

## 2015–2025 Yılları Arasında Fen Bilimleri Eğitim Programları Üzerine Yapılmış Lisansüstü Tezlerin Tematik Analizi

### Thematic Analysis of Postgraduate Theses on Science Education Programs Between 2015 and 2025

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#### ÖZET

Bu araştırmada, 2015-2025 yılları arasında Türkiye’de fen bilimleri öğretim programları alanında yapılmış lisansüstü tezlerin araştırma eğilimleri incelenmiştir. Araştırmada, fen bilimleri öğretim programlarıyla ilgili 29 lisansüstü (yüksek lisans ve doktora) tezi doküman analizi yöntemiyle değerlendirilmiştir. İnceleme kapsamında tezlerin türleri, yayınlanma yılları, araştırma konusu, kullanılan araştırma modeli, örneklem/çalışma grubu, veri toplama araçları gibi temel bileşenler ele alınmıştır. Araştırma bulgularına göre, tezlerin çoğunluğunda fen bilimleri öğretim programlarının genel değerlendirilmesi, teknoloji entegrasyonu, kazanım ve beceri geliştirme, tematik modüller ve ölçme-değerlendirme gibi konulara öncelik verilmiştir. Yöntemsel olarak nitel araştırma yöntemlerinin çoğunlukta olduğu, karma yöntemlerin ise giderek daha fazla tercih edildiği görülmüştür. Üniversitelere göre yapılan analizde, fen bilimleri öğretim programları alanındaki tezlerin farklı üniversitelere dağıldığı ve en fazla katkının 4 tez ile Marmara Üniversitesi tarafından sağlandığı belirlenmiştir. Çalışma gruplarında ağırlıklı olarak öğretmenlerin yer aldığı ve veri toplama süreçlerinde görüşme, anket ve doküman incelemesi gibi çoklu yöntemlerin kullanıldığı belirlenmiştir. Veri analizinde ise betimsel teknikler ve içerik analizine sıkça başvurulduğu ortaya çıkmıştır. Sonuç olarak, fen bilimleri öğretim programları alanında deneysel modellerin, nitel ve karma yöntemlerin daha fazla kullanılmasının; çalışma gruplarının çeşitlendirilerek farklı paydaşların araştırmalara dahil edilmesinin; araştırma konularının güncel ve özgün şekilde belirlenmesinin; veri toplama ve analiz süreçlerinin çeşitlendirilip detaylandırılmasının önem taşıdığı önerilmiştir. Bununla birlikte, benzer konularda yapılmış makale ve bildirilerle karşılaştırmalı çalışmaların artırılması alanın gelişimine katkı sağlayacaktır.

**Anahtar Kelimeler:** Fen bilimleri, öğretim programları, lisansüstü tezler, tez inceleme

#### ABSTRACT

In this study, the research trends of postgraduate theses conducted in the field of science education curricula in Turkey between 2015 and 2025 were examined. A total of 29 postgraduate theses (master’s and doctoral) related to science education curricula were evaluated using the document analysis method. The study addressed key components such as the type of theses, year of publication, research topic, research model used, sample/study group, and data collection tools. Findings revealed that most theses focused on topics such as general evaluation of science education curricula, technology integration, skill and competency development, thematic modules, and assessment and evaluation. Methodologically, qualitative research methods were predominant, with mixed methods being increasingly preferred. The university-based analysis showed that the theses were distributed across various universities, with Marmara University contributing the highest number (4 theses). It was also determined that teachers were the predominant participants in the study groups, and multiple data collection tools such as interviews, questionnaires, and document analysis were employed. In terms of data analysis,

descriptive techniques and content analysis were frequently used. As a result, it was suggested that experimental models, qualitative, and mixed methods should be more frequently utilized in the field; study groups should be diversified to include different stakeholders; research topics should be selected to be current and original; and data collection and analysis processes should be diversified and detailed. Furthermore, increasing comparative studies with articles and papers on similar topics would contribute to the development of the field.

