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An Examination of the Activity Stations in the 5th Grade Science Textbook

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Abstract

This study aims to examine the activity stations in the 5th-grade science textbook, prepared in accordance with the "Türkiye Century Education Model" curriculum implemented in 2024. The research focuses on the distribution of these activities across units, their alignment with learning outcomes, material accessibility, safety measures, and digital content integration. Using document analysis, a qualitative research method, 72 activity stations in the textbook were analyzed. Data were interpreted using descriptive analysis. The results show that the activities are fully aligned with the curriculum's learning outcomes and encourage active learning. Although the distribution across units varies, most necessary materials are easily accessible and pose a low safety risk; sufficient warnings are provided for specific experiments. However, the study also determined the extent of digital technology integration, as only 16.6% of the activity stations were supported by QR codes. In conclusion, it is recommended that activities be conducted as intended by the program by teachers and students, that safety precautions be observed, and that future textbook designs increase the prevalence of digital content to encourage hybrid learning environments and further develop students' digital skills alongside scientific inquiry.

Keywords: Science education, textbook analysis, activity stations, Türkiye Century Education Model, document analysis.

Introduction

The rapid scientific and technological advancements of today have brought about significant transformations in all areas of life, including education. Consequently, the ideal profile of the individual to be educated has also changed (Yıldırım & Çalışkan, 2024). In line with this change, the aim is to educate students as individuals who know how to access information, effectively utilize scientific process skills, and adapt to the digital transformation process (Terzi & Yenice, 2024). These skills, defined as 21st-century skills, include important behavioral patterns that help students find solutions to significant global problems, become effective citizens, and shape their careers (Ahonen & Kinnunen, 2015; Berg et al., 2021; Ceran, 2021; Çıtlak, 2024).

21st-century skills ensure the development of individuals who can adapt to change, solve problems through research, approach events from different perspectives, acquire digital skills, and are socially integrated (Çiftçi et al., 2021; Gündüz, 2023). Therefore, it is necessary to adapt 21st-century skills to the curriculum and teaching methods (Mahmud & Wong, 2022). Science education, by its nature and content, plays an important role in equipping students with 21st-century skills (Kaplan et al., 2024). Indeed, developed countries, in particular, place great importance on integrating 21st-century skills into science education programs (Şaşmaz-Ören et al., 2025). Therefore, students need to develop life and career skills such as flexibility and adaptability, self-management and entrepreneurship, social and cultural skills, leadership and social responsibility, productivity and accountability; and learning and innovation skills such as critical thinking, creative thinking, collaboration, problem-solving, and communication. In order for students to acquire information, media, and technology skills, a skills-based and activity-oriented teaching process is needed (Deniz & İzci, 2025). It is understood that the 21st Century Education Model implemented in Türkiye was designed by focusing on these skills that are sought to be instilled in students all over the world, and that it

aims to integrate 21st-century competencies into the new curriculum (Ministry of National Education [MoNE], 2024a).

An examination of the Science Curriculum, developed in 2024 based on the Türkiye Century Education Model, reveals an objective to cultivate students as inquiring individuals who collaborate effectively, demonstrate sensitivity to environmental issues, and internalize scientific attitudes and behaviors (MoNE, 2024b). The fundamental mission of the educational system is articulated as fostering individuals with sound judgment, moral integrity, and aesthetic refinement (MoNE, 2023). Consequently, it is understood that the curriculum adopts an approach centered on the integration of scientific knowledge with universal moral and national/cultural values. In alignment with these overarching goals, targeted activities have been designed to equip students with the competencies necessitated by the modern era (MoNE, 2024a). Within the science textbook, these activities are observed to be structured through station-based themes.

Science lessons support fundamental process components such as observation, comparison, classification, measurement, communication, using number/spatial relationships, data collection and recording; and causal process skills such as prediction, inference, identification of variables, interpretation of data, and drawing conclusions. Furthermore, experimental process skills such as hypothesis formulation, data utilization, experimentation, variable control, and decision-making are also included in the curriculum (Bayır & Kahveci, 2022). Students who acquire these scientific process skills are able to analyze problems and events in detail (Göktaş, 2024). Experiments and activities conducted in science lessons help students acquire scientific process skills, establish connections between learned information and daily life, and transfer knowledge to different situations (Anılan et al., 2020; Asa & Çalış, 2024; Capp, 2009; Nasırlı et al., 2019).

For students to become competent individuals who will shape the future, they need to have real learning experiences that will increase their self-confidence and self-esteem and improve their skills (Husain, 2023). In this context, experimental methods and activities that offer learning by doing come to the forefront. The information gained through experimentation helps students understand cause-and-effect relationships, interpret information, and draw conclusions. In addition, conducting experiments and activities allows students to learn while having fun (Eyecioğlu & Yeşilyurt, 2021). Experiments and activities help students improve their academic achievement levels, ensure the retention of learned information, and develop positive attitudes towards the lesson (İslamoğlu, 2023; Uyanık, 2018).

Science lessons can be conducted in traditional physical learning environments such as classrooms, laboratories, and workshops, or in virtual learning environments. Virtual reality and augmented reality-based online, social, and out-of-classroom learning environments can be utilized to ensure the holistic development of students (MoNE, 2025). Since the materials and learning environment used in the lesson are effective in the development of students' scientific literacy skills (Elma, 2024), these learning environments should be prepared in a way that is appropriate to the developmental characteristics, learning styles, and curriculum of the students (MoNE, 2025). Activities that are suitable for the individual characteristics and learning speeds of the students help increase their interest in the lesson (Çelik, 2024).

Activities carried out taking into account the learning styles of the students contribute to both the increase in the level of academic achievement and the development of students' self-efficacy perceptions (Aslan, 2024). However, it is an undeniable fact that not every school has the same physical conditions and educational materials. In this context, the materials to be used in the planned activities must be easily accessible and applicable. Indeed, the lack of sufficient laboratory equipment in schools, insufficient materials to be used in activities, and teachers' safety concerns are among the situations that hinder the conduct of experiments and activities (Ak, 2024; Kaya, 2025; Keskin & Güneysu, 2023; Timur et al., 2014).

Taking the necessary safety precautions in experiments and activities conducted in lessons is of great importance. Indeed, many experimental accidents with serious consequences have been recorded in Türkiye (Tepe & Tekbıyık, 2019). Therefore, the applications to be carried out in the activities included in textbooks must be appropriate to the age and developmental characteristics of the students. In addition, it is essential that students are made aware of this issue and that the necessary safety precautions are taken in the learning environment (Akkuzu-Güven & Uyulgan, 2022; Tepe, 2019).

