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**ORIGINAL ARTICLE**

# Analysis of Astronaut and Astronomer-themed Contents in Magazine Bilim Çocuk within the Context of the Science Curriculum in Turkiye

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**Ethical Statement**
In this study, all rules stipulated in the "Regulation on Scientific Research and Publication Ethics of Higher Education Institutions" have been adhered to. None of the actions listed under the second section of the Regulation titled "Actions Contrary to Scientific Research and Publication Ethics" have been conducted.

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**Conflict of Interest**
No conflict of interest is present in the conduction or the reporting of this study.

**ABSTRACT**

Recently, informal learning processes occurring outside formal educational institutions have been playing a critical role in accessing and structuring knowledge. Popular children's journals stand out for providing accessible, cost-effective, and enjoyable learning experiences for children.
The aim of this study is to analyze the contents related to astronomy published in the Magazine Bilim Çocuk, a popular children's journal, between 2004 and 2024, by searching for the keywords "astronaut" and "astronomer." The analysis is conducted within the framework of the Science Curriculum in Türkiye published in 2018, focusing on units, subject areas, and specific objectives. In this paper, document analysis, and a qualitative research method were used. It covers 12 astronomy-themed contents published between August 2004 and January 2024. Data collection was carried out through TÜBİTAK's e-magazine archive.
The collected data were analyzed using descriptive analysis, and the findings were evaluated by comparing them with the expectations of the science curriculum in Türkiye. The results of the study indicate that the contents related to "astronaut" and "astronomer" predominantly focus on the subject area of "Earth and the Universe" and the unit of "Solar System and Beyond." Moreover, these contents do not directly align with the specified objectives except from the 7th-grade level. The study emphasizes the need to integrate current concepts such as space, life in space, space research, space stations, spacewalks, space pollution, and gravity-free environment into the curriculum at each grade level.
In conclusion, the motivation for this study originated from the historic moment when the first Turkish astronaut, Alper Gezeravcı, embarked on his journey to space on January 19, 2024, conducting 13 different experiments on the International Space Station (ISS). Considering the research findings and the initiating space journey, this study provides concrete recommendations for the science curriculum and science education in Turkey to more effectively incorporate "astronaut" and "astronomer" topics, contributing to the country's scientific and technological development.

**Keywords:** Astronomy, Science Curriculum in Türkiye, Magazine Bilim Çocuk, Astronaut, Alper Gezeravcı

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## INTRODUCTION

Science education encompasses more than just the instruction of scientific phenomena, objects, or abstract and theoretical concepts; it also involves developing knowledge through inquiry that addresses the why and how questions regarding scientific facts (Erduran et al., 2004; Kolsto & Ratcliffe, 2005; Millar & Osborne, 1999). O'Neill and Polman (2004) reflected the necessity of internalizing the process beyond merely knowing conceptual knowledge, stating that "educating little scientists is a more valuable goal than passing accepted conceptual knowledge on to future generations." One of the global objectives of science education aimed at achieving this goal is to cultivate scientifically literate individuals.

Scientific literacy is defined as possessing adequate knowledge and skills for making responsible decisions and taking cognitive steps in situations that require a scientific and technological perspective (Şahin & Say, 2010). Scientific literacy, in its broadest sense, has been perceived synonymously with a general understanding of science. Stemming from this broad understanding, scientific literacy has been associated with the following components: (i) understanding of the nature of science (NOS) and its relationship with culture; (ii) comprehension of science and its applications; (iii) the ability to determine what can be considered scientific (and what cannot); (iv) the ability to think scientifically; and (v) the ability to engage in meaningful discussions on scientific issues using scientific data and logic (Allchin, 2014; DeBoer, 2000; Hurd, 1998; Norris & Phillips, 2003; NRC, 1996; OECD, 2006; Shamos, 1995). This suggests that scientific literacy is influenced not only by scientific curriculum knowledge but also by an understanding of the scientific knowledge production process and its originality. The primary means by which countries can cultivate their citizens as scientifically literate is through science education.

Science, as a significant area, holds strategic importance in a country's development. All nations are focused on equipping individuals with the desired qualifications to keep up with sustainable existence and maintain leadership in science and technology.