**Keywords:** *Science education, curricula, postgraduate theses, thesis analysis*

## INTRODUCTION

In 2024, it became necessary to update the Science Education curriculum, as was the case in other fields. The evolving expectations of students and teachers, the shifting areas of interest among students, and the rapid advancements in technology have necessitated a comprehensive reorganisation of the existing programme. In this regard, the new curriculum, which aims to develop individuals in a balanced way academically, socially and emotionally, was implemented in 2024. The new programme is founded on a holistic approach to education and has been developed within the framework of the "Turkey Century Education Model." In this model, subject and conceptual skills, aptitudes, social-emotional skills, values, and literacy are addressed holistically. The following essay will provide a comprehensive overview of the relevant literature on the subject.

The objective of the programme is to facilitate students' multidimensional development and to equip them with the competencies required for both national and international contexts. These competencies, determined in accordance with the Turkish Qualifications Framework, reflect a robust science education approach that encompasses 21st-century skills. The programme has been designed to enable students to utilise their literacy skills effectively in problem-solving and conscious decision-making processes. In addition, it aims to develop students' career awareness in science. The content has been enriched with skills and integrated with values education and interdisciplinary relationships into the teaching process. This approach is designed to ensure that students' academic and personal development is supported through a multifaceted and holistic lens.

The science education curriculum has undergone numerous revisions since the early years of the Republic, influenced by scientific and technological developments. The initial substantial step was taken at the Education Congress, which was organised under the leadership of Mustafa Kemal Atatürk in 1921, and the "Primary School Curriculum Program" was published in 1924 (Arslan, 2007). The Republic's inaugural comprehensive programme was devised in 1926, encompassing science education through the courses entitled "Life Skills", "Nature", and "Objects" (Tan Polat, 2019). In 1936, the "Nature" and "Objects" courses were amalgamated under the designation

"Nature Studies", and in 1948, the scope was expanded to create a programme that would be implemented for many years (Gücüm and Kaptan, 1992).

The 1968 programme, following a protracted preparatory process, grouped science courses under the designation "Science and Natural Sciences"; in 1974, it was renamed "Science". The 1992 program, however, distinguished itself from previous ones by setting specific objectives and behaviours for each grade level (Çelenk, Tertemiz, and Kalaycı, 2000).

In 2004, the programme was renamed "Science and Technology", a constructivist approach was adopted, and the concept of technology was included in the course name at the primary education level (Eskicumalı et al., 2014; Yurdatapan, 2011). The 2013 programme was predicated on an inquiry-based approach and its vision was founded on science literacy (MEB, 2013).

In 2017, the programme underwent an update in accordance with public opinion, resulting in the incorporation of the learning area "Science and Engineering Applications" and a reduction in the number of learning outcomes (Tan Polat, 2019). The 2018 revision sought to adapt to technological developments. The 2024 Science Program has been meticulously formulated within the overarching framework of the "Turkey Century Education Model," adopting a comprehensive educational approach that is in alignment with the competencies deemed essential for the 21st century.

In this context, particular emphasis has been placed on interdisciplinary connections, the establishment of a culture of science, adaptation to digital transformation, and awareness of sustainability. The programme has been developed to facilitate students' comprehension of the history of science, to acknowledge the contributions of scientists from the Turkish-Islamic civilisation, and to promote the adherence to scientific ethical principles. Moreover, the programme seeks to furnish students with a foundation of knowledge in fundamental disciplines such as physics, chemistry, and biology. It aims to instil environmental awareness in students and to facilitate the generation of solutions to pressing global challenges through technological application. In summary, the programme provides a contemporary framework that aims to cultivate individuals who are integrated with their values, inquisitive, productive, questioning, and entrepreneurial.

In the course of a review of the extant literature on the Science Education Program, Beker (2025) examined teachers' opinions on the updated 5th grade Science teaching program for 2024 and found that the program's general characteristics were positively evaluated, but misconceptions arose due to the confusion between learning outcomes and learning evidence. With regard to measurement and evaluation, the following issues were identified: insufficient knowledge, a lack of physical resources, and the need for in-service training. Güldeş (2025) examined the reflection of textbook

