. In the learning–teaching experiences, the explanation stating that "Students are expected to create original products related to the importance of obeying traffic rules" implies that inspiration may be drawn from nature during the product creation stage and that attention may be given to sustainable solutions. An example of an activity developed through the biomimicry technique is presented as follows:

In the observation stage, students may notice that fish schools in the sea, as part of nature, do not collide with one another while swimming. In the exploration stage, they may be asked to establish connections based on their prior knowledge regarding why this occurs. In the imitation stage, they may determine traffic rules inspired by nature. In the design stage, they may write these rules on a rules board they design and create a sign related to the rule. In the sharing stage, the rules may be discussed collectively in the classroom (HB.3.2.3).

The learning outcome in which the biomimicry technique can be used in the "My Place and My Country" learning area of the Grade 3 life science course is presented in Table 10

Table 10.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 3 "My Place and My Country" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
My Place and Country	HB.3.4.1. Recognizes the importance of protecting historical sites and natural beauties in the immediate surroundings

In the learning–teaching experiences of the learning outcome (HB.3.4.1.) within the "My Place and My Country" learning area, students are asked to examine the given examples regarding the importance of protecting historical sites such as museums, mosques, and castles, as well as natural beauties in their immediate surroundings. The importance of protecting seas and forests is emphasized. Natural beauties are part of nature, and since the biomimicry technique is grounded in nature, students may be encouraged to develop sustainable solution proposals by drawing inspiration from nature for the protection of the places mentioned in the explanation. This has led to the development of the following activity example:

In the observation stage, students may be taken on a field trip to observe historical sites and natural beauties in their immediate surroundings; subsequently, they may observe lotus flowers that repel water and dirt, as well as flexible and durable spider webs. In the exploration stage, based on their observations, they may generate ideas regarding how these sites can be protected. In the imitation stage, students may exchange ideas within their groups on how sustainable protection methods inspired by nature can be applied to historical sites and natural beauties. In the design stage, they may implement their ideas, and in the sharing stage, they may present their designs to others at a science and art fair (HB.3.4.1).

The learning outcomes and process components in which the biomimicry technique can be used in the "Nature and Environment" learning area of the Grade 3 life science course are presented in Table 11.

Table 11.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 3 "Nature and Environment" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
Nature and Environment	HB.3.5.1. Interprets the importance of natural entities for human life a. Examines examples of regarding the necessity of natural entities in human life. b. Expresses the impact of natural entities on human life in their own words.
	HB.3.5.3. Classifies what should be done in response to disasters a. Distinguishes actions to be taken before, during, and after a disaster.

In the learning outcome and process components of the "Nature and Environment" learning area (HB.3.5.1.), the importance, necessity, and impact of natural entities on life are stated. In the learning–teaching practices, students are expected to observe nature and examine the human position within nature. These statements are appropriate for the stages of the biomimicry technique, which should be grounded in nature. The biomimicry technique may assist students in observing nature and, by drawing inspiration from it, developing ways to protect natural entities. In the learning–teaching experience of HB.3.5.3, students are presented with educational content such as films, videos, animations, and infographics. It is stated that they are expected to prepare products containing the knowledge they have acquired regarding the topic. The emphasis on natural disasters within the learning outcome, process components, and learning–teaching experiences of HB.3.5.3 has enabled the use of the biomimicry technique and the development of an activity example. It is considered that the biomimicry technique will contribute to students' development of products related to sustainability and the protection of nature, as well as to raising awareness, within the specified learning outcomes and process components.

In the observation stage, it is suggested that students visit a farm to observe plants, bees, cows, chickens, and similar living beings. In the exploration stage, they may discover that plants produce oxygen for humans, bees produce honey, cows produce milk, and chickens lay eggs. In the imitation stage, based on what living beings in nature provide for humans, students may reflect on what humans can do for living beings in nature. They may recognize that plants require sunlight and water, bees require flowers, cows require grass, and chickens require feed, and they may be encouraged to generate corresponding design ideas. In the design stage, products may be designed that facilitate meeting the needs of living beings in nature. For example, they may design a mechanism that waters flowers or distributes feed to chickens at specific intervals. In the sharing stage, it is recommended that they present their designs and explain in their own words the impact of living beings in nature on human life (HB.3.5.1).

In the observation stage, students may examine crab shells, snail shells, and cacti, and it is suggested that they watch videos showing birds building nests and turtles retreating into their shells in response to danger. In the exploration stage, students may discover the impact resistance of crab and snail shells, the efficient water use of cacti, the durability of bird nests, and the protective function of turtle shells in the face of danger. In the imitation stage, students may watch videos and participate in drills regarding actions to be taken before, during, and after disasters. Subsequently, based on the living beings they observed, they may consider what actions can be taken in response to disasters. For example, similar to a turtle retreating into its

durable shell during an earthquake, they may attempt to adapt this idea into a product that can protect themselves and others during a disaster. In the design stage, they may design the product and present their designs to the AFAD teams visiting the school, and in the sharing stage, they may complete the process by testing their products during a simulation or drill (HB.3.5.3).

The learning outcomes and process components in which the biomimicry technique can be used in the "Science, Technology, and Art" learning area of the Grade 3 life science course are presented in Table 12.

Table 12.

Learning Outcomes Where the Biomimicry Technique Can Be Used in the Grade 3 "Science, Technology, and Art" Learning Area of the Life Science Course Curriculum

Learning area	Learning outcomes
Science, Technology and Art	HB.3.6.3. Collects information from given resources regarding artists' contributions to art a. Finds information regarding artists' contributions to art. b. Records information regarding artists' contributions to art.

In the learning–teaching experiences related to the learning outcome and process components (HB.3.6.3.) of the "Science, Technology, and Art" learning area, students are presented with educational content such as films, videos, animations, and infographics. It is stated that they are expected to prepare products containing the information they have acquired regarding the topic. Collecting information from given resources about artists' contributions to art is compatible with the stages of the biomimicry technique. Artists' creation of works inspired by nature and their presentation of art through musical instruments have enabled the development of the following activity example:

In the observation stage, students may first be asked to research artists and artworks in their immediate surroundings and subsequently in more distant contexts. In the exploration stage, artists' contributions to art are addressed, and students may examine the materials or musical instruments used by the artists. In the imitation stage, students may examine living beings in nature that inspire art or natural materials used in artistic production—for example, honeycombs built by bees, butterfly wings, nightingale songs, and musical instruments made from wood—and reflect these inspirations in their own designs. In the design stage, they may be asked to design these instruments or create drawings inspired by nature and using sustainable materials. In the sharing stage, it is recommended that exhibitions, musical performances, or science festivals be organized to present the designed instruments, thereby completing the sharing phase (HB.3.6.3).

Discussion and Conclusion

This study examined the usability of the biomimicry technique within the learning outcomes of the 2024 life science curriculum, based on its process components and learning–teaching experiences. The data obtained were tabulated by considering the learning outcomes together with their related process components, and learning–teaching applications were exemplified in accordance with the stages of the biomimicry technique. The findings indicate that the biomimicry technique can be applied to five learning outcomes in Grade 1, seven in Grade 2, and five in Grade 3. This distribution suggests that the number of learning outcomes

suitable for biomimicry demonstrates a relatively balanced pattern across grade levels. The life science course aims to enable children to recognize themselves and the objects in their surroundings, understand how to use them effectively, discover better ways of living, become aware of their natural and social environments, and comprehend environmental events (Şahin, 2009). In this context, identifying that biomimicry can be integrated into different grade levels and various learning outcomes demonstrates that the course framework supports an instructional approach that encourages students to observe nature, learn from natural systems, and interpret their surroundings meaningfully.