Space exploration, a significant area within the field of science, is a constantly active and evolving field, accompanied by numerous threats and opportunities worldwide. Some of the current and future objectives of space exploration mentioned in the literature include: sending humans to the Moon again and establishing a permanent base there (Spudis, 2016) sending humans to Mars and exploring colonization potential (Zubrin, 1996) detecting and examining exoplanets and searching for signs of life beyond Earth (Seager, 2010), and developing new technologies and methods for sustainable and affordable space travel (Diamandis & Kotler, 2012).

In our country, significant efforts are being made in the field of space and space research. A spacecraft belonging to SpaceX, including Turkey's first astronaut, Alper Gezeravcı, was successfully launched from NASA's Kennedy Space Center in Florida on January 19, 2024, at 16:49 local time (00:49 GMT). It has been a matter of curiosity how space travel and the experiments to be carried out on the international space station will affect first the scientific world and then the space research objectives of our country's science education. In this context, science education, including space and space research, is conducted through the Science Curriculum in Turkiye.

The ultimate goal of the Science Curriculum in Turkiye is to equip students with skills of research, inquiry to establish connections between events and situations, while also providing them with knowledge and skills based on

science, society, environment, and technology. As expressed by Minas and Gündoğdu (2013), these skills provide students with appropriate tools for acquiring knowledge, and science education involves developing these skills and includes practical applications to enable students to acquire knowledge in various subjects. Thus, science education facilitates the development of students' scientific thinking and their contribution to society.

As stated by Ayas (1995), the program aims to continuously improve the quality of science education in order to support national development and gain a competitive advantage in science and technology. The emphasis on engineering design skills highlighted in the Science Curriculum published in 2018 will enable students to adapt to the changing age and become individuals who implement applications with an innovative mindset (Ecevit et al., 2021).

Individuals taking science courses should be prepared to become science literate through activities in textbooks (Ardahan-Kulak & Bilican, 2023). Additionally, science education is not solely a process carried out in formal educational institutions and indoor environments. Recent studies have indicated that education designed to always take place in classrooms, with the majority of it being in a classroom setting, is not feasible (Balkan-Kıyıcı & Atabek-Yiğit, 2010; Gürsoy, 2018). Science education can be made more effective and sustainable by being supported with informal education environments.

In the revised Science Curriculum of 2013, the emphasis is placed on learning in informal learning contexts to facilitate the understanding and retention of knowledge in the field of science (Milli Eğitim Bakanlığı, 2013). Apart from schools, extracurricular books, magazines, and newspapers play a crucial role in the development of scientific literacy by prompting individuals to ask what, how, and why questions during the learning process (Kavak et al., 2006, p.19). In this regard, providing popular science books as sources of informal learning for students (Eroğlu & Sağlam, 2020), particularly through children's magazines at the K-12 level, is believed to positively influence students' attitudes and perceptions towards science.

Children's magazines are periodicals published at regular intervals covering current news, events, scientific topics, and research that may interest or appeal to children (Dedeoğlu et al., 2011). They aim to support children's developmental processes (Yıldız & Karaca, 2020), enhance their thinking, language, and reading skills, improve the quality of time spent outside school, educate and entertain children (Kaptan & Sürmeli, 2011), and enrich their inner worlds by offering experiences that foster different perspectives (Demir, 2019) through written and visual texts. Additionally, magazines can keep children informed about recent developments in various fields such as science, technology, and health.

In recent years, children's magazines have become increasingly diverse. They can be classified into consumer magazines that support specific products and brands and view children as consumers, electronic magazines, and educational children's magazines (Kaptan & Sürmeli, 2011). One such magazine falls into the category of educational magazines, namely Bilim Çocuk (Science Magazine for Children). Bilim Çocuk is a monthly children's magazine published by the Scientific and Technological Research Council of Turkey (TÜBİTAK). Published on the fifteenth of every month since 1998, Bilim Çocuk is an educational magazine aimed at instilling a love for science in children from a young age, fostering an understanding of science, providing activities to contribute to this goal (Akbaba et al., 2018), sparking curiosity, inquiry, and a desire for learning, making science more enjoyable for children (Eldiven, 2018), and encouraging them to notice phenomena and events around them.