activities on higher-order thinking skills, finding that critical thinking was supported, problem-solving skills were hardly addressed, and analytical thinking was the most emphasised area. It was determined that there was an imbalance in the distribution of skills across activities. Makal (2025) determined that the empathy modules themed "Zero Waste" and "Cat," integrated into the science programme, increased empathy, environmental awareness, and the desire for cooperation among 7th-grade students, and brought about positive changes in environmentally friendly behaviours. Yenigün (2024) revealed that the majority of science teachers were in favour of the addition of antibiotic use and vaccination topics to the science curriculum. The study also found that most teachers did not find it difficult to teach these topics, but that some teachers experienced difficulties. Mustafa Ok (2024) determined that the science teaching programme, prepared based on a systematic approach, is effective in increasing student achievement when integrated with technology. The programme was found to be both enjoyable and educational by the students, and it was recommended that technology-supported activities be expanded. Tuğba Yılmaz (2024) conducted an examination of the science curriculum, textbooks, and EBA content for grades five through eight, focusing on the affective domain skills. The study's findings indicated that the programme's curriculum failed to adequately address affective skills, and that the teaching materials provided insufficient support for students' affective development. In Nurdan Akar's (2024) study, middle school students participated in activities themed around core values related to science, and these activities were found to contribute positively to students' value development. It was posited by the students that the activities under discussion were commensurate with the objectives of the science curriculum. It was further recommended that such activities be incorporated into the existing science teaching programme.

A thorough examination of the extant studies reveals the general trends in research conducted in the field of science in Turkey. However, it is noteworthy that the number of postgraduate theses conducted within the scope of the "education program" and "teaching program" for science courses is limited. In view of the aforementioned circumstances, a thorough investigation of the master's theses encompassed within the purview of the research, with respect to subject, model, sample, data collection instruments, and analytical methodologies, is poised to significantly contribute to the resolution of the identified lacuna within the domain. This examination will serve as a guide for academics, graduate students, and teachers who plan to work in this field in the future.

## METHOD

### Research Model

This research is a descriptive study conducted within the scope of the science education programme in Turkey, aiming to reveal the thematic distribution of

postgraduate theses. It was carried out within the scope of a survey model. The research includes a systematic evaluation of existing postgraduate theses in terms of dimensions such as year, subject, method, sample, and analysis techniques.

### Population and Sample

The population of the study consists of all postgraduate theses in the field of science education and related sub-headings in the Higher Education Council National Thesis Centre (YÖKTEZ) archive. Within this population, master's and doctoral theses prepared between 2015 and 2025 and focusing on science education were specifically targeted. The sample of the research consists of 29 master's and doctoral theses selected by searching for relevant keywords during this time period. Upon examining the population, it was determined that the number of postgraduate studies related to science education programmes is limited, but the subject is gaining importance in the field of education.

**Table 1.**

*Authors and Titles of Postgraduate Theses*

| Author            | Year | Thesis Title                                                                                                                                                                      |
|-------------------|------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BEKER, K.         | 2025 | Evaluation of the 5th grade science teaching programme updated in 2024 based on teachers' opinions                                                                                |
| MAKAL, N.         | 2025 | Development, implementation and evaluation of empathy education modules integrated into the science teaching programme                                                            |
| GÜLDEŞ, D.        | 2025 | Examination of the extent to which activities in the new 5th grade science teaching programme textbook reflect critical thinking, problem solving and analytical thinking skills  |
| OK, M.            | 2024 | Examination of the effectiveness of the science teaching programme prepared based on a systematic approach from information and communication technology (ICT) integration models |
| AKAR, N.          | 2024 | Implementation of core value-themed activities related to the science teaching programme for secondary school students and their views on the development of values               |
| SÜRMELİ AKGÖZ, F. | 2024 | The examination of the concept of natural disasters in primary school life skills, social studies and science teaching programmes and textbooks                                   |
| YILMAZ, T.        | 2024 | The examination of science teaching programmes (Years 5, 6, 7 and 8), textbooks and eba content in terms of affective domain skills                                               |
| YENİGÜN, M.       | 2024 | Science teachers' views on integrating antibiotic use and vaccination into the science teaching programme                                                                         |
| EKİZCE, H. N.     | 2023 | Examination of core values in Science Children's Magazines according to science teaching programme outcomes                                                                       |
| ÇAMLICA, G.       | 2022 | Evaluation of the 2018 science teaching programme according to the CIPP model                                                                                                     |

