NEU PRESS

akef

Volume: 6 Issue: 2 Year: 2024 e-ISSN: 2687-1750

A Content Analysis on Theses Related to Inquiry-Based Learning Approach

Meryem İrem GÖKBULUT[1] Hayriye Nevin GENÇ[2*]

[1] Necmettin Erbakan University, Department of Science Education, Konya, Türkiye
[2] Necmettin Erbakan University, Ahmet Keleşoğlu Education Faculty, Department of Science Education, Konya, Türkiye

Article Info

Received: 06.12.2023
Accepted: 15.08.2024
Published: 30.09.2024

Keywords:
Inquiry based learning,
Science education,
Content analysis.

ABSTRACT

The aim of this study is to investigate 32 master's and 16 doctoral theses in the Higher Education Thesis Center (http://tez2.yok.gov.tr/), which were conducted between 2008 and 2022 in science education and which are about inquiry-based learning approach, by content analysis method. The data obtained through document analysis were analyzed by content analysis. In addition, it was aimed to identify the frame on inquiry-based learning in science education and to identify deficiencies and orientations. Document analysis method was used in the study. "Science Education Thesis Classification Form" was created by the researchers by examining the categories and themes created in the content analysis studies in the literature. Theses were accessed by searching the words "inquiry-based" and "inquiry-based learning" on the Council of Higher Education Thesis Center. Theses were examined in the categories of thesis type, year of publication, research method of the thesis, research model type of the thesis, sample size of the thesis, sample level of the thesis, data collection tool of the thesis and data analysis method types of the thesis. The data obtained were calculated with MS-Excel program. The analyzed postgraduate theses were evaluated separately as master's and doctoral theses. Frequency and percentage values were given in tables. As a result of the research, it was concluded that while the majority of the theses examined were master's theses, the theses conducted within the scope of doctorate were much less; quantitative research model was preferred more in the studies, and the most studies were conducted in 2019. It was found that undergraduate students were selected as the sample in the majority of the theses within the scope of the study; fewer studies were conducted at the primary education level, and the range of 51-100 was the most preferred number in sample size. At the end of the study, suggestions were made for future studies.

Sorgulamaya Dayalı Öğrenme Yaklaşımı ile İlgili Tezler Üzerine Bir İçerik Analizi

Makale Bilgisi

Geliş Tarihi: 06.12.2023
Kabul Tarihi: 15.08.2024
Yayın Tarihi: 30.09.2024

Keywords:
Sorgulamaya dayalı öğrenme,
Fen bilimleri eğitimi,
İçerik analizi.

ÖZET

Bu çalışmanın amacı fen eğitiminde 2008-2022 yılları arasında yapılmış ve sorgulamaya dayalı öğrenme yaklaşımını konu edinen Yüksek Öğretim Tez Merkezi'nde (http://tez2.yok.gov.tr/) yer alan 32 adet yüksek lisans ve 16 adet doktora tezlerini içerik analizi yöntemi ile incelemektir. Araştırmada doküman analizi kullanılarak elde edilen veriler, içerik analizi ile analiz edilmiştir. Ayrıca fen eğitiminde sorgulamaya dayalı öğrenme konusundaki çerçevenin belirlenip eksikliklerin ve yönelimlerin belirlenmesi amaçlanmıştır. Araştırma doküman incelemesi yöntemi ile gerçekleştirilmiştir. Literatürdeki içerik analizi araştırmalarında oluşturulan kategori ve temalar incelenerek araştırmacılar tarafından "Fen Eğitimi Tez Sınıflama Formu" oluşturulmuştur. "Sorgulamaya dayalı" ve "sorgulamaya dayalı öğrenme" kelimeleri YÖKTEZ veri tabanında taratılarak tezlere ulaşılmıştır. Tezler; tezin türü, tezin yayınlandığı yıl, tezin araştırma yöntemi, tezin araştırma model türü, tezdeki örneklem büyüklüğü, tezdeki örneklem düzeyi, tezin veri toplama aracı ve tezdeki veri analiz yöntem türleri kategorilerinde analiz edilmiştir. Elde edilen veriler MS-Excel programı ile hesaplanmıştır. İncelenen lisansüstü tezler yüksek lisans tezleri ve doktora tezleri şeklinde ayrı ayrı değerlendirilmiştir. Frekans ve yüzde değerleri tablolar aracılığı ile verilmiştir. Araştırma sonucunda incelenen tezlerin çoğunluğu yüksek lisans tezi iken doktora kapsamında yapılan tezlerin çok daha az olduğu; çalışmalarda nicel araştırma modelinin daha çok tercih edildiği, 2019 yılında en fazla çalışmanın yapıldığı gibi sonuçlara ulaşılmıştır. Çalışma kapsamındaki tezlerin büyük çoğunluğunda lisans öğrencilerinin örneklem olarak seçildiği; ilköğretim kademesinde daha az çalışma yapıldığı, 51-100 aralığının örneklem büyüklüğünde en fazla tercih edilen rakam olduğu bulgularına ulaşılmıştır. Çalışma sonunda gelecekte yapılması planlanan çalışmalara öneriler getirilmiştir.

