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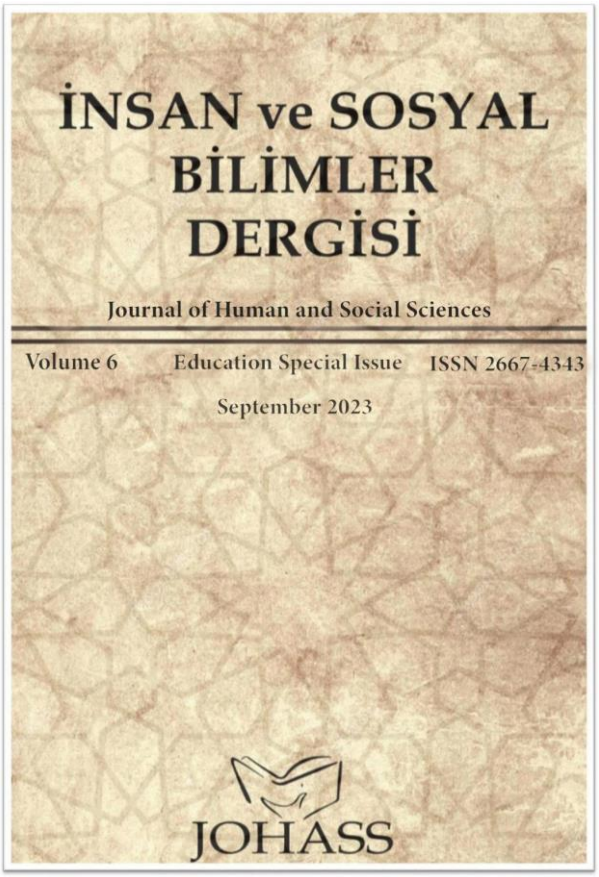


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# Thematic Analysis of Theses on Distance Education in Science Education

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# Thematic Analysis of Theses on Distance Education in Science Education

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**Abstract**

The aim of the study is to analyze the postgraduate theses in the field of science education within the scope of distance education. The document analysis method was used in this study, adopting a qualitative approach. Within the scope of the research, 50 theses that are suitable for the purpose reached by YÖK National Thesis Center with the words "distance education" and "science" constitute the documents of the study. The theses were coded according to type, research approach, sample, data collection tools, and data analysis methods and then subjected to descriptive analysis by determining their frequencies and percentages. As a result of the research, it was concluded that the theses examined were mostly master's theses; nearly 50% of them used qualitative research methods. In addition, "teachers" were mainly preferred as the sample. Also, concerning the chosen research design, the data collection tools, and data analysis methods were appropriately selected.

**Keywords:** Distance education, science education, thematic analysis

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## Introduction

On March 11, 2020, after COVID-19 was declared as a pandemic by the World Health Organization (URL-1), unexpected developments in education were experienced worldwide, as in many areas. It has been reported that the rate of spread of COVID-19 has been described as extremely fast and has caused significant economic hardship (Briggs et al., 2020). In countries around the world, it was found that the only way to stop the spread of COVID-19 infection was to stay at home and avoid social gatherings following social distancing (Madurai-Elavarasan & Pugazhendhi, 2020). Therefore, educational activities have also been disrupted. In line with the principle that education is a fundamental human right, many educational institutions have used emergency remote education (ERE) applications worldwide to compensate for the education interrupted due to the pandemic (Bozkurt, 2020). Due to the Presidential cabinet meeting on March 12, 2020, Turkey decided to continue education with distance education methods in educational institutions affiliated to the Ministry of National Education (URL2, 2020). Similarly, the Council of Higher Education made a press release and started distance education in all universities on March 25, 2020 (URL2, 2020).

During the COVID-19 pandemic, students across the globe were required to shift from in-person learning to virtual learning. According to a study by Salend (2020), the shift to distance learning resulted in students having difficulty accessing their virtual classrooms, lacking personal interactions and support, and teachers not being able to provide adequate oversight and accountability of their students. The COVID-19 pandemic has brought to light the need to provide students in general education with access to virtual learning and to provide teachers and students with the knowledge and support that they need to make the most of this kind of learning (Gifford, 2020). Learners have greater educational flexibility and access to academic materials, thanks to the recent spike in the popularity of online learning as an essential component of today's educational environment. Gifford (2020) noted that this trend has been largely attributed to the advent of recent technological advances.