In the period when children are very curious, the aim is to encourage them to explore, observe, interpret what

they are curious about, and develop skills such as drawing conclusions from events and establishing cause-effect relationships. Scientific magazines stimulate children's curiosity by engaging them in activities such as getting to know nature, making observations, interpreting what they are curious about, and drawing meaning from events, thereby helping them acquire skills. By arousing curiosity and making learning more enjoyable and lasting, scientific magazines facilitate a better understanding of scientific concepts.

Particularly, Magazine Bilim Çocuk, which produces abundant content on Astronomy, encourages students to be curious about topics such as space, life in space, space research, space stations, spacewalks, space pollution, and gravity-free environment, which bear similarities to life on Earth. Besides, the Magazine Bilim Çocuk can help children to acquire knowledge in a language suitable for their age level.

In table 1, looking at the Science Curriculum in Turkiye, there are the units and objectives related to the Earth and the Universe in astronomy starting from the 3rd grade of primary school.

**Table 1.**

*Science Curriculum in Turkiye (Primary and Middle School Grades 3, 4, 5, 6, 7, and 8) Topic Areas and Units of the Earth and Universe Domain*

| Grade | Unit | Topic Area |
|---|---|---|
| 3rd | Let's Get to Know Our Planet | Earth and Universe |
| 4th | Earth Crust and Movements | Earth and Universe |
| 5th | Sun, Earth, and Moon | Earth and Universe |
| 6th | Solar System and Eclipses | Earth and Universe |
| 7th | Solar System and Beyond | Earth and Universe |
| 8th | Seasons and Climate | Earth and Universe |

When the literature is reviewed, Eldiven (2018) examined the content of Bilim Çocuk magazine in terms of designing children's identity, while Yavuzoğlu and Pektaş (2020) analyzed the science content between 2000 and 2018 from the perspective of the history of science. Demir (2019) evaluated the use of the magazine in social studies classes, Pembegül (2019) examined the magazine from the perspective of children's rights and provided information about the "Science at Home" section in the magazine, and Yıldız and Karaca (2020) examined the magazine in terms of formal and content elements. Akbaba et al. (2018) examined Bilim Çocuk magazine as an e-magazine in terms of its structural aspects and investigated its contribution to children's literature. Kuyucu (2018), on the other hand, conducted an examination of the advertisements published in the magazine.

In this regard, no research has been found that investigates the content of an informal education-oriented science magazine in the context of current, active, and evolving topics of space and space research and the science curriculum in Türkiye. In this research, contents of the educational Bilim Çocuk Magazine, published regularly every month, since 2004, containing the words "astronaut" and "astronomer," will be examined within the context of the science curriculum in Türkiye.

The research questions are as follows:

1.Which units are related to the contents that have words "astronaut" and "astronomer"?

2.Which objectives in which grade levels are related to the contents that have words "astronaut" and "astronomer"?

3.Do the contents containing the words "astronaut" and "astronomer" align with the subject-specific objectives of the science curriculum in Türkiye?

## METHODOLOGY

In this research, a document analysis design, which is one of the qualitative research methods, was employed. Document analysis enables the analysis of written materials containing information about the concept or concepts under investigation (Yıldırım & Şimşek, 2018; p. 189). Patton (2014) states that document analysis, along with direct observation, is one of the fundamental methods for obtaining qualitative findings, emphasizing that the availability, accessibility, and interpretability of documents are some of the necessary skills for conducting qualitative research. Document analysis is also a purposeful system that involves reviewing and evaluating the entire documents by directly accessing written sources and through the internet (Kıral, 2020; p. 173).

In this context, the contents related to the "Astronomy" theme of Bilim Çocuk magazines published between August 2004 and January 2024 were subjected to document analysis, along with the updated Science Curriculum of 2018.

### Setting and Participants

#### *Data Collection*

In this study, a total of 12 contents related to the "Astronomy" theme in Bilim Çocuk magazines published between August 2004 and January 2024 were examined in terms of unit, subject area, and specific objectives of the Science Curriculum of 2018. The magazines, forming the data analysis unit of the research, were accessed from TÜBİTAK's electronic e-magazine archive, and their examination aimed to highlight situations related to direct concepts such as "space" concerning space, life in space, space research, space stations, spacewalks, space pollution, and gravity-free environment.