To cite this article:

Gökbulut, M. İ., & Genç, H. N. (2024). A content analysis on theses related to inquiry-based learning approach. *Ahmet Keleşoğlu Faculty of Education Journal (AKEF), 6*(2), 174-193. https://doi.org/10.38151/akef.2024.137

***Corresponding Author:** Hayriye Nevin Genç, *hngenc@erbakan.edu.tr*

INTRODUCTION

Education is defined as the process of creating desired behavioral changes in individuals through various learning experiences (Demirel, 2004). Inquiry-based learning approach, which takes place in every field of education, is actively used in the lesson plans. Inquiry-based learning approach enables students to solve the problems and reach different solutions by engaging in research while solving them (Taşlı, 2003, cited in Maytar, 2008). The generation aimed by the educational society is to raise individuals who question knowledge, continually reach for new information as they inquire, and can solve problems through exploration and inquiry.

Education is affected by this rapid change and transformation. For this reason, countries have felt the need to review their education systems and have made radical reforms in this field. As a result, behaviorist teaching approaches have been abandoned and approaches based on active learning have been adopted. Curricula developed in line with existing needs aim to raise individuals who can use ways of acquiring information, question the information they obtain, and have high-level thinking skills (Öztürk & Özel, 2021). Therefore, inquiry-based learning has great importance today. Inquiry-based learning approach is based on asking questions. Teaching starts by asking the right questions and each question arouses curiosity in students. In this way, students reach new information and solutions by questioning (Genç, 2020).

Science can be defined as all of the activities that include the fields of physics, chemistry and biology and aim to explain the physical and biological universe (Çepni, 2007). Science is the process of thinking about the nature of knowledge, understanding existing knowledge and creating new knowledge. In other words, it can be defined as natural science. It is the basis of knowledge and skills that enable people to understand and interpret the environment in which they live (Hançer et al., 2003).

Science plays an important role in the development of countries. For this reason, the importance of science continues to increase rapidly day by day. Great efforts and endeavors are being made to improve the quality standards of science education (Yaşa & Koçak, 2022). These efforts are generally focused on improving the curriculum programs, providing schools to effectively carry out these improved programs and developing appropriate teaching methods (Ayas, 1995).

Keeping up with the changing world has become more important in recent centuries. The objectives in the traditional curriculum are mostly aimed at cognitive skills. In today's modern science education system, on the contrary, education programs are used to develop affective and psychomotor skills. For this reason, traditional, rote-based science education has been replaced by education that provides creative thinking, enables the acquisition of scientific process skills, based on inquisitive learning, and encourages individuals to create products with the skills they have acquired. (Asal, 2020).

The purpose of the science education is to raise individuals as science literate. Individuals who grow up with this understanding, reach information more quickly, approach events with suspicion, have the ability to analyze natural phenomena and find solutions to the problems they face in daily life with scientific methods (Eroğlu, 2006).

Science education is not only a process of acquiring knowledge, but also a process of scientific research and discovery. As science and technology have developed rapidly in recent years, the use of different learning approaches has become inevitable. Accordingly, inquiry-based learning approach was emphasized in the science curriculum in 2013 (Karaman & Karaman, 2016). In the 2018 science curriculum, it is seen that the inquiry-based learning approach is based on an interdisciplinary perspective (MEB, 2018). In different approaches in science teaching, it is seen that individuals realize their learning and questioning by themselves, by doing and experiencing, with the inquiry-based learning approach.

The form of inquiry varies according to the objectives to be gained by the individual. In the science course, it can be aimed at conducting more open-ended investigations that require higher level thinking. The important issue here is to improve the quality of learning by helping students learn to work like scientists (NRC, 2000).

Content analysis is a qualitative research method in which some words of a text or a study are summarized with categories through coding (Büyüköztürk et al, 2013). Content analysis is collecting similar data groups in studies and interpreting them in a language that the reader is able to understand (Yıldırım & Şimşek, 2011, p. 227). Literatures in a specific field can be examined through content analysis method (Falkingham & Reeves, 1998). Çalık and Sözbilir (2014) discuss content analysis: meta-synthesis, meta-analysis and descriptive content analysis.