Meanwhile, many students, parents, and instructors have found the rapid change to distance learning due to the COVID-19 epidemic to be challenging. This quick transition to studying via distant means has substantially influenced pupils' learning. Disadvantages included learning loss, lack of student participation and engagement, students' mental health, inequities caused by digital divide, learning loss, lack of training for students, social and

emotional concerns, social skills, and lack of teacher preparedness (Garcia, 2023). COVID-19 expedited the naturally occurring growth in distance education as brick-and-mortar institutions were forced to close their doors (Brashear & Thomas, 2020). To keep a level of normalcy, avoid interrupting students' academic plans and provide faculty and university administrators with continued employment, institutions shifted their instructional modalities to a fully online format (Thomaszek & Muchacka-Cymerman, 2022).

Within the scope of distance education, TV and internet-based distance education platforms have started to be actively used by providing lessons via EBA (Education Information Network), internet, TRT channel, and television (Özdoğan & Berkant, 2020). For schools affiliated to the Ministry of National Education, it is seen that ten different courses for primary and secondary school level and 22 different courses for high school level are carried out as distance education and TV support (Can, 2020). Notably, the courses generally consist of introductory courses (Turkish, Mathematics, Physics, Chemistry, Biology, etc.), and other courses (Painting, Music, Physical Education, Visual Arts, etc.) are not included in the application. During the pandemic, the transition of universities to distance education has been rapid. Of 189 universities, 121 (64%) switched to distance education on March 23, 2020, 41 (21.6%) on March 30, 2020, and 25 (13.2%) on April 6, 2020. In the 2019-2020 Spring semester, while the number of courses to be offered in higher education institutions was 736,341, 663,808 courses were offered with the transition to distance education, and 90.1% of the courses were offered through distance education (Dikmen & Bahçeci, 2020).

Educational processes, difficulties, and various experiences during the pandemic have been included in academic research and studies conducted after 2020 (Taşkın & Kuru-Çetin, 2021). The COVID-19 pandemic and subsequent physical distancing measures have created challenges for interdisciplinary researchers. It is crucial to find ways to continue interdisciplinary research in progress, to design research for pandemic management and to achieve significant outcomes. However, the pandemic also creates opportunities for new research projects and new research designs, but in order to evaluate these opportunities, existing research methodologies must be adapted and their applicability for new research must be determined (Sy et al., 2020).

In particular, considerations to keep in mind when designing interdisciplinary research during the pandemic include research ethics and integrity, research design, data collection methods, research opportunities, implications, and limitations (Çağlayan et al., 2022). The effects of COVID-19 may require interdisciplinary researchers to change their research

methods. The shift to remote data collection may create the need to assess participants' ability to understand and use technological devices or applications. Online data collection methods, which were used in many quantitative research designs before physical distance measures came into effect, have become more preferred with the pandemic conditions. However, there are ways to reduce the challenges of physical distance and improve the diversity of tools to be used in research (Sy et al., 2020).

In this context, this study aims to reveal the trends in the research on education during the pandemic by conducting a thematic analysis of the theses and dissertations on distance education in Turkey after the pandemic period. It is thought that a holistic and systematic analysis of the different practices and perspectives that emerged in the field of education with the pandemic affecting the whole world can be a source of reference for research topics and methods in future studies. In this context, the main problem of the study was formed as "How is the analysis of science education thesis studies dealing with distance education approach in Turkey after the pandemic according to various variables?".

In this context, answers to the following research questions were sought within the framework of the problem addressed:

- How are the analyzed graduate theses distributed according to their types?
- Which research approach and sampling groups were preferred in the theses?
- Which data collection tools and data analysis methods were preferred in the theses?

## Method

### Research Model

The document analysis method, one of the qualitative research methods, was used in this study. Document analysis enables inferences to be made from written and visual materials (textbooks, program directives, in and out of school correspondence, student records, pictures, films, and articles, etc.) that contain information about the phenomena or events that are intended to be investigated (Yıldırım & Şimşek, 2011). The study examined postgraduate thesis studies in the field of science education that addressed the issue of distance education after the pandemic.

**Data Collection Tool**

The research classification form created by the researchers was used to analyze the theses in this study. The research classification form consists of fields covering the year the thesis was published, the type of thesis, the sample of the thesis, the data collection tools used in the thesis, the research method used in the thesis, and the data analysis methods used in the thesis. The studies were analyzed using the data obtained from this form.