Among the examined learning areas, biomimicry was found to be most applicable within the "Nature and Environment" learning area, and least applicable within the "Me and My School," "My Place and My Country," and "Family and Society" learning areas. Furthermore, it was determined that no learning outcomes appropriate for biomimicry were identified in Grade 1 within the learning areas of "Me and My School," "My Place and My Country," and "Science, Technology, and Art"; in Grade 2 within "Family and Society" and "My Place and My Country"; and in Grade 3 within "Me and My School" and "Family and Society."

The high applicability of biomimicry in the "Nature and Environment" learning area can be explained by the strong alignment between the foundational principles of biomimicry and the objectives of this learning area. A core element of biomimicry is the observation of living organisms within their natural environments (Ergül, 2023). The content of the "Nature and Environment" learning area explicitly focuses on observing natural systems and environmental phenomena. According to Çoban and Coştu (2023), the first stage of biomimicry is observation. Within the curriculum framework, Grade 1 topics include observing nature and celestial bodies (Sun, Earth, Moon); Grade 2 topics include weather events and seasons, navigation using nature, disaster preparedness, and efficient resource use; and Grade 3 topics include actions before, during, and after disasters as well as environmental sustainability (MoNE, 2024). The instructional expectations associated with these topics such as observation, product development, data collection and classification, investigation, inquiry, curiosity, openness to new ideas, note-taking, inference, collecting examples from nature, and sharing ideas directly correspond to the stages of biomimicry (observe, explore, imitate, design, share). Bayram and Topbaş (2024) emphasize that humanity sustains its existence through the resources provided by nature. In this respect, the biomimicry technique, which systematically draws inspiration from natural systems to generate solutions, is pedagogically consistent with the aims of the life science course.

In Grade 2, particularly within the first two learning outcomes and their associated process components, students are expected to observe, investigate according to criteria, prepare products, and demonstrate curiosity, inquiry, and openness to new ideas. These expectations provide a suitable pedagogical framework for implementing biomimicry stages. Indeed, biomimicry seeks to develop creative solutions inspired by nature by integrating observation and design processes (Eryılmaz, 2015). Similarly, the third and fourth Grade 2 learning outcomes addressing natural disasters and efficient resource use align with biomimicry in that they focus on understanding nature's processes and generating solutions inspired by them. The emphasis on information gathering, recording, inference, and product

development in the curriculum corresponds particularly to the observe, explore, and design stages of biomimicry.

The first learning outcome of Grade 3, within the framework of its process components, emphasizes the importance, necessity, and impact of natural elements on life. An examination of the learning–teaching applications indicates that students are expected to observe nature, examine humanity's position within nature, collect examples from nature, and demonstrate curiosity by asking questions. These expectations are compatible with the stages of the biomimicry technique, which fundamentally originates from nature. By encouraging students to observe nature and draw inspiration from it, biomimicry can support efforts to protect natural entities. Indeed, Yakışan and Velioğlu (2019) define biomimicry as the study of nature to solve human problems by taking inspiration from or imitating the solution strategies of non-human living organisms under natural conditions. Within the learning–teaching applications associated with the third learning outcome of Grade 3, students are presented with educational content. They are also expected to prepare products and share their ideas, which enables the implementation of the design and share stages of the biomimicry technique. Therefore, the use of biomimicry within the learning outcomes and process components of the "Nature and Environment" learning area is considered likely to contribute to students' development of sustainability awareness and the creation of products aimed at protecting nature.

When the "My Health and Safety" learning area is examined, the Grade 1 topics include "healthy growth and development" and "personal space"; Grade 2 includes "protecting personal space boundaries"; and Grade 3 includes "traffic rules" (MoNE, 2024). The presence of instructional elements such as examination, educational content, questioning, case studies, inference, original product creation, and sharing within learning–teaching practices allows for the application of the five stages of the biomimicry technique as defined by Çoban and Coştu (2023). In today's rapidly changing and evolving world, the development of 21st-century skills is essential for health and safety. The explanations included in the 2024 curriculum aim to foster such skills. Kandemir et al. (2022) similarly argue that the biomimicry technique can support the development of 21st-century skills among students. Accordingly, the integration of biomimicry into the "My Health and Safety" learning area is considered important for enhancing its contribution to students' overall development.

In Grade 1, the first learning outcome and its process components are grounded in the concept of growth. Learning–teaching applications require students to examine given examples, and the use of documentaries and visual materials is specified. For the second learning outcome of Grade 1, an activity example is developed based on the idea that other living beings, like humans, have their own living spaces and boundaries. The presentation of case studies, digital content, and materials is requested in learning–teaching applications. These features are particularly suitable for the observation and exploration stages of biomimicry. Lesson content structured around case studies can be designed in accordance with the stages of the biomimicry technique. For the second learning outcome of Grade 2, students are expected to recognize the importance of protecting personal space boundaries, participate in activities, and analyze case studies related to the topic. The requirement to present case studies enables the application of biomimicry through nature-based examples. The third

learning outcome of Grade 3 within the "My Health and Safety" learning area expects students to create original products. The creation of original products corresponds directly to the design stage of the biomimicry technique. During this stage, activities may be developed that draw inspiration from nature and emphasize sustainable solutions.

Within the content framework of the "Science, Technology, and Art" learning area, the Grade 2 topic "The place of art in daily life" and the Grade 3 topic "Artists' contributions to art" (MoNE, 2024), together with instructional practices such as examination, listing, providing examples from daily life, gathering and recording information, presenting educational content, sharing, and product creation, create conditions that support the implementation of biomimicry. Students are expected to develop their understanding of science, technology, and art concepts. Avcı (2019) states that the widespread implementation of biomimicry-based design studies at all educational levels can transform children's perspectives on nature and strengthen their scientific, creative, and productive thinking skills. In this respect, it is considered that the biomimicry technique can enhance these competencies among students. Based on these considerations, activity examples related to the use of biomimicry in the "Science, Technology, and Art" learning area have been presented.

The third learning outcome of Grade 2, within its learning–teaching applications, includes examining the place of art in daily life and analyzing materials and artworks from different branches of art. Students are expected to provide examples of how art is reflected in daily life. These explanations enable the implementation of the biomimicry technique by drawing upon examples encountered in nature. Similarly, within the third learning outcome of Grade 3, students are provided with educational content and are expected to gather information, prepare products, and share their ideas. These instructional expectations facilitate the usability of the biomimicry technique. The fact that artists create works inspired by nature and present their art through musical instruments has enabled the development of relevant biomimicry-based activity examples.