One of the obstacles to conducting experiments and activities is the inadequacy of laboratories and materials to be used in the activity. In these cases, experiments can also be carried out digitally (Eyecioğlu & Yeşilyurt, 2021). It has been determined that educational environments enriched with information technologies have a positive effect on academic achievement, retention of learned information, student motivation, and attitude towards the subject in science lessons (İdin & Aydoğdu, 2021; Ramaila & Molwele, 2022). In addition, educational environments enriched with digital technologies also have positive effects on students' concept development process. These digital educational environments, which extend learning opportunities beyond the classroom, also help students develop independent learning habits (Alp, 2023; Kalyani, 2024).

In line with the opportunities and requirements provided by digital technologies in educational settings, the 2024 curricula have been designed with a skill- and value-oriented approach that also encompasses digital competencies (Kosalı, 2025). The new curricula aim to foster students' 21st-century skills, including technological literacy and digital integration (MoNE, 2025). Textbooks also play a crucial role in cultivating these 21st-century skills among students (Gezer, 2022). Therefore, textbooks and learning environments must be revised in accordance with the competencies demanded by the modern era (Altay, 2022). However, critical aspects that warrant investigation within the newly developed textbooks include the alignment of experiments and activities with learning outcomes, their practical feasibility, the potential safety risks posed by the materials used, and their integration with essential digital content connections.

A review of the relevant literature reveals that no study has yet examined the activity stations in the 5th-grade science textbook prepared in accordance with the curriculum published in 2024. No research has been found that examines the suitability of the activity stations in the 5th-grade science textbook to learning outcomes, the appropriateness of the materials, the integration of digital content and technology, and the safety aspects. In this context, it can be stated that this research will make significant contributions to the relevant

literature. The findings obtained within the scope of the research will support the preparation of higher-quality textbooks by examining a significant portion of the 5th-grade science textbook, consisting of 72 activities, prepared in 2024. Furthermore, it will help increase teachers' awareness of the elements that should be considered during the implementation of experiments and activities.

This study aims to examine the activity stations within the 5th-grade science textbook, prepared in accordance with the "Türkiye Century Education Model", in terms of their distribution across textbook books (Book 1 and Book 2) and units, alignment with learning outcomes, material availability and safety precautions, as well as digital content and technology integration. To achieve this objective, the study sought answers to the following research questions:

1. How are the activity stations distributed across units and textbook books (Book 1 and Book 2)?
2. For which learning outcomes are the activity stations in the 5th-grade science textbook designed?
3. What is the availability of materials used in the activity stations and what are the necessary safety precautions for the laboratory?
4. What is the usage status and purpose of the digital content links included in the activity stations?

In this study, the selection of the sub-questions presented above was guided by the vision introduced by the Türkiye Century Education Model, which came into effect in 2024, and the implementation barriers emphasized in previous literature. To comprehensively reveal how the activity- and skill-oriented approach envisioned by the new curriculum is reflected in textbooks in practice, to identify chronic field problems such as material availability and safety, and to measure digital transformation integration, these four core dimensions were established as critical investigation areas.

Method

Research Model

In this research, the document review, one of the qualitative research methods, was used because the activity stations in the 5th grade science textbook were examined. Document analysis is based on the systematic examination and interpretation of the sources from which data will be collected (Yıldırım & Şimşek, 2021). Document analysis provides the opportunity to perform descriptive analysis, content analysis, and thematic analysis (Özkan, 2019). In this research, the document analysis method was needed because it was necessary to examine certain sections (activity stations) of a textbook, to digitize, code, organize, and categorize some data in order to present it effectively to the reader.

Data Source

In this study, the 5th grade science textbook, approved by the Board of Education and Training and used in middle schools and Imam Hatip middle schools from the 2024-2025 academic year onwards, was examined as the data source. The bibliographic information of the examined book is as follows:

Aydın, A., Kardeş, H., Sarıkavak, İ., Canan, L. N., Topak, M. E., Yılmaz, S., & Bağcı, Y. M. (2024). *5th grade science textbook (book 1 and book 2)*. MoNE.

When the textbook was examined, it was seen that it consists of two books (1 and 2) and seven units (three units in the first book, four units in the second book). It was also determined that the textbook is organized in the following stations:

1. Pre-assessment station
2. Preparation station
3. Curiosity station
4. Performance station
5. Bridge station
6. **Activity station**
7. Information station
8. End of chapter station
9. Research station
10. Reinforcement station

When the stations in the textbook are examined, it is seen that they are structured as 10 different stations. In this study, the "Activity Station" texts were examined. In this research, the Activity Station texts in the specified textbook were taken as the data source.

Data Collection Process

The 5th-grade science textbook examined in this study was downloaded from the MoNE's Educational Information Network [EBA] and a physical copy of the book was also obtained from a school affiliated with the MoNE. Both the electronic and physical copies of the book were examined by two researchers (a science education specialist and an educational programs and instruction specialist) based on the research questions, specifically focusing on the activity stations to be analyzed. Comparisons were made based on the data obtained by the researchers, and corrections were made to ensure that no activity station text was missing, using keywords in the electronic copy. The obtained data was also reviewed by a science teacher who teaches at the 5th-grade level, and corrections were made based on their feedback. When examining the activity stations, efforts were made to determine their page number, the unit they belonged to, their names, the learning outcomes they corresponded to, and the lists of materials required to carry out the activities.

Data Analysis

In line with the research objective, the data obtained through document review were analyzed using descriptive analysis techniques. Descriptive analysis allows for the systematic presentation of predetermined and targeted data (Yıldırım & Şimşek, 2021). Through descriptive analysis, the following were determined: the page number of the Activity Stations, the unit they belong to, their names, the learning outcomes they correspond to, and the lists of materials required to carry out the activities. For the reliability of the data obtained, Miles and Huberman's (1994) reliability formula [Agreement/(Agreement+Disagreement)×100] was used. The researchers' agreement percentage was determined as 95.8%, and the researchers made comparisons until the agreement was 100% and determined the final data. The obtained

data were tabulated and presented sequentially in the findings section in accordance with the research questions.

Limitations

This study is subject to certain limitations in terms of materials, content, and methodology. In terms of materials, the research is limited to the 5th Grade Science Textbooks (Books 1 and Book 2) prepared by the MoNE in accordance with the "Türkiye Century Education Model" curriculum and implemented in the 2024-2025 academic year; textbooks from other publishers or different grade levels are excluded. In terms of content, the analysis does not cover the entire text of the textbooks, focusing only on the 72 activities presented under the heading "Activity Station" thus excluding other sections or stations of the books. Methodologically, the study was conducted using document analysis, a qualitative research method, and the findings are based solely on the researcher's analysis of these documents. Results are limited to the researchers' perspective.