#### *Data Analysis*

The data obtained in the study were analyzed using the descriptive analysis technique, a qualitative data analysis method. Descriptive content analysis involves examining and organizing all qualitative and quantitative studies conducted independently within a predetermined framework of a topic. These studies can be published or unpublished and help determine general trends in the field, providing insight into what the general trend is for researchers working in or considering research in the relevant field (Cohen et al., 2007; Miles & Huberman, 1994). Yıldırım and Şimşek (2018) describe descriptive analysis as the clear and systematic description of the data obtained within the scope of the research, followed by interpretations of these descriptions to clarify them and reach conclusions through cause-and-effect relationships. Based on these explanations, contents scanned with the words "astronaut" and "astronomer" in Bilim Çocuk magazines published between August 2004 and January 2024 were analyzed in terms of units, objectives, and specific objectives of the Science Curriculum of 2018 in Türkiye.

## RESULTS AND DISCUSSION

In this section of the study, the obtained findings related to each of the questions expected to be answered in line with the general objective of the research, along with interpretations of these findings, are provided.

The contents scanned with the words "astronaut" and "astronomer" in the Bilim Çocuk magazine are presented Table 2.

**Table 2**

*Contents Scanned with the Words "Astronaut" and "Astronomer" in Bilim Çocuk Magazine*

| Content No | Content Title | Publication Date |
|---|---|---|
| 1 | "I Want to Be an Astronaut" | January / 2022 |
| 2 | "Astronaut Candidates Identified" | January / 2022 |
| 3 | "Chili Peppers Grown on the International Space Station Harvested"<br>"Four Astronauts Returned to Earth" | December / 2021 |
| 4 | "Why Are Astronaut Spacesuits White?" | December / 2021 |
| 5 | "Crew Dragon Carried Astronauts to Space Again" | December / 2020 |
| 6 | "NASA Astronauts Carried by SpaceX Returned to Earth!" | August / 2020 |
| 7 | "Handbook for Young Astronauts" | July / 2020 |
| 8 | "SpaceX Carries NASA Astronauts to the International Space Station" | June / 2020 |
| 9 | "Longest-Serving Female Astronaut in Space!" | January / 2020 |
| 10 | "The Daily Life of Astronauts" | October / 2019 |
| 11 | "International Space Station Hosting Astronauts for Fifteen Years" | November / 2015 |
| 12 | "Hooray, World Astronomy Year Begins" | January / 2009 |

The table above lists the contents scanned with the words "astronaut" and "astronomer" in Bilim Çocuk magazine published between 2004 and 2024, related to the "Astronomy" theme. The 12 focused contents cover various aspects including the daily life of astronauts, the International Space Station, and space travel processes. For example, the content titled "I Want to Be an Astronaut," published in January 2022, aims to attract the interest of younger generations towards astronautics. Similarly, the content titled "Why Are Astronaut Spacesuits White?" published in December 2021 aims to provide information about astronautics from a more technical perspective. Overall, the contents related to astronautics and space research predominantly focus on aspects such as becoming an astronaut from a scientific perspective, living in space and zero gravity environments, space travel, and its characteristics.

Below are the findings regarding the research questions and comments regarding these findings.

***Examining the connection of the content containing the words "Astronaut" and "Astronomer" with the units in the Science Curriculum in Turkiye***

**Table 3**

*Classification of Contents According to Related Units*

| Content No | Content Title | Associated Unit(s) |
|---|---|---|
| 1 | "I Want to Be an Astronaut" | Solar System and Beyond |
| 2 | "Astronaut Candidates Determined" | Solar System and Beyond |
| 3 | "Spicy Peppers Grown in the International Space Station Harvested"<br>"Four Astronauts Returned to Earth" | Solar System and Beyond,<br>Solar System and Eclipses |
| 4 | "Why Are Astronaut Spacesuits White?" | Solar System and Beyond,<br>Sun, Earth, and Moon |
| 5 | "Crew Dragon Carries Astronauts to Space Again" | Solar System and Beyond |
| 6 | "NASA Astronauts Carried by SpaceX Returned to Earth!" | Solar System and Beyond |
| 7 | "Handbook for Young Astronauts" | Solar System and Beyond,<br>Sun, Earth, and Moon |
| 8 | "SpaceX Took NASA Astronauts to the International Space Station" | Solar System and Beyond |
| 9 | "The Female Astronaut Who Spent the Longest Time in Space!" | Solar System and Beyond |
| 10 | "Daily Life of Astronauts" | Solar System and Beyond, Sun, Earth, and Moon |
| 11 | "International Space Station Has Been Home to Astronauts for Fifteen Years" | Solar System and Beyond, Sun, Earth, and Moon |
| 12 | "Hooray, the International Year of Astronomy Has Begun" | Solar System and Beyond, Sun, Earth, and Moon<br>Solar System and Eclipses |