| Author                  | Year | Thesis Title                                                                                                                                                |
|-------------------------|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DELİL, S.               | 2022 | Analysis of the achievements in the primary school science teaching programme according to the TIMSS 2019 framework                                         |
| ÇAMLICA, G.             | 2022 | Evaluation of the 2018 science teaching programme according to the CIPP model                                                                               |
| KIZMAZ, E.              | 2022 | Examination of the science teaching programme and textbooks in the context of the circulatory system using the didactic transformation theory approach      |
| SIRTLI, H. Ş.           | 2022 | Reflections of the 2018 science teaching programme assessment and evaluation approach on the Education Information Network (EBA): Secondary school analysis |
| GÜRDAL, B.              | 2021 | Teachers' views on the 2018 updated 6th grade science teaching programme and its implementation                                                             |
| ALTAY, E.               | 2020 | Research on primary school science curriculum, textbooks, and teachers' model usage approaches                                                              |
| CAN, K.                 | 2020 | Evaluation of primary school science curriculum, textbooks, and student learning outcomes in terms of scientific process skills                             |
| YETİM, H.               | 2020 | Reflections of assessment and evaluation approaches in 3rd-5th grade textbooks in light of the 2018 science curriculum                                      |
| BALIKÇI, Ç.             | 2019 | Evaluation of the 3rd grade science teaching programme according to the CIPP model                                                                          |
| ÖZTÜRK<br>ÇETİNKAYA, F. | 2019 | Evaluation of science teachers' beliefs and practices regarding assessment and evaluation processes in terms of the science teaching programme              |
| YOLCU, O.               | 2019 | Examination of the secondary school science teaching programme in terms of teacher autonomy based on the Stufflebeam Evaluation Model                       |
| ASLAN, H.               | 2019 | Examination of the fourth grade primary school science curriculum and its applications in terms of imparting higher-order thinking skills to students       |
| ÇELTEK, M.              | 2019 | Topics perceived as difficult in the science curriculum, possible reasons, and teacher and student views                                                    |
| SARI, A.                | 2019 | Teacher views on the 'science, engineering and entrepreneurship applications' learning area of the science curriculum                                       |
| DÖNMEZ, H.              | 2019 | Examination of the learning outcomes and assessment questions of the science curriculum for Years 6, 7 and 8: SOLO taxonomy                                 |
| DEVECİ, İ.              | 2016 | Development, implementation and evaluation of entrepreneurship education modules integrated with the science curriculum (Years 5-8)                         |
| ÇAĞLAR, Y.              | 2015 | Teachers' views on the 2013 science curriculum                                                                                                              |
| CAN, Ö.                 | 2015 | Examination of the revised science curriculum for grades 3 and 4 based on teachers' views                                                                   |
| KUBAT, U.               | 2015 | Evaluation of the learning outcomes of the fifth-grade science curriculum based on teachers' views: The case of Muğla province                              |

## Limitations

The research is limited to postgraduate theses registered at the Higher Education Council National Thesis Centre between 2015 and 2025 that are directly related to science education programmes. Furthermore, only theses that are accessible and available in full text have been included in the research. Consequently, some studies may be excluded from the scope.

## Data Collection and Analysis

Document analysis was utilised as the data collection instrument in the research study. Document analysis is defined as the process of systematically reviewing existing theses to collect and interpret data (Karadağ, 2009). In this context, the selected theses were methodically classified and analysed in detail according to a range of criteria, including year of publication, research model employed (quantitative, qualitative, or mixed), research sample, data collection tools, analysis techniques, and thematic content of the study. The analysis results were interpreted in a manner that revealed research trends, methodological preferences, and gaps in the literature related to science education programmes. Moreover, the presentation included recommendations for further studies in this field, which were based on the findings.

The following essay will provide a comprehensive overview of the relevant literature on the subject.

## FINDINGS

It was determined that twenty-four of the postgraduate theses included in the sample were master's theses, while five were doctoral theses.