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

Table 1 presents the data related to the first research question (What is the distribution of activity stations according to units and books [Book 1-Book 2]?).

Table 1.

Distribution of Activities According to Units and Books

Book	Unit name	Number of activity stations	Percentage
Book 1	Unit 1: Our Neighbors in the Sky and Us	8	11.1%
	Unit 2: Let's Get to Know Force	10	13.9%
	Unit 3: A Journey into the Structure of Living Things	12	16.7%
Book 2	Unit 4: The World of Light	12	16.7%
	Unit 5: The Nature of Matter	16	22.2%
	Unit 6: Electricity in Our Lives	9	12.5%
	Unit 7: Sustainable Living and Recycling	5	6.9%
Total	7 units	72 activity stations	100%

It is observed that the most activity stations (16) are in the "Nature of Matter" unit, and the least activity stations (5) are in the "Sustainable Living and Recycling" unit. When the distribution between the books is examined, it is seen that the first book contains a total of 30 activity stations (41.7%) and the second book contains 42 activity stations (58.3%).

Table 2 presents the activity names in the first book and their corresponding learning outcomes in the curriculum, based on the data related to the second research question (For

which learning outcomes were the activity stations in the 5th grade science textbook prepared?).

Table 2.

Activity Names and Corresponding Learning Outcomes in Book 1

Book	Related learning outcomes	Activities
Book 1	FB.5.1.1.1. Gathering information about the Sun's structure and rotation.	-Observation of the Sun -Apparent Size
	FB.5.1.2.1. Making scientific inferences about the Moon's properties, rotation, and revolution movements.	-Exploration of the Moon -Moon Observation -Movements and Visible Face of the Moon -Moon Observation-2
	FB.5.1.2.2. Creating a scientific model representing the phases of the Moon.	-Differences in the Moon's Appearance -Duration of the Moon's Phases
	FB.5.2.1.1. Defining force by its magnitude.	-First Things That Come to Mind About Force -Measuring the Magnitude of Force
	FB.5.2.1.2. Designing a dynamometer model using simple materials.	-Measuring with Different Dynamometers
	FB.5.2.2.1. Defining the gravitational force acting on mass as weight.	-Qualities of Mass and Weight Concepts -Measuring Mass and Weight
	FB.5.2.3.1. Reasoning inductively about the effects of friction force in various environments.	- Effect of Friction Force on Motion -Effect of Friction Force -Effect of Air and Water on the Motion of Objects
	FB.5.2.3.2. Designing a scientific model to increase or decrease friction in daily life.	-Effect of Friction on Vehicle Motion -Observing the Movement of the Book
	FB.5.3.1.1. Comparing plant and animal cells in terms of their basic parts and properties.	-Mystery in the Onion Skin -Cheek Epithelial Cell -Comparing Properties
	FB.5.3.1.2. Structuring the concepts of cell-tissue-organ-system-organism.	-Simulating Structures in the Cell -Journey to the Organism
	FB.5.3.2.1. Classifying structures belonging to the support and movement system.	-Movement According to Command -Components of the Support and Movement System -Labeling the Structures -Following the Commands -Door Hinge -Skeleton Puppet
	FB.5.3.2.2. Gathering information on what needs to be done for the health of the support and movement system.	- Protecting Our Health
Total	12 learning outcomes	30 activity stations

When Table 2 is examined, it is seen that the first textbook, covering units 1, 2 and 3, has 30 activity stations and these activities serve a total of 12 learning outcomes. (FB.5.3.2.1.) It has been determined that the learning outcome "Being able to classify the structures of the support and movement system" is represented by the most activity stations (6). In addition, it has been determined that the learning outcomes "Being able to design a dynamometer model using simple tools" (FB.5.2.1.2.) and "Being able to gather information about what needs to be done for the health of the support and movement system" (FB.5.3.2.2.) are supported by one activity station each. It is seen that all activity stations are aimed at the learning outcomes included in the curriculum published with the Türkiye Century Education Model.

Table 3 presents the activity names in the second book and the corresponding learning outcomes in the curriculum, from the data related to the second research question (For which learning outcomes are the activity stations in the 5th-grade science textbook designed?).

Table 3.

Activity Names and Corresponding Learning Outcomes in Book 2

Book	Related learning outcomes	Activities
Book 2	FB.5.4.1.1. Explaining with observations that light emitted from a source follows a linear path in every direction.	-First Things That Come to Mind About Light Sources -Propagation of Light -Spreading of Light -Let's Observe Light-1
	FB.5.4.2.1. Classifying materials based on their light transmission properties	-Let's Observe Light-2 -Interaction of Matter and Light -Light Permeability -Let's Group According to Light Permeability -Let's Label the Samples
	FB.5.4.3.1. Observing full shadow scientifically.	-Shadows of Figures -I am Drawing a Shadow -Change in Shadow Size
	FB.5.5.1.1. Classifying matter based on its particulate, porous, and mobile structure.	-Properties of Matter -Let's Model the Particulate Structure of States of Matter -Matters in Syringes -Discussion Groups -Matter Labels -Particle Demonstration of Matter
	FB.5.5.2.1. Comparing heat and temperature concepts.	-Is it Heat? Is it Temperature? -Is it Hot? Is it Cold? - Similarities and Differences
	FB.5.5.3.1. Predicting based on scientific observation that matter can change state under the effect of heat.	-Effect of Heat on Matter -What Happened to the Wax? -What Happened to the Water? -Heat Flow
	FB.5.5.4.1. Classifying materials in terms of heat conduction.	-Heat Transfer in Materials
	FB.5.5.4.2. Creating a model showing heat insulation.	-Adventure of Maras Ice Cream -Cool in Summer, Warm in Winter
	FB.5.6.1.1. Classifying elements in an electrical circuit based on whether they have symbols or not.	-Advantages of Symbols -Let's Characterize Circuit Elements with Symbols - "Is There a Symbol or Not?" -Let's Choose and Match Cards -Let's Create a Poster
	FB.5.6.1.2. Conducting an experiment suitable for the drawn electric circuit diagram.	-Let's Draw a Circuit Diagram -Let's Animate the Circuit
	FB.5.6.2.1. Formulating a hypothesis regarding the variables affecting bulb brightness in an electrical circuit.	-How Do We Change Bulb Brightness? -Let's Change Bulb Brightness
	FB.5.7.1.1. Classifying recyclable and non-recyclable materials in household waste.	-Let's Group Waste Materials
	FB.5.7.1.2. Making scientific inferences on the importance of recycling for effective resource usage.	-Importance of Recycling
	FB.5.7.1.3. Reflecting experiences regarding the applicability of waste management in the immediate environment.	-Waste Control -Here is My Masterpiece -Waste Management Ideas
Total	14 learning outcomes	42 activity stations