**Sample of the Study**

The theses examined in the study were accessed by searching the keywords "distance education" and "science" in the National Thesis Center on the website of YÖK. In this context, a total of 50 theses, 47 master's and 3 doctoral theses, were selected for this study.

**Data Analysis**

The Microsoft Excel program was used to code the theses included in the study, which were coded separately. Theses were classified according to the type of thesis, the year the thesis was published, the sample of the thesis, the data collection tools used in the thesis, the research method used in the thesis, and the data analysis methods used in the thesis. The studies were analyzed according to descriptive analysis. Descriptive analysis is a type of qualitative data analysis that involves summarizing and interpreting the data obtained according to predetermined themes. Its purpose is to present the findings obtained in a summarized and interpreted form (Yıldırım & Şimşek, 2003).

**Reliability and Validity**

Since this study deals with theses accepted by the Council of Higher Education, it is assumed that theses are naturally valid and reliable. For the reliability of this study, two researchers worked independently, and the researcher took part in the data coding process. After the first coding, the inter-coder reliability coefficient was calculated as 91% according to Miles and Huberman formula. The study is reliable since this rate is above 70% (Miles & Huberman, 1994). The researchers then came together to compare their coding and agreed on the items that caused disagreement.

## Findings

### Distribution of Theses According To Their Types

The distribution of the theses examined within the scope of the research according to the status of master's and doctorate is given in Table 1.

***Table 1***

*Types of Examined Theses*

| Types | f | % |
|---|---|---|
| **Master** | 47 | 94% |
| **PhD** | 3 | 6% |
| **Total** | 50 | 100% |

When the data in Table 1 are examined, it is concluded that 94% of the theses on distance education in the field of science education after the pandemic are master's theses. Only 3 of the analyzed theses were conducted within the scope of doctoral research.

### Distribution of Theses According to Research Methods

The distribution of the research models used in the theses examined within the scope of the research is given in Table 2.

**Table 2**

*Research Methods of Examined Theses*

| Methods | f | % |
|---|---|---|
| Qualitative | 23 | 46% |
| Quantitative | 16 | 32% |
| Mixed | 11 | 22% |
| **Total** | 50 | 100% |

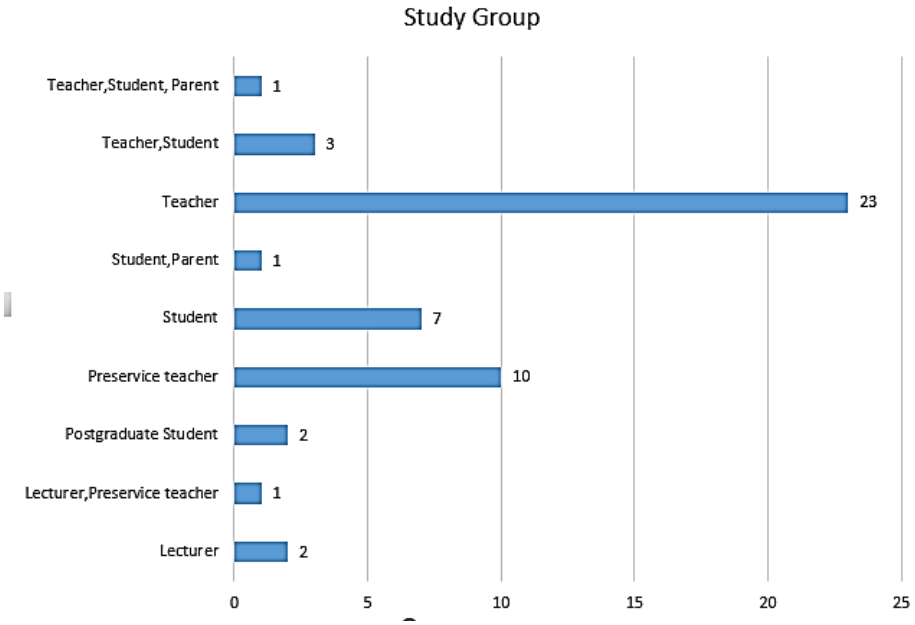
When the data in Table 2 are examined, it is seen that nearly half (46%) of the theses on distance education in the field of science education after the pandemic use qualitative research methods. There 32% theses that adopt a quantitative approach and 22% theses that use mixed methods.