When the "Family and Society" learning area is examined, it is observed that the biomimicry technique is applicable in one of the nine learning outcomes and its related process component. Within the content framework of this learning area, the Grade 1 topic "The Importance of Family" (MoNE, 2024), together with learning–teaching practices such as presenting educational content, examining examples, making inferences, and creating a family album, enables the implementation of biomimicry. Ergül (2023) states that biomimicry opens a powerful window that guides both children and adults toward creative and innovative solutions inspired by nature while enriching science education perspectives. Based on this view, incorporating family members into biomimicry-based activities may also foster adults' engagement with biomimicry and transform their perspectives on nature. In the present study, learning outcomes and process components were structured within the framework of the concept of nature, and a biomimicry activity example was developed based on the concept of family observed in animals.

In the "Me and My School" learning area, it was determined that biomimicry can be applied in one process component among eleven learning outcomes across Grades 1, 2, and 3. Within the Grade 2 content framework, the topic "Strengths and Areas for Development"

(MoNE, 2024), and the expectations related to decision-making, information gathering, generating alternatives, and evaluating options provide opportunities for implementing the stages of biomimicry. Furthermore, learning–teaching practices such as providing examples, examination, questioning, listing, and information gathering strengthen the applicability of biomimicry. Velioğlu and Yakışan (2024) emphasize that nature's developmental processes have inspired humans to generate solutions to encountered problems and have encouraged a renewed engagement with nature. Accordingly, the use of biomimicry may support students in modeling the continuous development observed in nature and applying it to their own personal growth.

Within the "My Place and My Country" learning area, biomimicry was found to be applicable in one of the fourteen learning outcomes across Grades 1, 2, and 3. Topics such as "Our country's form of government," "Mustafa Kemal Atatürk's personality traits," and "national unity and solidarity" are not directly compatible with the principles of biomimicry (MoNE, 2024). Avcı (2019) explains that biomimicry draws lessons from nature's forms, systems, processes, and cycles and applies this knowledge to develop environmentally sensitive, sustainable, and innovative solutions. Within this framework, the Grade 3 learning outcome related to "historical sites and natural beauties," together with instructional practices involving example analysis, educational content, curiosity, questioning, and product creation and presentation, allows for the implementation of biomimicry. In the learning–teaching application of HB.3.4.1, students are expected to examine examples related to the importance of protecting historical sites and natural beauties in their immediate environment, and emphasis is placed on protecting seas and forests. Since natural beauties constitute part of nature, students may be encouraged to develop sustainable solutions inspired by nature for the protection of such sites.

This study demonstrates that the biomimicry technique can be integrated into the life science course. The ultimate objective stated in the common framework text of the 2024 curriculum is to educate competent and virtuous individuals. Such individuals are expected to be inquisitive, productive, and capable of critical engagement. The holistic education approach emphasized in the common text highlights epistemological integrity (knowledge and wisdom), focusing on how knowledge is acquired and accessed. Students are expected to develop the ability to solve real-life problems and use knowledge to make sense of complex situations (MoNE, 2024). These characteristics of the intended student profile underscore the relevance of integrating biomimicry into learning outcomes and process components. Bayram and Topbaş (2024) emphasize the need for individuals capable of solving complex problems, understanding interdisciplinary relationships, and generating creative and innovative solutions. In this context, biomimicry-defined as developing solutions inspired by nature-gains increasing significance. Furthermore, according to Avcı (2019), nature is regarded in biomimicry as the most effective guide for problem-solving, innovation, and human advancement. Collectively, these considerations highlight the importance of incorporating biomimicry technique into the life science course.

Recommendations

This study identified the learning outcomes and process components within the 2024 life science curriculum in which the biomimicry technique can be implemented. It is recommended that biomimicry be integrated into the instruction of these identified learning outcomes and that the activity examples developed within the scope of this study be considered in classroom practice.

The "Nature and Environment" learning area was determined to be the domain in which biomimicry is most applicable. Future research may therefore focus on empirically examining the effectiveness of biomimicry-based instructional practices within this learning area.

While this study analyzed the applicability of biomimicry within the life science curriculum, future studies may investigate the applicability of other instructional techniques in life science, as well as examine the integration of biomimicry into the curricula of other subject areas.

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2024 Hayat Bilgisi Dersi Öğretim Programı'nda Biyomimikri Tekniği

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Özet

Biyomimikri (hayatı taklit etme) tekniği, doğadan ilham alarak tasarım geliştirme sürecini içermesinden dolayı öğrencilerin bilimsel süreç becerilerini kullanmasına, farklı disiplin alanlarından bilgiyi edinmesine, çevreye yönelik farkındalık kazanmasına olanak sağlayabilir. İlkokulun ilk üç yılında yer alan hayat bilgisi dersinin çocukların doğal ve toplumsal çevreye uyumu için gerekli olan bilgi, beceri, değer, tutum ve alışkanlıkların kazandırılmasında önemli bir rolü vardır. Hayat bilgisi dersinin içeriğinin bir bölümünü fen bilimlerinden alıyor olması, dersin doğa ile ilişkisini göstermektedir. Bu bağlamda hayat bilgisi dersinin öğrenme çıktılarında biyomimikri tekniğinden yararlanılabileceği düşünülmektedir. 2024 Hayat Bilgisi Dersi Öğretim Programı'nda yer alan öğrenme çıktılarının hangilerinde biyomimikri tekniğinden nasıl yararlanılabileceğinin belirlenmesi araştırmanın amacını oluşturmuştur. Çalışmada nitel araştırma yöntemi benimsenmiş ve doküman incelenmesi modeli kullanılmıştır. Araştırmanın veri kaynağını, 2024 Hayat Bilgisi Dersi Öğretim Programı oluşturmuş ve program doküman analizi adımları takip edilerek analiz edilmiştir. Araştırma sonucunda biyomimikri tekniğinin hayat bilgisi dersi 1., 2. ve 3. sınıf düzeyindeki öğrenme alanlarının tamamında kullanılabileceği belirlenmiştir. "Doğa ve Çevre" öğrenme alanı, biyomimikri tekniğinin en çok kullanılabileceği öğrenme alanıdır. Hayat bilgisi dersinin özellikle fen alanı ile ilgili öğrenme çıktılarında biyomimikri tekniğinden yararlanılması önerilebilir.

Anahtar Kelimeler: Hayat bilgisi dersi, öğretim programı, biyomimikri tekniği.

Giriş

Hayat bilgisi dersi ilkokullarda okutulan bir ders olmasının yanı sıra hayatın içinden ve günlük yaşam ile ilgili bir derstir. Bu ders, öğrencinin benliğini keşfetmesini, iyi vatandaş ve iyi insan olmasını sağlar. Yapılandırılmış bir öğretim programı çerçevesinde verilen hayat bilgisi dersi, çocukların gerçek yaşam durumlarını anlamalarına, karşılaşabilecekleri olası sorunları çözmelerine ve günlük yaşam için gerekli bilgi ve becerileri edinmelerine yardımcı olma konusunda çok önemli bir rol oynar (Turan, 2024). Hayat bilgisi dersinin kapsamını oluşturan insan, doğa ve toplum kavramları; topluma ilişkin sosyal bilimleri, doğaya ilişkin fen bilimlerini ve insana ilişkin sanat, düşünce ve değerleri kapsayan bütüncül bir yapıdan oluşmaktadır (Tay, 2017).