Table 3 is examined, it is seen that the second textbook, which covers units 4, 5, 6 and 7, has 42 activity stations and these activities serve a total of 14 learning outcomes. (FB.5.5.1.1.) It has been determined that the learning outcome "Being able to classify materials according to their particulate, porous and mobile structure" is represented by the most activity stations (6). In addition, it is seen that there is one activity station each for the learning outcomes "Being able to classify materials in terms of heat conduction", "Being able to classify recyclable and non-recyclable materials in household waste", and "Being able to make scientific inferences about the importance of recycling in the effective use of resources". It is understood that all activity stations are aimed at the learning outcomes included in the curriculum published with the Türkiye Century Education Model.

Table 4 presents the data related to the third research question (What is the availability of materials used in the activity stations and what are the necessary safety precautions for the laboratory?).

Table 4.

The Availability of Materials Used in Activities and Their Safety Risk Status

Material type	Material group and content	Availability	Safety risk level	Potential hazards and precautions
Basic stationery	Pencil, a4 paper, notebook, eraser, book, sticky note, cardstock, glue, tape	Easy	Low	There is no physical injury risk, but care should be taken with pencil tips.
Observation and optical tools	Binoculars, telescope, camera, phone, magnifier	Moderate	Moderate	Optical Instruments (Binoculars/Telescope): Never look directly at the Sun. It carries a risk to eye health. There is a warning in the textbook.
Simple everyday items	Plastic bottle, string, ball, toy car, straw, ping pong ball, fabric piece, empty box	Easy	Low	There is no risk. Precautions can be taken against the risk of swallowing small parts (for siblings, etc.).
Measurement and force tools	Dynamometer, equal-arm balance, weight sets	Moderate	Low	Care should be taken not to drop weights on feet.
Cutting and piercing tools	Scissors, thumbtack, needle	Easy	Moderate	May cause cutting and puncture injuries. Must be used carefully under teacher supervision.
Biological investigation materials	Microscope, slide, cover slip, scalpel, forceps, dropper, tongue depressor	Hard	Moderate	1. Glass Breakage: Slides/cover slips are very thin and can cut if broken. 2. Hygiene: Hygiene rules must be followed and gloves worn when taking cheek epithelial samples.
Heat and temperature experiment materials	Spirit lamp, tripod stand, beaker, thermometer, candle	Hard	High	Burns and Fire: Involves open flame and hot glass materials. Hair must be tied back; experiments must strictly be performed under teacher supervision.
Light and laser materials	Laser light source, flashlight, mirrors, glass surfaces	Moderate	Moderate	Eye Health: Laser light should never be aimed at friends' eyes or reflected into eyes from surfaces. Risk of retinal damage.

Continue to Table 4

Circuit components	Battery, battery holder, bulb, bulb holder, connecting wire, switch	Moderate	Low	In case of a short circuit, batteries and wires may overheat and burn hands. The circuit should not be kept closed (on) for a long time.
Chemical and powder substances	Baking powder, baking soda, water, milk, vegetable oil	Easy	Low	Contact with eyes should be avoided. Student conditions regarding allergic reactions (milk, etc.) should be considered.
Waste materials	Waste battery, glass, metal lids, food waste	Easy	Moderate	Hygiene and Cuts: Gloves should be used when collecting waste. Ensure waste batteries are not leaking and glass items do not cut.

Table 4 shows that the materials used in the activities were mostly readily available. "biological examination materials" (microscope, slide, cover slipper, scalpel, forceps, dropper, tongue depressor/wooden stick) and "heat and temperature experiment materials" (spirit burner, tripod, beaker, thermometer, candle) were classified as being more difficult to obtain compared to other materials. In terms of safety risk, the vast majority of materials were found to be in the Low-risk group. It was determined that heat-related activities and activities using glass materials might be riskier.

Table 5 presents data related to the fourth research question (What is the usage status and purpose of the digital content links included in the activity stations?).

Table 5.

Distribution and Types of Digital Content Links Located at Activity Stations

Book	Unit	Page	Activity name	Digital content type (QR code)
Book 1	Unit 1	22	Observation of the Sun	Interactive content
		23	Apparent Size	Music video
		28	Moon Observation	Interactive content
		29	Movements and Visible Face of the Moon	Activity evaluation
	Unit 4	122	Components of the Support and Movement System	Interactive content
Book 2	Unit 4	20	Let's Observe Light-2	Interactive content
		37	Change in Shadow Size	Interactive content
	Unit 5	61	Particulate Structure of Matter	Interactive content
		80	Heat Flow	Activity evaluation
		81	Effect of Air and Water on the Motion of Objects	Interactive content
	Unit 6	112	Let's Create a Poster	Activity evaluation
	Unit 7	152	Waste Management Ideas	Activity evaluation
Total			12 activity stations	12 digital links

When Table 5 is examined, it is seen that QR codes are provided as digital links in a total of 12 activity stations. This rate is 16.6% when considering the total of 72 activity stations in the textbooks (Table 1). It is seen that digital content is presented only by providing QR codes. It has been determined that seven of the 12 QR codes are "interactive content", four are "activity evaluation" and one is "music video". When the distribution according to units is examined; it is seen that the most digital content is provided for Unit 1 (4), and no digital content is provided for Unit 2.

Discussion and Conclusion

This study examines the activity stations in the 5th-grade science textbook published within the framework of the curriculum prepared under the Türkiye Century Education Model. The study analyzes their distribution across books and units, suitability to learning outcomes, material accessibility/security, and the use of digital content using a document analysis method. The findings are discussed in light of the relevant literature, and conclusions are drawn, leading to recommendations.

Regarding the distribution of activity stations across books and units, the study found that there are 30 activity stations in the first book and 42 in the second, totaling 72 activity stations. Considering the number of units in the books, the distribution between the first and second books appears proportionate. Arduç and Yalçın (2024), who examined the previous science textbook, found that the 5th-grade textbook contained 25 experiments and activities. When considering the 14 performance stations (Aydın et al., 2024) featuring similar experiments and activities in the textbook published in 2024, it is observed that the number of experiments and activities has increased from 25 to 86. It appears that the number of experiments and activities has been significantly increased in the new textbooks. This indicates that the new textbooks aim to make students more active and emphasize learning by doing and experiencing. The relevant literature (Batdı, 2014; Kahraman et al., 2023) shows that activity-based learning is effective in scientific literacy and academic achievement, and that the intended learning outcomes are taught more permanently. Furthermore, activity-based learning is seen to have a significant impact on the development of higher-order thinking skills (Çakıcı & Yakışan, 2020).