The above table presents the classification of contents containing the concepts of "Astronaut" and "Astronomer" in the Bilim Magazine according to their associated units. The findings indicate that the contents in the magazine are generally grouped under the unit "Solar System and Beyond." For instance, the content titled "I Want to Be an Astronaut" and "Astronaut Candidates Determined" are part of the "Solar System and Beyond" unit within the 7th-grade "Earth and Universe" topic. Additionally, the contents titled "Spicy Peppers Grown in the International Space Station Harvested" and "Four Astronauts Returned to Earth" are associated with both the "Solar System and Beyond" and "Solar System and Eclipses" units. In this context, it can be concluded that the magazine's content related to astronauts is predominantly linked to the "Solar System and Beyond" unit under the 7th-grade "Earth and Universe" topic.

***Examining the content containing the words "Astronaut" and "Astronomer", which grade level in the Science Curriculum in Turkiye and which Objective it is related to.***

**Table 4.**

*Classification of Content in Terms of Grade Level and Objective Link*

| Content No | Content Title | Grade Level | Objective Link |
|---|---|---|---|
| 1 | "I Want to Be an Astronaut" | 7th Grade | "Explains the relationship between technology and space research" |
| 2 | "Astronaut Candidates Selected" | 7th Grade | "Explains the relationship between technology and space research" |
| 3 | "Chili Peppers Grown in International Space Station Harvested" ,"Four astronauts returned to Earth" | 7th Grade 6th Grade | "Explains the relationship between technology and space research" "Compares the planets in the solar system with each other" |
| 4 | Why Are Astronauts' Space Suits White?" | 7th Grade 5th Grade | "Explains the relationship between technology and space research" "Explains the characteristics of the Sun" |
| 5 | "Crew Dragon Carries Astronauts to Space Again" | 7th Grade | "Explains space technologies" |
| 6 | "NASA Astronauts Carried by SpaceX Return to Earth!" | 7th Grade | "Explains space technologies" |
| 7 | "Young Astronaut's Handbook" | 7th Grade 5th Grade | "Explains the relationship between technology and space research" "Explains the characteristics of the Sun" |
| 8 | "SpaceX Takes NASA Astronauts to International Space Station" | 7th Grade | "Explains the relationship between technology and space research" |
| 9 | "Longest Stayed Female Astronaut in Space!" | 7th Grade | "Explains the relationship between technology and space research" |
| 10 | "Daily Life of Astronauts" | 7th Grade 5th Grade | "Explains the relationship between technology and space research" "Explains the characteristics of the Sun" |
| 11 | "International Space Station Hosting Astronauts for Fifteen Years" | 7th Grade 5th Grade | "Explains the relationship between technology and space research" "Explains the characteristics of the Sun" |
| 12 | "Hooray, the World Astronomy Year Has Begun!" | 7th Grade 6th Grade | "Explains the relationship between technology and space research" "Compares the planets in the solar system with each other" |

Upon examining the above table, it is evident that the contents scanned for the terms "astronaut" and "astronomer" in the Magazine Bilim Çocuk detail the connection between grade levels and objectives related to the astronomy theme. The findings indicate that the contents in the magazine are generally geared towards 7th-grade students, focusing on the objective of "Explaining the relationship between technology and space research." For instance, the contents titled "I Want to Be an Astronaut" and "Astronaut Candidates Identified" target this grade level to aim at this objective. Additionally, the contents titled "Chili Peppers Cultivated on the International Space Station" and "Four Astronauts Returned to Earth" cater to both 7th and 6th-grade levels, focusing on different objectives.