**Table 2.**

*Distribution of Theses Included in the Sample by Type and Year of Publication*

| Year | Number of Master's Theses | Number of Doctoral Theses | Total Number of Theses |
|------|---------------------------|---------------------------|------------------------|
| 2015 | 2                         | 1                         | 3                      |
| 2016 | 0                         | 1                         | 1                      |
| 2019 | 6                         | 1                         | 7                      |
| 2020 | 3                         | 0                         | 3                      |
| 2021 | 1                         | 0                         | 1                      |
| 2022 | 4                         | 0                         | 4                      |

| Year         | Number of Master's Theses | Number of Doctoral Theses | Total Number of Theses |
|--------------|---------------------------|---------------------------|------------------------|
| 2023         | 2                         | 0                         | 2                      |
| 2024         | 4                         | 1                         | 5                      |
| 2025         | 2                         | 1                         | 3                      |
| <b>Total</b> | <b>24</b>                 | <b>5</b>                  | <b>29</b>              |

As illustrated in Table 2, between the years 2015 and 2025, a total of 29 postgraduate thesis studies were conducted on the science education programme. Of these, 24 were at master's level and 5 at doctoral level. A closer look at the distribution by year reveals that the most prolific year in terms of thesis production was 2019, with a total of six master's theses and one doctoral thesis completed. Other years that demonstrated high production levels included 2022, with four master's theses, and 2024, with four master's theses and one doctoral thesis. Conversely, the number of theses was comparatively low in 2016, 2021 and 2023, with only one doctoral thesis in 2016, one master's thesis in 2021 and two master's theses in 2023. This situation indicates that thesis work has followed a fluctuating pattern over the years.

**Table 3.**

*Thematic Distribution of Science Education Programme Theses*

| Theme                                                | Number of Master's Theses | Number of Doctoral Theses | Total Number of Theses |
|------------------------------------------------------|---------------------------|---------------------------|------------------------|
| General Evaluation of the Science Teaching Programme | 8                         | 2                         | 10                     |
| Technology Integration and Digital Content           | 4                         | 0                         | 4                      |
| Review of Learning Outcomes and Skills               | 5                         | 0                         | 5                      |
| Thematic and Value-Based Modules                     | 3                         | 1                         | 4                      |
| Assessment and Evaluation Approaches                 | 3                         | 0                         | 3                      |
| Textbooks and Content Analyses                       | 3                         | 0                         | 3                      |
| <b>Total</b>                                         | <b>26</b>                 | <b>3</b>                  | <b>29</b>              |

As illustrated in Table 3, of the 29 theses examined on science education programmes between 2015 and 2025, the majority of studies concentrated on the overall evaluation of the programme. A total of 10 theses in this area provide comprehensive analyses of the programme's structure, implementation and stakeholder views. The integration of technology and the impact of digital content on science education are addressed in four theses, while the development of achievements and skills is addressed in five theses, thereby demonstrating the significance attributed to students' critical thinking and scientific process skills. Four theses on thematic and value-based modules focus on the linkage of science education to social-emotional development and ethical values, while three theses examining measurement and evaluation approaches emphasise the necessity for fair and effective measurement of student achievement. A close examination of three theses devoted to textbooks and content analysis reveals the role of the quality of educational materials in achieving programme objectives. A review of the extant literature indicates that the structural and pedagogical dimensions of science teaching programmes have been the focus of research, yet the paucity of studies on assessment and evaluation, and material analysis, suggests that further research is required in these areas.

Doctoral theses, by contrast, typically concentrate on the comprehensive evaluation of science education programmes and thematic-value-based modules. These theses are distinguished by their more in-depth and thorough analyses. Conversely, master's theses tend to encompass a more extensive and application-oriented array of subjects, including technology integration, learning outcomes, assessment and evaluation, and textbooks. It can be concluded that doctoral studies are geared towards strategic programme development, while master's theses are geared towards practical and content-focused research.

**Table 4.**

*The following study groups are included in the theses*

| Sample                            | Number of Theses | Description                                                                                                            |
|-----------------------------------|------------------|------------------------------------------------------------------------------------------------------------------------|
| Teacher Opinions                  | 12               | The research is based on the views and experiences of teachers.                                                        |
| Student Opinions                  | 2                | The views and experiences of students have been included in the studies.                                               |
| Both Teacher and Student Opinions | 3                | Theses that evaluate both teachers' and students' views together.                                                      |
| No Sample Group                   | 12               | Theses that do not involve a working group, such as educational programme reviews, evaluations, and textbook analyses. |
| <b>Total</b>                      | <b>29</b>        |                                                                                                                        |

As demonstrated in Table 4, the majority of theses on science teaching programmes between 2015 and 2025 comprised teachers as the study group. The standpoint of educators was given primacy in the 12 theses, thereby signifying the significance attributed to the experiences and assessments of the programme's implementers. A total of two theses were found to be exclusively concerned with the perspectives of students. Consequently, these theses proceeded to undertake an examination of the programme's reflections on the student dimension. The three theses proffered a multifaceted perspective, addressing both teachers' and students' views in unison. A further salient point is that 12 theses principally examine programme texts, learning outcomes, textbooks and content through document analysis. This distribution indicates that researchers evaluated both the implementer and beneficiary perspectives, and that theoretical and document-based studies also played an important role.