The findings show that the distribution of activity stations across units is not balanced. It was determined that the highest number of activities (22%) were in the "Nature of Matter" unit, and the lowest number (7%) were in the "Sustainable Living and Recycling" unit. This may be due to the content density and the number of learning outcomes in the given units. On the other hand, the inclusion of topics such as properties of matter, phase changes, and heat in the "Nature of Matter" unit, and the attempt to concretize abstract concepts, may be among the reasons for this situation. Considering Piaget's theory of cognitive development, it is understood that 5th-grade students are in the concrete operational stage, and to facilitate their understanding, learning through doing and experiencing should be provided through more concrete activities. For students in this age group, the high number of activities in newly prepared textbooks can provide a significant advantage. Considering the "Sustainable Living and Recycling" unit, the low number of activity stations may stem from the less dense content compared to other units. Curricula aim not only at students' academic development but also at improving their scientific literacy and higher-order thinking skills. In this context, cultivating environmentally literate and conscious individuals is crucial, especially in this unit. Research (Bozoğlu et al., 2024) also emphasizes the need for more emphasis on environmental and climate issues in textbooks. Furthermore, since sustainable living and recycling are topics directly related to real life and constantly relevant, a lesson process where students are active and engage in as many activities as possible is important for raising their awareness. Topal and Keleş (2024), in their study, determined that students had deficiencies in their conceptual

understanding of this unit and its topics. In this context, activities that can ensure meaningful and lasting learning are important.

When examining the findings regarding the alignment of the activity stations in the 5th-grade science textbook with the learning outcomes of the Türkiye Century Education Model curriculum, which is the second sub-problem of the research, it is understood that all activity stations serve the learning outcomes. Accordingly, it is seen that the textbook adheres to the curriculum and is goal-oriented. The science textbook, consisting of two books, has a total of 30 activity stations in the first book, corresponding to 12 learning outcomes; the second book has a total of 42 activity stations, aimed at achieving 14 learning outcomes. Considering the intensity of the activities, it is understood that, as in the Mastery Learning Model, attention has been paid to pedagogical concerns, and the fact that students may have different learning methods has not been overlooked. Supporting the permanent teaching of abstract concepts with multiple activities and methods is quite important (Ayas et al., 2012). Studies show the importance of using different activities to develop higher-order thinking skills in students. Senemoğlu (2023) emphasizes the importance of the concepts of "repetition" and "variety" in learning. Supporting students' learning processes in different ways—visual, auditory, tactile, etc.—will ensure lasting learning and facilitate the transfer of information to long-term memory. Providing students with alternative learning methods is important for meaningful and lasting learning, and the fact that the textbook supports a learning outcome with multiple activity stations shows that this has been considered. Altun and Aktan (2024), in their study, drew attention to the scarcity of activities in previous textbooks. In this sense, it is understood that the new textbooks are trying to address this deficiency and emphasize reinforcing learning.

When examining the findings related to the third research question (Availability of materials used in activity stations and laboratory safety/precautions to be taken?), it was determined that the vast majority of materials used in activity stations were easily available everyday materials. This shows that in different studies (Batı, 2018), efforts are made to minimize the situations where teachers cannot conduct experiments and activities due to a lack of materials. It can be said that the use of easily accessible materials is consistent with the principles of equal opportunity and economy in education. Attention is paid to Context-Based Learning studies, which are based on the relationship of information to daily life, and efforts are made to show that experiments/activities can be conducted not only in laboratories but also in out-of-school learning environments. Although some materials, such as microscopes and thermometers, are harder to find, it is known that these materials are available in almost all schools in Türkiye. These materials are among the basic materials for science lessons and laboratories.

When examining the findings related to safety, it is seen that many materials are in the Low-risk group. It is known that experiments and activities, by their nature, carry a small safety risk. In this regard, necessary warnings are given in textbooks (Aydın et al., 2024). Teachers also support this by trying to minimize safety risks as much as possible (Hussein & Shifera, 2022). Although materials such as stoves and spring water in heat experiments, and glasses in microscope experiments pose risks, it is important for students to experience occupational

health and safety rules at an early age by conducting these activities under teacher supervision. When the relevant literature (Akpullukçu & Çavaş, 2017; Prabha, 2016) is examined, it is seen that teachers also conduct demonstration experiments/activities due to these safety concerns in some activities. In addition, the fact that the textbook also includes the necessary warnings in the activity stations due to eye health concerns in optics topics (Table 4) shows that the textbooks pay attention to safety concerns. In general, it is understood that science textbooks prioritize control and taking precautions for risky situations.

Regarding the fourth sub-problem of the research, the findings on the support of activity stations in the textbook with digital content show that 12 out of 72 activity stations (16.6%) are supported with digital resources via QR codes. While it is not expected that digital support will be provided in every activity given the time constraints in the lessons, increasing this number for students to use outside of class for review can help with the retention of learning. The literature (Lai & Bower, 2019) shows that digital resources are quite effective in student learning. Considering the goal of the Türkiye Century Education Model to raise "individuals with digital competence," increasing the number of digital contents where each experiment and activity can be viewed through demonstration methods, or presenting all experiments and activities as digital content, can make learning more efficient. Technology, as in every field, has taken its place in teaching environments not as an extra tool, but as an important component that should be present and used (Doğan, 2016). In this context, learning environments can be made more effective by trying to create Hybrid Learning environments by providing digital resources. The sheer breadth of digital platforms necessitates that textbooks provide links to appropriate content for students, requiring expert assessment of student-level content. It has been observed that some units do not include any digital content or resource support. For the units on Measuring the Magnitude of Force and Friction, tools containing simulations similar to PhET are considered important in the literature (Özmen, 2019). Providing digital content appropriate to the nature of all units is crucial for ensuring that learning outcomes are taught with equal or similar importance.

Recommendations

Considering the reality of digitalization, which forms a significant part of our lives today, the support of experiment and activity pages in textbooks with digital content could be increased. In this context, it is recommended to provide QR codes or digital links for every experiment and activity in the book, allowing students to access beneficial supplementary activities parallel to the covered content.