Hayat bilgisi dersinin kapsamında yer alan doğa boyutu ile ilgili konuların öğretiminde kullanılabilecek öğretim tekniklerinden biri biyomimikri olabilir. Biyomimikri, yaşamın taklit edilmesi anlamına gelmektedir. İnsanların günlük yaşamda karşılaştıkları problemleri çözmek amacıyla doğadan yararlanan, doğadaki insan dışı canlıların çözüm yollarını örnek alan ya da taklit eden bir yaklaşımdır (Yakışan & Velioğlu, 2019).

Biyomimikri tekniğinin yalnızca doğayı taklit etmekle kalmayıp aynı zamanda doğanın işleyiş felsefesini kavramayı, çevre dostu ve sürdürülebilir çözümler üretmeyi hedeflediği görülmektedir. Bu bağlamda biyomimikri tekniği, özellikle çevresel krizlerin yoğunlaştığı günümüzde, yenilikçi tasarımlar ve teknolojiler geliştirilmesinde önemli potansiyel taşıyabilir.

Biyomimikri tekniği beş aşamadan oluşan bir uygulamayı içermektedir. Çoban ve Coştu'ya (2023) göre bu aşamalar sırasıyla gözlemle, keşfet, taklit et, tasarla, paylaş aşamalarıdır.

Gözlemle: Öğrenciler, doğadaki canlıları ve sistemleri dikkatlice gözlemler. Yapılan inceleme birebir doğayı incelemek olduğu gibi teknolojik araçlar aracılığıyla incelemek de olabilir. Bu aşamada, canlıların yapı ve işlevleri arasındaki ilişkiler incelenir.

Keşfet: Gözlemler sonucunda elde edilen bilgilerle, doğadaki çözümler ve mekanizmalar keşfedilir. Bu aşamada doğanın karşılaştığı problemleri nasıl çözdüğü üzerinde durulur. Bir başka ifadeyle öğrenciler bağlantı kurar.

Taklit et: Problemin çözümü için doğadan ilham alınmasıdır. Keşfedilen doğal çözümler, insan yapımı sistemlere uyarlanır. Bu aşamada, doğadaki mekanizmaların teknik tasarımlara nasıl entegre edilebileceği üzerinde çalışılır.

Tasarla: Taklit edilen doğal prensipler doğrultusunda yeni ürünler veya sistemler tasarlanır. Bu aşamada, öğrenciler kendi tasarımlarını oluşturur ve prototipler geliştirir.

Paylaş: Geliştirilen tasarımlar ve elde edilen bilgiler başkalarıyla paylaşılır. Bu aşamada, öğrenciler projelerini sunar, geri bildirim alır ve toplulukla bilgi alışverişinde bulunur.

Biyomimikri tekniğinin uygulanmasının çeşitli avantajları ve sınırlılıkları bulunmaktadır. Değirmenci ve Çevik Kansu (2022) bu tekniğin öğrencilerin günlük yaşamda karşılaştıkları problemlere hayal güçlerini ve yaratıcılıklarını kullanarak doğadan ilham alan çözümler geliştirmelerini sağladığını, öğrencilerin çoklu zekâ alanlarını aktif biçimde kullanmalarına olanak tanıyarak bilişsel süreç becerilerini yapılandırmalarına katkı sunduğunu, ayrıca doğaya ve derse yönelik ilgi ve motivasyonun artmasını, buna bağlı olarak olumlu tutumların gelişmesini desteklediğini, biyomimikri tekniğinin öğrencilerin bilimsel süreç becerilerinin gelişimine katkı sağlarken alışılmış düşünce kalıplarının ötesine geçmelerine de imkân tandığını, farklı bilim disiplinlerini bütüncül bir yaklaşımla bir araya getirdiğini ve işbirlikli öğrenme yoluyla akran öğrenmesini, saygıyı, iletişim becerilerini ve özgüvenin gelişimini desteklediğini ifade etmişlerdir.

Biyomimikri tekniğinin sınırlılıkları, öğretim sürecinde ortaya çıkması muhtemel durumlar ve öğretmenin uygulamaya etkisi açısından değerlendirilebilmektedir. Kalabalık sınıflarda öğrenci profili çeşitliliğinin bazı öğrencilerde uyum sorunlarına yol açabilmesi, içerik seçiminin gelişim düzeylerine uygun yapılmaması hâlinde sınıf genelinde düzey farklılıklarının ortaya çıkması, uygulamanın zaman alıcı olması ve bazı öğrencilerin etkinliklere katılmak istememesi biyomimikri tekniğinin dezavantajları arasında yer almakta; bu durum öğretmenin etkili rehberlik sunmasını ve zamanı verimli kullanmasını gerekli kılmaktadır (Değirmenci & Çevik Kansu, 2022).

2024 Hayat Bilgisi Dersi Öğretim Programı beceri temelli program anlayışıyla hazırlanmıştır. Bu nedenle öğrenciler bilgileri ezberlemek yerine günlük hayatta karşılaşabilecekleri problemleri üst düzey düşünme gerçekleştirerek çözmelidir. Biyomimikri tekniğinin problemleri doğadan ilham alarak çözmeye çalışan bir teknik olması sebebiyle öğrencilere özellikle doğa ile ilgili konuların öğretiminde yardımcı olacağı düşünülmektedir. Alan yazınında hayat bilgisi dersi kapsamında biyomimikri tekniği ile ilgili çalışmanın yer almadığı görülmektedir. Bu bağlamda 2024 Hayat Bilgisi Dersi Öğretim Programı'nda biyomimikri tekniğinin hangi öğrenme çıktılarında nasıl kullanılabileceğini belirleme amacında olan bu çalışmanın özgün bir değer taşıdığı ve alan yazını için önemli olduğu düşünülmektedir. Araştırmanın amacı doğrultusunda "2024 Hayat Bilgisi Dersi Öğretim Programı'nın öğrenme çıktılarında biyomimikri tekniğinin kullanılabilme durumu nedir?" problemine yanıt aranmıştır.

Yöntem

Araştırma Deseni

2024 Hayat Bilgisi Dersi Öğretim Programı öğrenme çıktılarında biyomimikri tekniğinin uygulanabilirliğinin belirlenmesine yönelik yapılan bu çalışmada nitel araştırma yaklaşımı benimsenmiştir. Nitel araştırma; saha notları, gözlem, günlük notları, mülakatlar, yaşam öyküleri, eserler ve belgeler gibi nitel veri toplama teknikleri kullanarak olgu ve olayları gerçekçi ve bütüncül bir biçimde ele alan araştırma yaklaşımıdır (Cohen vd., 2007; Hoy & Adams, 2015). Nitekim bu araştırma, araştırması planlanan konular hakkında bilgi içeren yazılı ve sözlü materyallerin değerlendirildiği (Altunkaynak, 2020) nitel araştırma desenlerinden doküman inceleme yöntemi ile gerçekleştirilmiş ve yazılı bir materyal olan öğretim programında biyomimikri tekniğinin kullanılabilirliği incelenmiştir.