***Examining the contents containing the words "astronaut" and "astronomer" within the alignment of the subject-specific objectives of the science curriculum.***

**Table 5**

*Classification of Content Alignment with Specific Objectives*

| No | Content Title | Specific Objectives |
|---|---|---|
| 1 | "I Want to Be an Astronaut" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Developing awareness of career options and entrepreneurial skills in the field of science |
| 2 | "Astronaut Candidates Identified" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Developing awareness of career options and entrepreneurial skills in the field of science |
| 3 | "Chili Peppers Grown on the International Space Station Harvested" "Four Astronauts Returned to Earth" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Assisting in understanding how scientific knowledge is created by scientists, the processes it undergoes, and how it is used in new research |
| 4 | "Why Are Astronauts' Spacesuits White?" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications |
| 5 | "Crew Dragon Carries Astronauts to Space Again" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Developing awareness of career options and entrepreneurial skills in the field of science |
| 6 | "NASA Astronauts Carried by SpaceX Returned to Earth!" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Developing awareness of career options and entrepreneurial skills in the field of science |
| 7 | "Young Astronaut's Handbook" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Developing awareness of career options and entrepreneurial skills in the field of science |
| 8 | "SpaceX Takes NASA Astronauts to the International Space Station" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Developing awareness of career options and entrepreneurial skills in the field of science |
| 9 | "Female Astronaut Holds the Record for Longest Time Spent in Space!" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications,<br>- Developing awareness of career options and entrepreneurial skills in the field of science |
| 10 | "Daily Life of Astronauts" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications |
| 11 | "International Space Station Has Been Home to Astronauts for Fifteen Years" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications |
| 12 | "Hooray, World Astronomy Year Has Begun" | - Providing fundamental knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and science and engineering applications |

Furthermore, this content also aligns with the 10th objective of the "life in our school" unit in the primary school life sciences curriculum in Turkiye, which states, "explores the professions of interest and their characteristics." It is believed that interdisciplinary studies involving both science and life skills subjects could increase students' motivation to become astronauts.

Additionally, the content "Chili Peppers Grown on the International Space Station Harvested" and "Four Astronauts Returned to Earth" align with the aim of helping students understand the processes by which scientists create scientific knowledge.

## CONCLUSION AND RECOMMENDATIONS

In this study, content related to the astronomy theme containing the words "astronaut" and "astronomer" in the Magazine Bilim Çocuk since 2004 was examined within the context of the science curriculum in Turkiye. These contents were primarily associated with the units of the science curriculum. According to the classification, all of the contents are related to the "Earth and the Universe" topic area, specifically the "Solar System and Beyond" unit. Four of the total 12 contents were indirectly associated with "Sun, Earth, and Moon," while two were indirectly related to "Solar System and Eclipses." These results indicate that contents containing the words "astronaut" and "astronomer" are confined to a single unit. No connections were found between the contents containing these words and the units "Let's Get to Know Our Planet," "Earth's Crust and Movements," "Seasons and Climate," or any other related units.

Regarding the other research question, content containing the words "astronaut" and "astronomer" in the Magazine Bilim Çocuk since 2004 was analyzed in terms of grade level and objectives. As a result of this analysis, it was concluded that all of the content was associated with the 7th-grade level, with two contents also being linked to 6th-grade level objectives, and four contents being related to 5th-grade level objectives. No connections were found between the contents and objectives at the 3rd, 4th, and 8th-grade levels. The identified objectives include "Explains the relationship between technology and space research (7th grade)," "Compares the planets in the solar system with each other (6th grade)," and "Explains the characteristics of the Sun (5th grade)." While these objectives are not directly related to topics such as space, life in space, space research, space stations, spacewalks, space pollution, or zero gravity, they are indirectly associated with these topics.

When examining the science curriculum in Türkiye, particularly from the 3rd grade onwards where science classes are introduced, it is evident that there is a gap in the direct coverage of topics such as astronauts, space life, space research, space stations, spacewalks, space pollution, zero-gravity environments, experiments conducted in space, and comparisons with Earth until the 7th grade. This highlights a need for further development in the field of space sciences within the science curriculum in Türkiye.

Discussions in the literature often revolve around how astronomy education should be integrated into the curriculum. There is debate over whether astronomy topics should be taught as a separate subject or integrated with other disciplines. Both approaches include fundamental astronomical topics such as the formation of day and night, seasons, phases of the Moon, eclipses, tides, planets, and stars. These discussions have inspired some countries to develop programs and conduct studies related to astronomy education. The International Astronomical Union has emphasized the importance of including astronomy education in primary and secondary education curricula, regardless of whether it is taught as a separate subject or integrated into other content areas (Trumper, 2006).