In other words, content analysis is a form of research that enables the dissemination of the researched concept and has an important place in the creation of research (Çalık & Sözbilir, 2014). Many studies on content analysis have been conducted to date. In the light of the findings obtained in the studies (Kaya, 2022; Kula & Sadi, 2016; Bayraklı, 2019 and Tok, 2019), it is easy to determine how many researches have emerged in which field and on which subject, and to determine the deficiencies of the researchers who will conduct studies on the subject and to access information. In addition, studies on content analysis provide important benefits to the literature on the subject in terms of determining the existing deficiencies in the relevant field, revealing the qualifications of the studies and their usability (Kanlı et al., 2014).

The inquiry-based learning approach has been the subject of many studies until today and content analysis articles contribute to the development of the research field. By reviewing content analysis articles, researchers can gain insight into how existing methods and techniques can be developed or improved and guide future research. Although in the literature from Turkey, there are a number of journal articles that aimed to investigate graduate theses, the current study aims to conduct a deeper analysis with an inclusive perspective, thus, this research is significant in addressing the gap in the literature (Derman, 2023; Özalp & Kaymakcı, 2022). In the literature review conducted within the scope of the key words of the study, no content analysis study related to the theses in Türkiye on inquiry-based learning approach was found. For this reason, this study analyzed the postgraduate theses in science education in which inquiry-based teaching was used. It is thought that this study will play a role in determining the development and trends of graduate theses on inquiry-based learning in Türkiye, give clues to determine the missing aspects of the studies and guide researchers who want to work on the same subject. For this purpose, the research question of the study was determined as follows.

What are the descriptive characteristics (type, publication year), methodological procedures (research method, type of research, sample size, sample level, data collection tools, type of data analysis method) of graduate studies on inquiry-based learning in science education between 2008 and 2022?

METHOD

Research Design

In this study, the systematic review method was used. In a systematic review, the steps are clearly planned and fully described, all activities are transparent, and all important methodological decisions are grounded in theory and/or pragmatism and left to the reader to judge (Dickson et al., 2014). We employed the qualitative research method of document analysis as a data collection method to examine postgraduate theses and dissertations published between 2002 and 2023, which we accessed through the tez.yok.gov.tr website. Document analysis is a research method that can yield better results in studies that utilize documents as a primary source, and it is described as an economical method (Mogalakwe,

2006). The data obtained from the research using document analysis were analyzed by content analysis (Şenyiğit, 2021).

Research Instruments and Processes

The population of the study consists of all postgraduate theses scanned with the keywords 'inquiry-based' and 'inquiry-based learning' in the National Thesis Center and open to access between 2008 and 2022. Accordingly, the sample of the study consists of master's and doctoral theses in which inquiry-based learning approach is used in science education. Within the scope of this study, a total of 48 postgraduate theses, 32 master's theses and 16 doctoral theses were examined.

Information Sources and Search Strategy

The theses on inquiry-based learning approach in the field of science education were scanned by using the "Detailed Search" section on the website of the National Thesis Center of the Council of Higher Education. The names of the theses, the departments and contents of the theses were taken into consideration while classifying. Access to the analyzed postgraduate theses was carried out in two phases as "Inquiry-Based" and "Inquiry-Based Learning" screening.

Inclusion and Exclusion Criteria

When the criteria to be considered were based on thesis type, year, research methods, models, sample level, sample size, data collection tools and data analysis method type, some exceptions were made. The exceptions were as follows: there were 81 theses on inquiry-based learning that do not fit the science education screening but fit the inquiry-based learning screening. Thirty-three of these theses were conducted in other departments and divisions. These theses were not included in the study.

Data Analysis

A coding sheet prepared by the researcher was used to examine the postgraduate theses open to online access at the Higher Education Thesis Center. During the process of content analysis, the coding was constantly reviewed and the form was updated again with new codes. The data to be analyzed in line with the research problems determined in the study were selected, a coding sheet was prepared, the data were divided into sections and evaluated in the coding sheet. The findings obtained by making necessary corrections and coding were interpreted. The coding sheet used during content analysis was created by making use of similar studies conducted in this field. (Bayraklı, 2019; Kaltakçı Gürel, et al., 2017; Köseoğlu, 2018; Yavuz, 2016; Çiltaş et al., 2012). Two expert researchers checked the validity and reliability of this research. Experts analyzed the documents if topics of the documents are appropriate for focus of this study or not. The classification was made by reading the theses, evaluating descriptions and applications in related parts and filling out the theses classification form. The reliability of the coding was assessed using the reliability formula proposed by Miles and Huberman (1994). According to the formula, the inter-coder agreement percentage was calculated as 91%. Miles and Huberman (1994) suggest that achieving a reliability percentage of at least 90% indicates that the codes are reliable. Therefore, it can be said that the obtained agreement percentage (91%) is acceptable, indicating that the coding is reliable and valid.

The codes for the imprint of the study were determined as follows.

-The type of the studies was subcategorized as master's degree (MA) and doctoral degree (PhD).

-The year of the studies was coded to include the years 2008-2022.