Veri Kaynağı

Araştırmanın veri kaynağını 2024 yılında yayımlanan "Hayat Bilgisi Dersi Öğretim Programı (1, 2 ve 3. Sınıflar)" oluşturmaktadır. Öğretim programında biyomimikri tekniğinin kullanılabilirliği programın öğrenme çıktıları odağında incelenmiş, öğrenme çıktıları kapsamında süreç bileşenleri ve öğrenme-öğretme yaşantıları da dikkate alınmıştır.

Veri Analizi

Araştırmanın bulguları doküman analizi kullanılarak analiz edilmiştir. Forster'a (1995; akt. Yıldırım & Şimşek, 2016) göre doküman analizi; dokümanlara ulaşma, orijinalliği kontrol etme, dokümanları anlama, veriyi analiz etme, veriyi kullanma olarak beş aşamada gerçekleşmektedir.

Dokümanlara ulaşma: Araştırmanın dokümanını 2024 Hayat Bilgisi Dersi Öğretim Programı oluşturmuştur. Dokümana Talim ve Terbiye Kurulu'nun resmî genel ağ sayfasından ulaşılmıştır.

Orijinalliği kontrol etme: Millî Eğitim Bakanlığı resmî sitesinden doküman olarak alınan 2024 Hayat Bilgisi Dersi Öğretim Programı'nın orijinal olduğu kabul edilmiştir.

Dokümanları anlama: Bu aşamada 2024 Hayat Bilgisi Dersi Öğretim Programı'nın öğrenme çıktıları, süreç bileşenleri ve öğrenme-öğretme yaşantıları, biyomimikri tekniğinin özellikleri dikkate alınarak incelenmiştir.

Veriyi analiz etme: Bir öğrenme çıktısının biyomimikri tekniğinin kullanımına uygunluğu değerlendirilirken ilgili öğrenme çıktısının süreç bileşenleri ve programda bu öğrenme çıktısına yönelik önerilen öğrenme-öğretme yaşantıları (temel kabuller, ön değerlendirme, köprü kurma, öğrenme-öğretme uygulamaları) da incelenmiştir. Oluşturulan etkinlik örnekleri bu çerçeve içerisinde oluşturulmuştur. Veriler; sınıf düzeyleri, öğrenme alanları, öğrenme çıktıları, süreç bileşenleri ve öğrenme-öğretme yaşantıları başlıkları altında kategorilere ayrılarak analiz edilmiştir. Verilerin analizinde açık yaklaşım benimsenmiştir. Yapılan analizlerin güvenirliğini sağlamak amacıyla araştırmacıların ayrı ayrı gerçekleştirdiği kodlamalar kendi kategorileriyle karşılaştırılmış ve free-marginal kappa katsayısı .94 olarak hesaplanmıştır. Bu değer güvenilirlik için yeterli kabul edilmektedir.

Veriyi kullanma: Analiz sonuçları her bir öğrenme çıktısı ve öğrenme-öğretme yaşantılarına denk gelecek şekilde kullanılmıştır. Bu yolla elde edilen bulgular tablolar yoluyla sunulmuştur. Öğrenme çıktıları, süreç bileşenleri ve öğrenme-öğretme yaşantıları ile ilgili atıflara yer verilmiştir.

Araştırmanın Etik İzinleri:

Bu çalışmada "Yükseköğretim Kurumları Bilimsel Araştırma ve Yayın Etiği Yönergesi" kapsamında uyulması gerektiği belirtilen tüm kurallara uyulmuştur. Yönergenin ikinci bölümü olan "Bilimsel Araştırma ve Yayın Etiğine Aykırı Eylemler" başlığı altında belirtilen eylemlerin hiçbiri gerçekleştirilmemiştir.

Etik Kurul İzin Bilgileri:

Araştırma, kamuya açık dokümanlarla gerçekleştirildiği için etik kurul onayı gerektirmemektedir.

Bulgular

2024 Hayat Bilgisi Dersi Öğretim Programı'nın 1, 2, 3. sınıf düzeyinde yer alan öğrenme alanları ve öğrenme çıktılarında biyomimikri tekniğinin kullanılabilirliği incelendiğinde "Doğa ve Çevre" ile "Sağlığım ve Güvenliğim" öğrenme alanlarının tüm sınıf düzeylerinde, "Bilim, Teknoloji ve Sanat" öğrenme alanının 2. sınıf düzeyinde ve "Ben ve Okulum", "Ailem ve Toplum", "Yaşadığım Yer ve Ülkem" öğrenme alanlarının 1. sınıf düzeyinde kullanılabilirliğine rastlanmıştır. Öğrenme çıktılarına bakıldığında biyomimikri tekniğinin kullanılabilirliğinin 1. sınıfta 23 öğrenme çıktısının beş tanesinde, 2. sınıfta 23 öğrenme çıktısının yedi tanesinde ve 3. sınıfta 20 öğrenme çıktısının beş tanesinde kullanılabileceği görülmüştür. 1, 2, 3. sınıf düzeyinde toplam 66 öğrenme çıktısının 17 tanesinde biyomimikri tekniğinin kullanılabilir olduğu görülmüştür.

2024 Hayat Bilgisi Dersi Öğretim Programı'nda biyomimikri tekniğinin 1. sınıfta beş öğrenme çıktısında kullanılabileceği görülmektedir. Biyomimikri tekniği "Doğa ve Çevre" ile "Sağlığım ve Güvenliğim" öğrenme alanlarının iki öğrenme çıktısında, "Ailem ve Toplum" öğrenme alanının bir öğrenme çıktısında uygulanabilirdir. Bununla birlikte "Ben ve Okulum",

"Yaşadığım Yer ve Ülkem" ve "Bilim, Teknoloji ve Sanat" öğrenme alanlarında ise biyomimikri tekniğinin kullanılabileceği uygun öğrenme çıktısı yer almamaktadır.

2024 Hayat Bilgisi Dersi Öğretim Programı'nda biyomimikri tekniğinin 2. sınıfta yedi öğrenme çıktısında kullanılabileceği görülmektedir. Biyomimikri tekniği "Doğa ve Çevre" öğrenme alanında dört öğrenme çıktısında, "Ben ve Okulum", "Sağlığım ve Güvenliğim" ve "Bilim, Teknoloji ve Sanat" öğrenme alanlarında bir öğrenme çıktısında yer bulmuştur. Bununla birlikte "Ailem ve Toplum" ile "Yaşadığım Yer ve Ülkem" öğrenme alanlarında ise biyomimikri tekniğinin kullanılabileceği uygun öğrenme çıktısı yer almamaktadır.

2024 Hayat Bilgisi Dersi Öğretim Programı'nda biyomimikri tekniğinin 3. sınıfta beş öğrenme çıktısında kullanılabileceği görülmektedir. Biyomimikri tekniği "Doğa ve Çevre" öğrenme alanında iki öğrenme çıktısında, "Sağlığım ve Güvenliğim", "Yaşadığım Yer ve Ülkem" ve "Bilim, Teknoloji ve Sanat" öğrenme alanlarında bir öğrenme çıktısında kullanılabilir durumdadır. Bununla birlikte "Ben ve Okulum" ile "Ailem ve Toplum" öğrenme alanlarında ise biyomimikri tekniğinin kullanılabileceği uygun öğrenme çıktısı yer almamaktadır.