It is recommended that all activity stations in the textbook include digital links (such as QR codes) that direct to animation or simulation applications. This is highly important so that experiments which cannot be conducted in the school environment due to a lack of materials or various other issues can be individually watched and compensated for by students via digital platforms.

In order to minimize safety concerns in experiments and activities classified in medium and high-risk groups (use of heat, fire, glass, etc.) and to instill an "occupational health and safety" awareness in students at an early age, special course materials and pre-activity preparation guidelines supporting this culture should be developed.

Since this research is limited to the document analysis method, it is recommended that researchers in the field conduct similar studies for different grade levels (6th, 7th, and 8th grades). Furthermore, going beyond mere document analysis, conducting qualitative or mixed-design field research that deeply examines the classroom implementation and effectiveness of activity stations through observation and interview techniques (teacher and student opinions) will make significant contributions to the literature.

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BIOGRAPHICAL NOTES

Contribution Rate of Researchers

Author 1: 50%

Author 2: 50%

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Conflict Statement

There is no conflict of interest that the author will declare in the research.

Notice of Use of Artificial Intelligence

The authors used [ChatGPT / Gemini] as an AI tool in the research, writing, and publication processes of this article solely for language editing and proofreading purposes.

5. Sınıf Fen Bilimleri Ders Kitabındaki Etkinlik İstasyonlarının İncelenmesi

Özet

Bu çalışma, 2024 yılında uygulamaya konulan "Türkiye Yüzyılı Eğitim Modeli" öğretim programına uygun olarak hazırlanan 5. sınıf fen bilimleri ders kitabındaki etkinlik istasyonlarını incelemeyi amaçlamaktadır. Araştırma, bu etkinliklerin üniteler arası dağılımına, öğrenme çıktılarıyla uyumuna, materyal erişilebilirliğine, güvenlik önlemlerine ve dijital içerik entegrasyonuna odaklanmaktadır. Çalışmada, nitel bir araştırma yöntemi olan doküman analizi tekniği kullanılarak ders kitabında bulunan 72 etkinlik istasyonu analiz edilmiştir. Veriler, betimsel analiz kullanılarak yorumlanmıştır. Sonuçlar, etkinliklerin öğretim programının öğrenme çıktılarıyla tam olarak uyumlu olduğunu ve aktif öğrenmeyi teşvik ettiğini göstermektedir. Üniteler arası dağılım farklılık gösterse de gerekli materyallerin çoğuna kolayca erişilebilmekte ve materyaller düşük güvenlik riski taşımaktadır. Belirli deneyler için yeterli uyarılar sağlanmıştır. Bununla birlikte çalışma, istasyonların %16,6'sında QR kod desteği bulunması nedeniyle dijital teknoloji entegrasyonunun durumu belirlemiştir. Sonuç olarak öğretmen ve öğrenciler tarafından etkinliklerin programın hedeflediği gibi yapılması, güvenlik önlemlerine dikkat edilmesi, gelecekteki ders kitabı tasarımlarının, hibrit öğrenme ortamlarını teşvik etmek ve öğrencilerin bilimsel sorgulamayla birlikte dijital becerilerini daha da geliştirmek için dijital içeriğin yaygınlığının artırılması önerilmektedir.

Anahtar Kelimeler: Fen eğitimi, ders kitabı analizi, etkinlik istasyonları, Türkiye Yüzyılı Maarif Modeli, doküman analizi.

Giriş

Günümüzde yaşanan hızlı bilimsel ve teknolojik gelişmeler, eğitimde ideal insan profilini değiştirerek öğrencilerin problem çözme, dijital uyum ve eleştirel düşünme gibi 21. yüzyıl becerileriyle donatılmasını zorunlu kılmıştır. Fen bilimleri dersi, doğası gereği bu becerilerin ve bilimsel süreç becerilerinin kazandırılmasında kritik bir role sahiptir. Bu doğrultuda, 2024 yılında yürürlüğe giren Türkiye Yüzyılı Maarif Modeli esaslı Fen Bilimleri Dersi Öğretim Programı; evrensel ve millî değerleri bütünleştiren, beceri ve etkinlik odaklı bir yaklaşımı benimsemiştir.

Öğrencilerin kalıcı ve anlamlı öğrenmeler gerçekleştirebilmesi için fen derslerindeki deney ve etkinlikler hayati önem taşır. Ancak uygulamada okul fiziki koşullarının yetersizliği, materyal eksikliği ve güvenlik endişeleri bu etkinliklerin yapılmasını zorlaştırmaktadır. Laboratuvar kazalarını önlemek adına yaşa uygun, güvenli materyallerin seçilmesi şarttır. Ayrıca fiziksel imkânların yetersiz kaldığı durumlarda, öğrencilerin bağımsız öğrenmesini destekleyen dijital eğitim ortamlarının ve teknolojilerin ders kitaplarına entegrasyonu modern eğitimin bir gerekliliğidir.

Alan yazını incelendiğinde 2024 öğretim programına göre hazırlanan 5. sınıf fen bilimleri ders kitabındaki etkinlik istasyonlarını çok boyutlu olarak inceleyen bir çalışmaya rastlanmamıştır. Yeni müfredatın öngördüğü vizyonun ders kitaplarında nasıl karşılık

bulduğunu ortaya koymak ve sahadaki kronik problemleri tespit etmek amacıyla bu araştırma tasarlanmıştır. Çalışma, ders kitabında yer alan toplam 72 etkinlik istasyonunu inceleyerek gelecekteki kitapların niteliğini artırmayı ve öğretmen farkındalığını yükseltmeyi hedeflemektedir.

Bu genel amaç doğrultusunda, araştırmada aşağıdaki alt problemlere yanıt aranmıştır:

1. Etkinlik istasyonlarının üniteler ve kitaplara (1. ve 2. kitap) göre dağılımı nasıldır?

2. Etkinlik istasyonları, öğretim programındaki hangi öğrenme çıktılarına yönelik olarak hazırlanmıştır?

3. Etkinliklerde kullanılan materyallerin bulunabilirliği ve laboratuvar güvenliği açısından alınması gereken önlemler nelerdir?