**Table 5.**

*Types of Research Used in Theses in the Field of Science Education Programmes*

| Method Name  | Number of Method | %          |
|--------------|------------------|------------|
| Qualitative  | 17               | 58.62      |
| Quantitative | 3                | 10.34      |
| Mixed        | 9                | 31.03      |
| Total        | <b>29</b>        | <b>100</b> |

An examination of Table 5 reveals that 58.6% of the 29 studies in the field of science were conducted using qualitative methods, thereby underscoring the significance accorded to in-depth and explanatory studies in this domain. Quantitative methodologies were employed in a mere 10.3% of the studies, suggesting a predominant emphasis on participant experiences in conjunction with numerical data. The application of mixed methods accounted for a significant proportion of the total at 31.1%, reflecting an endeavour to obtain more comprehensive and reliable results by evaluating both quantitative and qualitative data in unison. It is evident that, while qualitative approaches predominate in the field of science research, the increasing use of mixed methods indicates that analyses in this domain are becoming more balanced and comprehensive. It is conceivable that research will become more diversified in the future as the number of quantitative studies also increases.

Table 6.

*Data Collection Methods Used in Theses*

| Data Collection Method                   | Number of uses |
|------------------------------------------|----------------|
| Survey                                   | 13             |
| Interview (semi-structured / structured) | 16             |
| Document Review / Analysis               | 11             |
| Observation                              | 3              |
| Test / Measurement Tool                  | 2              |
| Self-assessment Form                     | 1              |

The frequency with which the data collection methods outlined in Table 6 were employed clearly indicates that a preference for multi-method approaches was evident in the studies. The most frequently employed methods include interviews (semi-structured or structured) with 16 instances, questionnaires with 13 instances, and document review/analysis with 11 instances. In less frequent instances, alternative methods are employed, such as observation, the utilisation of test and measurement tools, and the employment of self-assessment forms. The rationale behind the aggregate number of uses exceeding the number of theses is that numerous data collection methods are frequently employed in conjunction with one another in a multitude of studies, with the objective of ensuring data integrity and facilitating more profound analysis. Consequently, studies endeavour to attain more robust results by being supported by both qualitative and quantitative data.

Table 7.

*Distribution of postgraduate theses included in the sample according to the universities where they were completed*

| University Name                | Number of Theses |
|--------------------------------|------------------|
| Marmara Üniversitesi           | 4                |
| Bursa Uludağ Üniversitesi      | 2                |
| Necmettin Erbakan Üniversitesi | 1                |
| İstanbul Üniversitesi          | 1                |
| Ondokuz Mayıs Üniversitesi     | 1                |

| University Name                       | Number of Theses |
|---------------------------------------|------------------|
| Dokuz Eylül Üniversitesi              | 1                |
| Bartın Üniversitesi                   | 1                |
| Niğde Ömer Halisdemir Üniversitesi    | 1                |
| Bahçeşehir Üniversitesi               | 1                |
| Manisa Celal Bayar Üniversitesi       | 1                |
| Bolu Abant İzzet Baysal Üniversitesi  | 3                |
| Zonguldak Bülent Ecevit Üniversitesi  | 2                |
| Amasya Üniversitesi                   | 1                |
| Aydın Adnan Menderes Üniversitesi     | 1                |
| Uşak Üniversitesi                     | 3                |
| Gaziantep Üniversitesi                | 1                |
| Kahramanmaraş Sütçü İmam Üniversitesi | 1                |
| Süleyman Demirel Üniversitesi         | 1                |
| Çanakkale Onsekiz Mart Üniversitesi   | 1                |
| Muğla Sıtkı Koçman Üniversitesi       | 1                |
| <b>Total</b>                          | <b>29</b>        |