"Sağlığım ve Güvenliğim" öğrenme alanına ait öğrenme çıktısında (HB.1.2.1.) tüm canlıların ortak özelliği olan büyüme kavramı temele alınmıştır. Öğrenme-öğretme yaşantılarında öğrencilerin yapması gerekenleri verilen örnekler üzerinden incelemeleri istenmiştir. Belgesel, görsel sunulması belirtilmiştir. Biyomimikri tekniği ile uyuşan öğrenme-öğretme yaşantılarından hareketle uygulama aşamaları oluşturulmuştur. Bir diğer öğrenme çıktısında (HB.1.2.2.) insanlar gibi diğer canlıların da kendi yaşam alanları ve sınırları olabileceği düşüncesinden yola çıkılarak etkinlik örneği oluşturulmuştur. Öğrenme-öğretme yaşantılarında konu ile ilgili çeşitli örnek olay sunulması, dijital içerikler, materyaller sunulması istenmiştir. Biyomimikri tekniği aşamalarından olan gözlemle ve keşfet aşamaları için uygun olduğu değerlendirilmiştir. Örnek olay üzerinden sunulması istenen ders içeriği biyomimikri tekniği aşamalarını içeren ders süreci ile hazırlanabilir.

"Ailem ve Toplum" öğrenme alanına ait öğrenme çıktısında (HB.1.3.1.) belirtilen ailenin önemini fark edebilme için biyomimikri tekniği kullanılabilir. Biyomimikri tekniğinde öğrencinin bilgiyi kendisinin fark etmesi sağlanır. Öğrenme çıktısında ve öğrenme-öğretme yaşantılarında kazandırılması hedeflenen unsurların doğa kavramı çerçevesinde şekillendiği, bu bağlamda hayvanlarda görülen aile kavramının etkinlik örneği olarak ele alınabileceği söylenebilir.

"Doğa ve Çevre" öğrenme alanına ait öğrenme çıktıları ve süreç bileşenlerinde yer alan doğa kavramı, öğrenme alanının adından da anlaşılacağı üzere, biyomimikri tekniğinin kullanılabilmesi için ideal bir zemindir. HB.1.5.1 öğrenme çıktısı ve süreç bileşenleri 2024 Hayat Bilgisi Dersi Öğretim Programı'nda belirtilen öğrenme-öğretme yaşantılarında öğrencilere doğadaki varlıkları gözlemleme, okul bahçesi ve yakın çevrede gözlem yapma fırsatı verilir. Öğrencilerden doğadaki varlıklara örnek vermeleri istenir. Not alma, resim çizme, fotoğraf çekme vb. ile veri toplanır. Veriler sınıflandırılır. Öğrencilerden ürün hazırlamaları istenir. Belirtilen bu açıklamalar biyomimikri tekniğinin tüm aşamalarına uyumludur. HB.1.5.2 öğrenme çıktısı ve süreç bileşenlerine ait öğrenme-öğretme yaşantısında kısa film, belgesel, fotoğraf, görseller gibi eğitici içerikler ile sunulması, ürün hazırlamaları

istenir. Süreç bileşenlerinde gök cisimlerini inceleme ile özelliklerini, benzerlik ve farklılıklarını listeme vardır. Verilen öğrenme çıktıları (HB.1.5.1. ve HB.1.5.2.) canlıların ve doğanın gözlemlenmesini sağladığından dolayı etkinlik örneği oluşturulmuştur.

2024 Hayat Bilgisi Dersi Öğretim Programı'nda yer alan 2. sınıf öğrenme alanlarının dört tanesinde ve yedi öğrenme çıktısında biyomimikri tekniğinin kullanılabileceği görülmektedir. "Ben ve Okulum" öğrenme alanının öğrenme çıktısı ve süreç bileşenleri (HB.2.1.2.) kapsamında öğrencilerden konu ile ilgili ulaşabildikleri kitap, belgesel gibi kaynakları incelemeleri istenir, hayvanların güçlü ve belirgin özelliklerinden yola çıkılarak biyomimikri tekniği etkinlik örneği sunulur.

"Sağlığım ve Güvenliğim" öğrenme alanının öğrenme çıktısına ilişkin (HB.2.2.2) öğrenme-öğretme yaşantılarında kişisel alan sınırlarını korumanın önemini fark etmeleri, etkinlikler yaptırılması, öğrencilere konu ile ilgili örnek olaylar sunulması istenir. Örnek olaylar sunulması istenmesi biyomimikri tekniğinin doğa örnekleri üzerinden uygulanmasına olanak sağlar.

"Doğa ve Çevre" öğrenme alanındaki öğrenme çıktılarının ve süreç bileşenlerinin (HB.2.5.1 ve HB.2.5.2) öğrenme-öğretme yaşantılarında öğrencilerin gözlem yapmalarının sağlanması söylenir. Gözlemlerini not tutmaları, kriterlere göre inceleme yapmaları istenir. Araştırmacı, sorgulayıcı olmaları söylenir. Verilen bu açıklama biyomimikri tekniği aşamalarının uygulanmasını sağlamaktadır. Ayrıca öğrenme çıktısında verilen hava olayları, mevsimler ve doğadan yararlanarak yön bulma biyomimikri tekniğinin doğa kavramı ile ilişkilidir. HB.2.5.3 ve HB.2.5.4 öğrenme çıktıları ve süreç bileşenlerinde belirtilen doğal afetler ve kaynakların tasarruflu kullanılması doğanın sundukları ile etkilerini içeren öğrenme çıktılarıdır. Ayrıca öğrenme çıktısının açıklamasında belirtilen ürün oluşturma biyomimikri tekniğinin tasarla aşamasına uygundur.

"Bilim, Teknoloji ve Sanat" öğrenme alanının öğrenme çıktısının (HB.2.6.3.) öğrenme-öğretme yaşantılarında sanatın günlük yaşamdaki yerini inceleme, farklı sanat dallarına ait materyal, sanat eseri incelemeden bahsedilir ve sanatın günlük yaşamdaki yerinde yaşadığımız doğada karşımıza çıkan bir kuş sesindeki melodi, bir damlanın oluşturduğu desen gibi sanatın günlük yaşamdaki yansımalarına örnekler vermeleri beklenir.

3. sınıf Hayat Bilgisi Dersi Öğretim Programı'nda yer alan öğrenme alanlarının dört tanesinde ve beş öğrenme çıktısında biyomimikri tekniğinin kullanılabileceği görülmektedir. "Sağlığım ve Güvenliğim" öğrenme alanına ait öğrenme çıktısı ve süreç bileşenlerinde (HB.3.2.3.) öğrencilerden trafik kurallarına uymanın önemine ilişkin özgün ürünler oluşturabilmesi beklenir. Özgün ürünler oluşturması biyomimikri tekniği aşamalarında belirtilen ilham alarak özgün ürünler oluşturma aşamalarına uygundur. Öğrenme-öğretme yaşantılarında "Öğrencilerden trafik kurallarına uymanın önemine ilişkin özgün ürünler oluşturabilmeleri beklenir." açıklamasında yer alan ürün oluşturma aşamasında doğadan ilham alınması beklenir ve sürdürülebilir çözümlere dikkat çekilir.