4. Etkinlik istasyonlarında yer alan dijital içerik bağlantılarının kullanım durumu ve amacı nedir?

Yöntem

Araştırmanın Modeli

Bu araştırmada, 5. sınıf fen bilimleri ders kitabında yer alan etkinlik istasyonları incelendiği için nitel araştırma yöntemlerinden biri olan doküman incelemesi tekniği kullanılmıştır. Doküman incelemesi, veri toplanacak kaynakların sistematik bir bütünlük içerisinde incelenmesine ve yorumlanmasına dayanır (Yıldırım & Şimşek, 2021). Doküman incelemesi betimsel analiz, içerik analizi ve tematik analiz yapma olanağı sağlar (Özkan, 2019). Bu araştırmada bir ders kitabının belirli bölümlerinin (etkinlik istasyonları) incelenmesi, bazı verilerin sayısallaştırılması, kodlanması ve okuyucuya etkili sunulabilmesi için düzenlenmesi, kategorize edilmesi gerektiğinden doküman incelemesi yöntemine ihtiyaç duyulmuştur.

Veri Kaynağı

Çalışmada, veri kaynağı olarak Millî Eğitim Bakanlığı [MEB] tarafından ortaokul ve imam hatip ortaokullarında 2024-2025 eğitim-öğretim yılından itibaren Talim ve Terbiye Kurulu Başkanlığı'nın onayıyla okutulan 5. sınıf fen bilimleri ders kitabı incelenmiştir. İncelenen kitabın künyesi şu şekildedir:

Aydın, A., Kardeş, H., Sarıkavak, İ., Canan, L. N., Topak, M. E., Yılmaz, S., & Bağcı, Y. M. (2024). *Fen bilimleri 5. sınıf ders kitabı (1. ve 2. kitap)*. MEB.

Ders kitabı incelendiğinde iki kitaptan (1 ve 2), yedi üniteden (üç ünite birinci kitap, dört ünite ikinci kitap) oluştuğu görülmektedir. Ayrıca ders kitabının istasyonlar şeklinde düzenlendiği görülmektedir: Ön değerlendirme istasyonu, Hazırlık istasyonu, Merak istasyonu, Performans istasyonu, Köprü istasyonu, Etkinlik istasyonu, Bilgi istasyonu, Bölüm sonu istasyonu, Araştırma istasyonu, Pekiştirme istasyonu.

Ders kitabında yer alan istasyonlar incelendiğinde 10 farklı istasyon şeklinde yapılandırıldığı görülmektedir. Bu çalışmada "Etkinlik İstasyonu" metinleri incelenmiştir. Bu araştırmada veri kaynağı olarak belirtilen ders kitabında yer alan Etkinlik İstasyonu metinleri alınmıştır.

Veri Toplama Süreci

Bu çalışmada incelenen 5. sınıf fen bilimleri ders kitabı MEB Eğitim Bilişim Ağı [EBA] üzerinden indirilmiş ve MEB'e bağlı bir okuldan kitap fiziksel ortamda da temin edilmiştir. Kitabın elektronik nüshası da fiziksel nüshası da incelenecek etkinlik istasyonları özelinde 2 araştırmacı (bir fen eğitimi alan uzmanı, bir eğitim programları ve öğretim uzmanı) tarafından araştırma soruları referansında incelenmiştir. Araştırmacıların elde ettiği veriler üzerinden gerekli karşılaştırmalar yapılarak ve elektronik nüsha üzerinden anahtar kavramlar yardımıyla aranarak eksik bir etkinlik istasyonu metni bırakılmayacak şekilde düzeltmeler yapılmıştır. Elde edilen veriler 5. sınıf düzeyinde derse giren bir fen bilimleri öğretmenine de inceletilerek dönütleri doğrultusunda düzeltmeler yapılmıştır. Etkinlik İstasyonları incelenirken hangi sayfada yer aldıkları, hangi üniteye ait oldukları, isimleri, hangi öğrenme çıktısına karşılık geldikleri ve etkinliklerin yapılabilmesi için gerekli malzeme listeleri tespit edilmeye çalışılmıştır.

Veri Analizi

Araştırmanın amacı doğrultusunda doküman incelemesi yöntemiyle elde edilen verilerin çözümlenmesi betimsel analiz tekniği ile yapılmıştır. Betimsel analiz, önceden belirlenen, elde edilmesi hedeflenen verilerin düzenli bir şekilde sunulmasına olanak tanır (Yıldırım & Şimşek, 2022). Betimsel analiz yardımıyla; Etkinlik İstasyonlarının hangi sayfada yer aldıkları, hangi üniteye ait oldukları, isimleri, hangi öğrenme çıktısına karşılık geldikleri ve etkinliklerin yapılabilmesi için gerekli malzeme listeleri tespit edilmiştir. Elde edilen bulgulara ilişkin verilerin güvenirliği için Miles ve Huberman'ın (1994) güvenirlik formülü olan [Görüş Birliği/(Görüş Birliği+Görüş Ayrılığı)×100] kullanılmıştır. Araştırmacıların uyum yüzdeleri %95,8 olarak tespit edilmiş, uyum %100 oluncaya kadar araştırmacılar karşılaştırmalar yapmış ve nihai verileri belirlemişlerdir. Elde edilen veriler tablolaştırılmış, araştırma soruları doğrultusunda bulgular bölümünde sırayla sunulmuştur.

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

Ders kitabında toplam 7 türde 72 etkinlik istasyonu bulunmaktadır. Bunların 30'u (%41,7) birinci kitapta, 42'si (%58,3) ikinci kitapta yer almaktadır. En fazla etkinlik 16 adet ile "Maddenin Doğası" ünitesinde yer alırken, en az etkinlik 5 adet ile "Sürdürülebilir Yaşam ve Geri Dönüşüm" ünitesindedir.

Birinci kitaptaki 30 etkinlik istasyonu 12 öğrenme çıktısına, ikinci kitaptaki 42 etkinlik istasyonu ise 14 öğrenme çıktısına hizmet etmektedir. Tüm etkinlik istasyonlarının Türkiye

Yüzyılı Maarif Modeli öğretim programındaki kazanımlarla uyumlu olduğu, bazı kazanımların (örneğin "Destek ve hareket sistemine ait yapıları sınıflandırabilme" ve "Maddeleri tanecikli, boşluklu ve hareketli yapısına göre sınıflandırabilme") en fazla etkinlikle desteklendiği tespit edilmiştir.

Etkinliklerde kullanılan materyallerin çoğunlukla kolay bulunabilir nitelikte olduğu görülmüştür. "Biyolojik İnceleme Malzemeleri" ile "Isı ve Sıcaklık Deney Malzemeleri" temin edilmesi zor kategoride yer almıştır. Malzemelerin büyük kısmı düşük risk grubunda bulunurken ısı, ateş, cam malzeme kullanımı ve kesici aletler içeren etkinliklerin orta/yüksek güvenlik riski taşıdığı belirlenmiştir.