As demonstrated in Table 7, a total of 29 theses were completed at various universities, with Marmara University contributing the most with four theses. Uşak University and Bolu Abant İzzet Baysal University each contributed three theses, while Bursa Uludağ University and Zonguldak Bülent Ecevit University each contributed two theses, thereby playing an active role in the research. It is evident that other universities contributed to academic diversity with one thesis each. This distribution underscores the comprehensive and inclusive nature of research initiatives across Turkey, encompassing its diverse geographical and academic centres. It is noteworthy that this approach fosters interdisciplinary collaboration and knowledge sharing, thereby contributing to the advancement of research in a multifaceted and inclusive manner. Consequently, these theses, conducted at various institutions, not only augment the scientific richness of the field but also underscore the prevalence and diversity of academic activities across the country.

## DISCUSSION AND CONCLUSION

This study, which examined master's theses on science education programmes in Turkey between 2015 and 2025 from a thematic and methodological perspective, revealed important findings regarding the development of the field. The fact that the vast majority of the 29 theses examined were completed at the master's level indicates that research on science education is particularly concentrated in postgraduate education. It was found that the number of theses fluctuated over the years, with increases in 2019, 2022 and 2024, and low thesis production in 2016, 2021 and 2023. It

is thought that this situation may be due to seasonal variations in research interests and resource distribution.

A thematic analysis of the extant literature revealed a preponderance of studies that focused on the overall evaluation of science education programmes. This finding indicated that the structural and functional dimensions of these programmes were being addressed comprehensively. Moreover, it was observed that themes pertaining to technology integration, the reflection of digital content in science education, and the development of learning outcomes and skills occupied a significant place in the research. However, the paucity of studies examining assessment methods and teaching materials has exposed significant knowledge gaps and research needs in these areas.

With regard to the composition of the research sample, it was determined that the majority of subjects were teachers. The following essay will provide a comprehensive overview of the relevant literature on the subject.

The working group was referenced less frequently in the theses, with student opinions being mentioned less often. It was determined that this phenomenon may have arisen from the prioritisation of the experiences and evaluations of those implementing science teaching programmes. Moreover, the utilisation of document analysis without the incorporation of a direct implementation group in numerous theses suggests a theoretical examination of programme content and outcomes. From a methodological perspective, it has been demonstrated that qualitative methods have been preferred in the majority of postgraduate research in the field of science, while mixed methods have been used to an increasing extent. The observed preference for qualitative methods may be indicative of a tendency towards in-depth understanding and participant experiences in the field. However, the utilisation of mixed methods signifies an endeavour on the part of researchers to achieve more comprehensive and reliable results by evaluating both quantitative and qualitative data in unison. Moreover, the employment of multiple data collection techniques evidently signifies the significance attributed to data integrity and the extent of analysis in these studies.

A university-based analysis revealed that theses within the domain of science education programmes were disseminated across multiple universities. Notably, Marmara University emerged as the leading contributor, with a total of four theses. Uşak University and Bolu Abant İzzet Baysal University were notable for their three theses each, while Bursa Uludağ University and Zonguldak Bülent Ecevit University were active with two theses each. The presence of one thesis at other universities

indicates that research on science education is conducted in a widespread and diverse manner across the country.

### Recommendations

Based on the findings outlined above, researchers may propose the following recommendations:

1. The number of studies on assessment and evaluation processes in science education programmes should be increased, and original, application-oriented research should be conducted in this field.
2. Student opinions should be given greater consideration, and programmes should be evaluated from the beneficiary perspective; thus, the effectiveness of educational programmes and student satisfaction should be increased.
3. Studies on current educational trends, such as technology integration, the use of digital content, and the development of learning outcomes, should be encouraged, and science teaching programmes should be adapted to the requirements of the age.
4. Reviews of educational materials and textbooks should be increased, and the suitability of materials for programme objectives and their impact on the educational process should be analysed in detail.
5. For the sustainability of research and applications, science teaching programmes should be continuously updated, and innovative approaches should be regularly monitored.

These recommendations will serve as a guide to improving the quality of research in science education, enhancing the effectiveness of educational programmes, and making significant contributions to the scientific development of the field.

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