"Yaşadığım Yer ve Ülkem" öğrenme alanına ait öğrenme çıktısının (HB.3.4.1.) öğrenme-öğretme yaşantılarında "Yakın çevresindeki müze, cami, kale gibi tarihi mekân ve doğal güzelliklerin korunmasının önemine ilişkin verilen örnekleri incelemeleri istenir.

Denizlerimizin ve ormanlarımızın korunmasının önemi üzerinde durulur." açıklaması yer almaktadır. Doğal güzellikler doğanın bir parçasıdır. Biyomimikri tekniğinin doğayı temele alması, açıklamada yer alan mekânların/yerlerin korunması için doğadan ilham alınarak ve sürdürülebilir çözüm önerisi oluşturmaları istenebilir.

"Doğa ve Çevre" öğrenme alanına ait öğrenme çıktısı ve süreç bileşenlerinde (HB.3.5.1.) doğadaki varlıkların önemi, gerekliliği ve yaşama etkisi belirtilmiştir. Öğrenme-öğretme yaşantılarında doğanın gözlemlenmesi ve insanın doğa içindeki konumunun incelenmesi beklenmektedir. Belirtilen bu ifadeler doğadan yola çıkması gereken biyomimikri tekniği aşamaları için uygundur. Öğrencilerin doğayı gözlemlemelerinde, buradan ilham alarak doğadaki varlıkları korumak için de biyomimikri tekniği yardımcı olabilir. HB.3.5.3 öğrenme çıktısının öğrenme-öğretme uygulamalarında öğrencilere film, video, animasyon, infografik gibi eğitici içerikler sunulur. Konuya ilişkin edinilen bilgilerin yer aldığı ürünler hazırlamaları istendiği belirtilir. HB.3.5.3 öğrenme çıktısı, süreç bileşenleri ve öğrenme-öğretme yaşantılarında doğal afetler üzerine durulması biyomimikri tekniğinin kullanılmasını ve etkinlik örneği oluşturulmasını sağlamıştır.

"Bilim, Teknoloji ve Sanat" öğrenme alanına ait öğrenme çıktısı ve süreç bileşenlerinin (HB.3.6.3.) öğrenme-öğretme yaşantılarında öğrencilere film, video, animasyon, infografik gibi eğitici içerikler sunulur. Konuya ilişkin edinilen bilgilerin yer aldığı ürünler hazırlamaları istendiği belirtilir. Sanatçıların sanata katkılarına yönelik verilen kaynaklardan bilgi toplayabilme biyomimikri tekniğinin aşamalarına uygundur. Sanatçıların doğadan ilham alarak oluşturdukları eserlerden, müzik aletleri aracılığı ile sanatını sunmaları etkinlik örneği oluşturulmasına imkân tanımıştır.

Tartışma ve Sonuç

Bu araştırmada 2024 Hayat Bilgisi Dersi Öğretim Programı süreç bileşenleri ve öğrenme-öğretme yaşantılarından hareketle öğrenme çıktılarında biyomimikri tekniğinin kullanılabilirliği araştırılmıştır. Toplanan veriler öğrenme çıktıları ile süreç bileşenleri dikkate alınarak tablolaştırılmış ve öğrenme-öğretme uygulamaları biyomimikri tekniği aşamalarına uygun örneklendirilmiştir. 1. sınıfta beş, 2. sınıfta yedi ve 3. sınıfta beş öğrenme çıktısında biyomimikri tekniğinin kullanılabileceği belirlenmiştir. Buradan hareketle öğretim programında biyomimikri tekniğinin kullanılabileceği öğrenme çıktısı sayılarının sınıf düzeylerine göre dengeli bir dağılım gösterdiği söylenebilir. Hayat bilgisi dersi çocuğun kendisini, çevresindeki eşyaları tanıyıp nasıl kullanacağını bilmesi, daha iyi yaşama yollarını keşfetmesi, içinde bulunduğu doğal ve toplumsal çevrenin farkına varması ile çevreyi ve çevrede meydana gelen olayları anlamasını amaçlar (Şahin, 2009). Bu doğrultuda, biyomimikri tekniğinin öğretim programındaki farklı sınıf düzeylerinde ve çeşitli öğrenme çıktılarında kullanılabilir olduğunun belirlenmesi, hayat bilgisi dersinin öğrencinin doğal çevreyi gözlemleme, doğadan öğrenme ve çevresini anlamlandırma amacını destekleyen bir öğretim yaklaşımı sunduğunu göstermektedir.

İncelenen öğrenme alanlarında biyomimikri tekniğinin en çok "Doğa ve Çevre"; en az "Ben ve Okulum", "Yaşadığım Yer ve Ülkem" ve "Ailem ve Toplum" öğrenme alanlarında kullanılabilir olduğu görülmüştür. Buna ek olarak; 1. sınıf Hayat Bilgisi Dersi Öğretim

Programı'nda "Ben ve Okulum", "Yaşadığım Yer ve Ülkem" ve "Bilim, Teknoloji ve Sanat"; 2. sınıfta "Ailem ve Toplum" ve "Yaşadığım Yer ve Ülkem"; 3. sınıfta ise "Ben ve Okulum" ve "Ailem ve Toplum" öğrenme alanlarında biyomimikri tekniğinin kullanılabileceği öğrenme çıktısının olmadığı tespit edilmiştir. İncelenen öğrenme alanlarında biyomimikri tekniğinin en çok "Doğa ve Çevre" öğrenme alanında kullanılabilir olduğunun belirlenmesi, biyomimikrinin doğası ile hayat bilgisi dersinin bu öğrenme alanının amaçları arasındaki güçlü uyumla açıklanabilir. Nitekim biyomimikri tekniğinin yapı taşlarından biri, canlıların doğal ortamlarında gözlenmesidir (Ergül, 2023). "Doğa ve Çevre" öğrenme alanı konuları dikkate alındığında canlıların doğal ortamlarının konu edinildiği ve öğrenme içeriğinin bu ortamları gözleme ile ilgili olduğu görülmektedir. Çoban ve Coştu'ya (2023) göre biyomimikri tekniğinin ilk aşaması gözlemle aşamasıdır. "Doğa ve Çevre" öğrenme alanının içerik çerçevesinde 1. sınıfta "doğayı gözlemleme, gök cisimleri -güneş, dünya, ay-", 2. sınıfta "hava olayları ve mevsimler, doğadan yararlanarak yön bulma, afetlere karşı alınacak önlemler, kaynakları tasarruflu kullanma" ve 3. sınıfta "afet öncesi-sırası ve sonrasında yapılması gerekenler, çevresel sürdürülebilirlik" konuları yer almaktadır (Millî Eğitim Bakanlığı [MEB], 2024). Söz konusu konuların öğretiminde gözlem, ürün hazırlama, veri toplama, veri sınıflandırma, eğitici içerikler, listeleme, sorgulayıcı olma, inceleme, araştırmacı olma, çeşitli fikir ve yeni bilgilere açık olma, merak duyma, bilgi toplayabilme ve kaydetme, not alma, çıkarımda bulunma, doğadan örnek toplama, sınıflandırma ve fikirlerini paylaşma gibi unsurların varlığından dolayı biyomimikri tekniğinden yararlanabilir. Bayram ve Topbaş (2024) insanlığın varlığını doğanın sunduğu kaynaklara bağlı olarak sürdürdüğünü ifade etmektedir. Doğa kavramına ulaşmada en etkili tekniklerden biri olan biyomimikri tekniğinin tüm aşamaları (Gözlemle, keşfet, taklit et, tasarla, paylaş) bu açıklama ile uyumludur.