Toplam 72 etkinlik istasyonunun yalnızca 12'sinde (%16,6 oranında) karekod şeklinde dijital içerik bağlantısına yer verilmiştir. Bu bağlantıların 7'si etkileşimli içerik, 4'ü etkinliği değerlendirme ve 1'i müzik klibi türündedir. Üniteler bazında en çok dijital içeriğin 1. ünitede yer aldığı, 2. ünitede ise hiç dijital içerik bağlantısı bulunmadığı saptanmıştır.

Tartışma ve Sonuç

Bu çalışmada, Türkiye Yüzyılı Maarif Modeli kapsamında hazırlanan 5. sınıf fen bilimleri ders kitabında yer alan etkinlik istasyonlarının dağılımı, öğrenme çıktılarına uygunluğu, materyal erişilebilirliği, güvenliği ve dijital içerik kullanımı hususları doküman incelemesi yöntemiyle kapsamlı bir şekilde ele alınmıştır. Araştırma sonucunda elde edilen veriler, yeni nesil ders kitaplarının öğrenciyi merkeze alan, aktif katılımı önceleyen ve yaparak yaşayarak öğrenme yaklaşımını destekleyen bir yapıyla kurgulandığını açıkça ortaya koymuştur. Kitaplardaki etkinlik istasyonlarının genel dağılımı incelendiğinde birinci kitapta 30 ve ikinci kitapta 42 olmak üzere toplam 72 etkinlik istasyonunun yer aldığı görülmüştür. Bu sayısal veri, geçmiş yıllarda yayımlanan fen bilimleri ders kitaplarına kıyasla etkinlik ve uygulama sayısında belirgin ve sevindirici bir artış yaşandığını kanıtlamaktadır. Bununla birlikte, etkinliklerin ünitelere göre dağılımının tamamen dengeli bir grafik çizmediği anlaşılmıştır; en fazla etkinlik "Maddenin Doğası" ünitesinde yer alırken, en az etkinliğin "Sürdürülebilir Yaşam ve Geri Dönüşüm" ünitesinde bulunduğu tespit edilmiştir. Maddenin doğası gibi soyut ve kavramsal yoğunluğu fazla olan ünitelerde etkinlik sayısının fazla olması, öğrencilerin somutlaştırarak öğrenmelerini kolaylaştırma çabasıyla açıklanırken sürdürülebilir yaşam gibi kritik ve güncel konularda etkinlik sayısının nispeten düşük kalmasının ders kitapları yazımında yeniden gözden geçirilmesi gereken bir alan olduğu değerlendirilmektedir.

Araştırmanın bir diğer önemli boyutu olan öğrenme çıktılarıyla uyum durumu incelendiğinde incelenen tüm etkinlik istasyonlarının yeni öğretim programındaki kazanımlarla tam bir uyum içerisinde olduğu saptanmıştır. Özellikle soyut kavramların kalıcı bir şekilde zihne yerleşmesini sağlamak amacıyla bazı temel kazanımların birden fazla etkinlik istasyonuyla desteklenmesi, pedagojik açıdan son derece yerinde bir yaklaşım olarak öne çıkmıştır. Bu durum, öğrenme süreçlerinde tekrarın ve çeşitliliğin önemsendiğini, farklı öğrenme stillerine sahip öğrencilerin ihtiyaçlarının gözetildiğini göstermektedir. Öte yandan, etkinliklerde kullanılan materyallerin büyük çoğunluğunun günlük hayatta kolayca bulunabilen, ucuz ve erişilebilir malzemelerden seçilmiş olması; eğitimde fırsat eşitliği ve

ekonomiklik ilkeleriyle birebir örtüşmektedir. Mikroskop, termometre, ısı kaynakları gibi temini daha zor olan veya özen gerektiren materyallerin ise fen laboratuvarlarının standart donanımları arasında yer aldığı ve bu durumun okulların genel altyapısıyla uyumlu olduğu görülmüştür. Ayrıca malzemelerin genel olarak düşük risk grubunda bulunduğu, ısı, ateş, cam malzeme ve kesici aletler gibi az sayıdaki orta veya yüksek risk taşıyan unsurlar için ise ders kitabında hem öğrencilere hem de öğretmenlere yönelik gerekli güvenlik uyarılarının yapıldığı tespit edilmiştir.

Son olarak, ders kitabındaki etkinlik istasyonlarının karekodlar aracılığıyla dijital içeriklerle desteklenme durumu analiz edildiğinde toplam 72 etkinlik istasyonunun yalnızca 12'sinde (%16,6 oranında) dijital bağlantılara yer verildiği ve bazı ünitelerde hiç dijital içerik bulunmadığı saptanmıştır. Türkiye Yüzyılı Maarif Modeli'nin öğrencilere kazandırmayı hedeflediği dijital yetkinlikler ve hibrit öğrenme ortamlarının yaygınlaştırılması gerekliliği göz önüne alındığında, mevcut dijital içerik oranının yetersiz kaldığı söylenebilir. Sınırlı düzeyde kalan bu dijital bağlantıların simülasyonlar, sanal laboratuvar uygulamaları ve zenginleştirilmiş materyallerle artırılması, öğrenmenin okul dışına taşınması ve kalıcılığın artırılması açısından büyük önem taşımaktadır.

Öneriler

Sunulan öneriler doğrultusunda, günümüzün kaçınılmaz bir gerçeği olan dijitalleşme sürecine uyum sağlanarak ders kitaplarındaki deney ve etkinlik sayfalarının zenginleştirilmesi gerektiği vurgulanmaktadır. Bu kapsamda, öğrencilerin işlenen içeriklere paralel ek materyallere ulaşabilmesi için her deney ve etkinlik için karekod veya dijital bağlantıların sunulması, ayrıca animasyon ve simülasyon tabanlı yönlendirmelerle okul ortamındaki malzeme eksikliği ya da aksaklıkların telafi edilebilmesi büyük önem taşımaktadır. Öte yandan, ısı, ateş ve cam kullanımı gibi orta ve yüksek risk grubundaki etkinliklerde güvenlik endişelerini azaltmak ve öğrencilere erken yaşta iş sağlığı ve güvenliği bilinci kazandırmak adına özel yönergelerin geliştirilmesi önerilmektedir. Son olarak mevcut araştırmanın doküman incelemesiyle sınırlı olması nedeniyle, benzer çalışmaların diğer sınıf kademelerinde de yürütülmesi ve sınıf içi uygulamaları gözlem ve mülakat teknikleriyle derinlemesine inceleyen saha araştırmalarının yapılması alan yazınına önemli katkılar sunacaktır.