**Distribution of Theses According to Study Group**

The distribution of the study groups in the theses examined within the scope of the research is given in Figure 1.

**Figure 1**

*Study Group Distribution of Examined Theses*




When the graph in Figure 1 is analyzed, it is seen that 46% of the theses on distance education in science education after the pandemic were conducted with teachers. Following these studies, pre-service teachers were studied in 10 theses and students in 7 theses. In 6 of the 50 theses examined, more than one type of study group was used (for example, teachers, students, and parents were studied).

**Distribution of Theses According to Data Collection Tools**

The distribution according to the data collection tools in the theses examined within the scope of the research is given in Table 3. Since more than one data collection tool was used in some theses, the total number of theses appears to be higher than the number of theses examined.

**Table 3**

*Data Collection Tools of Examined Theses*

| **Methods** | **f** |
|---|---|
| Opinion forms | 25 |
| Scales | 22 |
| Achievement tests | 6 |
| Semi-structured interview | 6 |
| Survey | 5 |
| Diary | 4 |
| Presentation videos | 1 |
| Observation forms | 1 |

When the data in Table 3 are analyzed, it is seen that opinion forms and scales were mainly used in theses on distance education in science education after the pandemic. Observation forms and presentation videos were used as data collection tools the least.

**Distribution of Theses According to Data Analysis Methods**

The distribution of data analysis methods in the theses examined within the scope of the research is given in Table 4. Since more than one data analysis method was used in some theses, the total number of theses appears to be higher than the number of theses examined.

**Table 4**

*Data Analysis Methods of Examined Theses*

| **Methods** | **f** |
|---|---|
| Descriptive | 40 |
| Parametric tests | 23 |
| Content analysis | 5 |
| Nonparametric tests | 4 |

When the data in Table 4 are examined, it is seen that descriptive analysis was used in almost all of the theses on distance education in the field of science education after the pandemic. It was determined that parametric tests (t-tests, ANOVA test) were used to a great extent in theses using quantitative or mixed methods. Content analysis and nonparametric tests were used the least.

## Discussion and Results

This study conducted a thematic analysis of theses related to distance education in the field of science in Turkey after the COVID-19 pandemic, according to various variables.

According to the findings, 94% of the 50 theses examined were master's theses. This situation may be because there has not been enough time to complete long-term doctoral studies after the pandemic.

It was concluded that qualitative approaches were the most common, and mixed approaches were the least common in the analyzed theses. When it is considered that qualitative studies seek answers to the questions "Why?" and "How?" in addition to "What?" (Çepni, 2009), it can be said that trying to reveal opinions and detailed examinations with such approaches towards distance education is effective in explaining the background of the results obtained. In addition, survey studies were also found to be a significantly preferred approach. This enabled some general inferences to be made based on the results obtained by reaching a larger sample. Considering the strengths and weaknesses of both research methods, it can be said that the mixed method approach, which will help to build a bridge between qualitative and quantitative research (Baki & Gökçek, 2012; Onwuegbuzie & Leech, 2004), can shed light on educational research in reaching generalizations as well as understanding the nature of phenomena

In the studies examined in this study, it was seen that teachers were primarily preferred as the sample group. Then, students and prospective teachers constituted the group, while the least preferred groups were school administrators and parents. In contrast to the findings of this study, Çevik (2017) concluded that pre-service teachers were the most preferred sample group, followed by secondary school students. Similarly, Çevik (2017) stated that pre-school students were never used as a sample in his study. Similar to this study, the study conducted by Çavaş et al. (2020) determined that most of the studies were conducted with secondary school students as the sample group.

When an evaluation was made according to data collection tools, it was seen that scales and opinion forms were the most preferred tools. In contrast to this situation, Yaşar and Papatya (2015) concluded that achievement tests were used more in the postgraduate theses they examined. On the other hand, in the study conducted by Özarslan (2019), the most preferred data collection tool was an interview (interview), which overlaps with this study's result. In data analysis preferences, it was seen that qualitative analysis methods were preferred more than quantitative analysis methods in the theses examined within the scope of the research. Çavaş et al. (2020) concluded that the reason for the high preference for quantitative research methods in their research is parallel to the high use of parametric tests in data analysis methods.

## Recommendations

In the light of the results obtained from this study, the following recommendations can be presented:

- Studies on distance education should also be examined for other disciplines other than science education.
- In addition to thematic analysis, comparative analyses can also be made regarding results.

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