"Sağlığım ve Güvenliğim" öğrenme alanı incelendiğinde söz konusu öğrenme alanında birinci sınıfta "sağlıklı büyüme ve gelişme, kişisel alan", ikinci sınıfta "kişisel alan sınırlarını koruma" ve üçüncü sınıfta "trafik kuralları" konularından bahsedilmiştir (MEB, 2024). Öğrenme alanının içeriğinde yer alan öğrenme-öğretme uygulamalarında inceleme, eğitici içerikler, sorular sorma, örnek olay, çıkarım yapma, özgün ürünler oluşturma, paylaşma ifadelerine yer veriliyor olması, biyomimikri tekniğinin Çoban ve Coştu'nun (2023) belirttiği beş aşamasında kullanılabilmesini sağlamıştır.

"Bilim, Teknoloji ve Sanat" öğrenme alanının içerik çerçevesinde ikinci sınıfta "sanatın günlük yaşamdaki yeri" ve üçüncü sınıfta "sanatçıların sanata katkısı" konularından bahsedilmesi (MEB, 2024) ve söz konusu konuların öğrenme-öğretme uygulamalarında inceleme, listeleme, günlük yaşamdan örnek, bilgi toplama, eğitici içerikler, paylaşma, bilgi kaydetme, ürünler oluşturma ifadelerine yer veriyor olması ve öğrencilerden bilim, teknoloji, sanat kavramlarının gelişiminin istenmesi biyomimikri tekniğinin kullanımına olanak sağlamıştır.

"Ailem ve Toplum" öğrenme alanı incelendiğinde dokuz öğrenme çıktısı ile süreç bileşenlerinden bir tanesinde biyomimikri tekniğinin kullanılabilirliği görülmektedir. Bahsedilen öğrenme alanının içerik çerçevesinde birinci sınıfta "ailenin önemi" konusundan bahsedilmesi ve söz konusu konuların öğrenme-öğretme uygulamalarında eğitici içerikler,

örnek inceleme, çıkarım yapma, aile albümü oluşturma ifadelerine yer veriyor olması (MEB, 2024) biyomimikri tekniğinin uygulanabilmesini sağlamıştır.

"Ben ve Okulum" öğrenme alanında biyomimikri tekniğinin 1, 2 ve 3. sınıfa ait 11 öğrenme çıktısı ile süreç bileşenlerinin bir tanesinde kullanılabilir olduğu tespit edilmiştir. Öğrenme alanının içerik çerçevesinde ikinci sınıfta "güçlü ve gelişime açık alanlar" konusundan bahsedilmesi ve öğrenme çıktısı ile süreç bileşenlerinde ifade edilen güçlü ve gelişime açık olduğu alanlar ile ilgili karar verme, bilgi toplama, seçenekler oluşturma ve değerlendirme (MEB, 2024) biyomimikri tekniğinin aşamalarının uygulanabilmesini sağlamıştır.

"Yaşadığım Yer ve Ülkem" öğrenme alanında 1, 2 ve 3. sınıf düzeyinde 14 öğrenme çıktısının bir tanesinde biyomimikri tekniği kullanılabilmektedir. Öğrenme alanının içerik çerçevesinde "ülkemizin yönetim şekli", "Mustafa Kemal Atatürk'ün kişilik özellikleri", "millî birlik ve beraberlik" konularından bahsedilmesi biyomimikri tekniğinin uygulanması için uygun değildir (MEB, 2024). 3. sınıf 1. öğrenme çıktısı ile süreç bileşenleri "tarihî mekân ve doğal güzellikler" konusu ve öğrenme-öğretme uygulamalarında örnek inceleme, eğitici içerikler, merak, sorular sorma, ürünler oluşturma-sunma ifadelerine yer veriliyor olması biyomimikri tekniğinin uygulanabilirliğini sağlamıştır.

Bu çalışma, biyomimikri tekniğinin hayat bilgisi dersinde kullanılabilir olduğunu göstermektir. 2024 yılı öğretim programlarının ortak metninde belirtilen nihai hedef, yetkin ve erdemli insanlar yetiştirmektir. Yetkin ve erdemli insanın sorgulayıcı ve üretken olması beklenmektedir. Bütüncül eğitim anlayışı benimseyen ortak metinde, öğrenci profiline temel oluşturan epistemolojik bütünlük (bilgi ve bilgelik) bilginin nasıl öğrenileceği, nasıl erişilebileceği ile ilgilidir. Öğrencilerin günlük hayatta karşılaştıkları problemlere çözüm bulma, karmaşık durumları anlamlandırmak için bilgiyi kullanabilme becerisi kazandırmaya yol açar (MEB, 2024). Ortak metinde bahsedilen öğrenci profili içerisinde yer alan bu ifadeler biyomimikri tekniğinin öğrenme çıktıları ile süreç bileşenlerinde kullanılmasının önemini arttırmıştır. Nitekim Bayram ve Topbaş (2024) günümüzde ve gelecekte karmaşık problemleri çözebilen, disiplinler arası ilişkileri anlayabilen, yaratıcı ve yenilikçi çözümler üretebilen insanlara ihtiyaç olduğunu ve bu bağlamda doğadan ilham alarak çözümler geliştirebilme olarak bilinen biyomimikri kavramının öneminin ortaya çıktığını belirtmektedirler. Ayrıca biyomimikriye göre doğa hem problem çözmede hem de yeni bir şey üretmekte ya da var olanı geliştirme konusunda insanlık için, insanlığın ilerleyebilmesi için en iyi, en etkili kılavuz olarak görülmektedir (Avcı, 2019). Tüm bunların biyomimikri tekniğinin hayat bilgisi dersinde kullanılmasının önemini işaret ettiği söylenebilir.

Öneriler

Bu çalışmada 2024 Hayat Bilgisi Dersi Öğretim Program'ında biyomimikri tekniğinin kullanılabileceği öğrenme çıktıları ile süreç bileşenleri belirlenmiştir. Söz konusu öğrenme çıktılarının öğretiminde biyomimikri tekniğinin kullanılması ve bu araştırma kapsamında oluşturulan etkinlik örneklerinin dikkate alınması önerilmektedir.

Doğa ve Çevre öğrenme alanı biyomimikri tekniğinin en çok kullanılabilir olduğu öğrenme alanı olarak tespit edilmiştir. Bu öğrenme alanında biyomimikri tekniğinin etkisi araştırma konusu edilebilir.

Hayat Bilgisi Dersi Öğretim Program'ında biyomimikri tekniğinin kullanılabilirliği analiz edilmiştir. Bu bağlamda yapılacak çalışmalarda farklı tekniklerin hayat bilgisi dersinde kullanılabilirliği ve farklı derslerin öğretim programlarında da biyomimikri tekniğinin kullanılabilirliği araştırması konusu edilebilir.