Through descriptive analysis, the alignment of astronomy-themed content containing the words "astronaut" and "astronomer" with the specific objectives of the science curriculum in Türkiye has been examined. The results indicate that all content aligns with the objective of providing basic knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and engineering applications, as they all contain the words "astronaut" or "astronomy." Additionally, content containing information about astronauts and astronomers aligns with the objective of developing awareness of career opportunities and entrepreneurial skills related to science. For example, the content "Harvesting Chili Peppers Grown on the International Space Station" aligns with the objective of understanding how scientific knowledge is created, the processes involved, and how it is used in new research.

While the subject-specific objectives of the science curriculum in Türkiye provide a general framework, it is natural that they do not directly refer to the words "astronaut" and "astronomer." However, the first objective, which aims to provide basic knowledge about astronomy, biology, physics, chemistry, earth and environmental sciences, and engineering applications, underscores the importance of astronomy education within the field of science.

Many studies have been carried out on the importance of astronomy education in countries that put great importance to concepts such as science education, scientific literacy, and space sciences (Zeilik et al., 1998; Pena & Quilez, 2001; Trundle et al., 2002; Bakas & Mikropoulos, 2003; Trumper, 2006; Starakis & Halkia, 2010; Kallery, 2011). In these studies, the effects of astronomy education on individuals were examined. When we look at the astronomy education studies conducted in our country in general, they generally aim to determine the knowledge level of students on astronomy subjects (Ünsal et al., 2001; Orbay & Gökdere, 2006; Bayraktar, 2009) or aim to reveal existing misconceptions in students (Ekiz & Akbaş, 2005; Kalkan et al., 2007; Küçüközer, 2008; Emrahoğlu & Öztürk, 2009) seem to be widespread. In addition, it is seen that the importance given to astronomy education in our country has increased over the time and the number of studies in this field has increased (Kahraman, 2006; Bostan, 2008; Kurnaz & Değirmenci, 2011; Çolak, 2014; Gülen & Demirkuş, 2014; Gündoğdu, 2014; Kanlı, 2014; Bektaşlı, 2016; Yılmaz & Laçin Şimşek, 2017; Alın & İzgi, 2017; Buluş-Kırıkkaya & Şentürk, 2018).

While research on concepts related to the universe and Earth is prevalent at the preschool, primary, and middle school levels, studies focusing on "becoming an astronaut" or "motivations for space exploration" among the same age group are also important.

The launch of the SpaceX spacecraft, including Turkey's first astronaut Alper Gezeravcı, and the conduct of various experiments on the International Space Station on January 19, 2024, could be a turning point for the concepts of Turkey-Science-Astronomy. This historic event, occurring for the first time in centuries, could change the perceptions of preschool and primary school students regarding astronomy and space. It could instill the belief that "conducting space research is not too difficult, and I can do it too."

Based on these findings and research results, it is recommended that concepts related to space, space life, space research, space stations, spacewalks, space pollution, and zero-gravity environments be integrated into the primary and middle school science curriculum in Türkiye, tailored to the students' levels. For example, in the 3rd-grade science curriculum unit "Let's Get to Know Our Planet," the objective "Explains the existence of a layer of air surrounding our Earth" could be supplemented with the objective "Understands and explains the effects of space exploration on our daily lives using examples."

Researchers can also examine other educational science magazines, such as Bilim Teknik Dergisi (Science and Technology Magazine), targeted at high school students, within the context of the science curriculum and contribute to the field. Additionally, other astronomy concepts within the "Astronomy" theme of the Magazine Bilim Çocuk can be examined.

Most importantly, integrating concepts related to becoming an astronaut, the lives of astronauts, criteria for becoming an astronaut, and space scientist careers into the 3rd and 4th-grade social and life science studies "career planning" objectives in an integrated manner is recommended. Developing a science curriculum in Türkiye that allows for more frequent responses of "I will become an astronaut" to the question "What do you want to be when you grow up?" holds significance for the development of our country.

As the founder of our Republic, the great leader Atatürk once said, "The Future is in the Skies." Providing science education to students within this vision, conducting scientific research for the realization of this vision, and preparing the groundwork for the science curriculum are important recommendations that can be offered to researchers.

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