-The method of the studies was sub-categorized as quantitative, qualitative and mixed methods (quantitative + qualitative).

-Sample size was subcategorized as 0-50, 51-100, 101-150, 151-200, 201-250, 251-300, 351 and above.

-The sample level was subcategorized as primary school 3rd and 4th grade, secondary school 5th, 6th, 7th and 8th grade, undergraduate student and teacher codes.

-Data collection tools were coded in 35 different ways.

-In the category of data analysis method types, coding was done under 16 different headings.

The data obtained during the study were analyzed using MS-Excel program. Frequency and percentage values were calculated and tables were made.

FINDINGS

In this part of the study, the findings of the study were given within the framework of " What are the descriptive characteristics (type, publication year), methodological procedures (research method, type of research, sample size, sample level, data collection tools, type of data analysis method) of graduate studies on inquiry-based learning in science education between 2008 and 2022?

Findings Related to the Title of the Theses

The distribution of the postgraduate studies published between 2008 and 2022 according to their types was examined and frequency and percentage values were calculated. The obtained data were presented in Table 1.

Table 1
Distribution by Thesis Type

Type of Thesis	Frequency (F)	Percentage (%)
Master's Degree	32	66.68
PhD	16	33.33
Total	48	100

When Table 1. was examined, it was seen that there were 32 master's theses and 16 doctoral theses among 48 studies in total. When the data given in Table 1 were examined, 66.68% of the studies were master's theses, while 33.33% were doctoral theses. In this context, master's theses constituted the majority of the studies conducted.

The distribution of postgraduate studies published between 2008 and 2022 according to their years were examined, and frequency and percentage values were calculated separately as master's and doctoral dissertation. The obtained data were presented in Table 2.

Table 2
Distribution by Years

Years	Master's Thesis		Doctoral Thesis	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
2008	-	0.00	1	6.25
2009	-	0.00	-	0.00
2010	-	0.00	-	0.00
2011	-	0.00	1	6.25
2012	-	0.00	-	0.00
2013	-	0.00	-	0.00

2014	2	6.25	4	25.00
2015	2	6.25	1	6.25
2016	4	12.50	2	12.50
2017	1	3.12	2	12.50
2018	5	15.62	3	18.75
2019	11	34.37	1	6.25
2020	2	6.25	-	0.00
2021	3	9.37	-	0.00
2022	2	6.25	1	6.25
Total	32	100	16	100

In the examination, it was concluded that the highest number of studies among 32 master's theses was conducted in 2019 with a value of 34.37%, and no study on the inquiry-based approach in science teaching was conducted between 2009-2010 and 2012-2013. It was seen that the least study was conducted in 2017 with a value of 3.12%. When 16 doctoral thesis were examined, it was concluded that the highest number of studies was conducted in 2014 with a value of 25.00%; no doctoral thesis were conducted on the subject in 2009, 2010, 2012, 2013, 2020 and 2021. When the data given in Table 2. were examined, it is concluded that the number of studies increases with the passing of the year when looking at the frequency values of the studies according to the years.

Findings Related to Methodology

The distribution of the postgraduate studies published between 2008 and 2022 according to the research type; quantitative, qualitative, mixed research types were examined, and frequency and percentage values were calculated separately as master's and doctoral theses. The obtained data were presented in Table 3.

Table 3
Distribution by Research Type

Research Type	Master's Thesis		Doctoral Thesis	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Quantitative	16	50.00	8	50.00
Qualitative	4	12.50	3	18.75
Mixed	12	37.50	5	31.25
Total	32	100	16	100

When Table 3. was examined, it was found that mixed method was used in 12 theses, qualitative method in 4 theses and quantitative method in 16 theses. It was observed that quantitative research method had the highest rate of use in published master's theses. It was observed that qualitative research was not preferred much in master's theses. In doctoral theses, mixed method was used in 5 theses, qualitative method in 3 theses and quantitative method in 8 theses. It was observed that quantitative research method had the highest rate of use in published doctoral dissertations, while qualitative research method was least preferred in doctoral thesis. If we look at the research methods used in doctoral and master's theses as a whole, the vast majority of the studies were conducted with quantitative research method, and qualitative research method was not preferred much in the studies.

The distribution of postgraduate studies published between 2008 and 2022 according to the research model were examined and frequency and percentage values were calculated separately for master's and doctoral theses. The data obtained as a result of the analysis were presented in Table 4.

Table 4
Distribution by Research Model

Research Model	Master's Thesis		Doctoral Thesis	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Full Experimental	2	6.25	-	0.00
Quasi-Experimental	12	37.50	7	43.75
Single Sample	-	0.00	1	6.25
Survey	2	6.25	-	0.00
Action Research	1	3.13	2	12.50
Case Study	4	12.50	1	6.25
Explainer	-	0.00	1	6.25
Explanatory	1	3.13	-	0.00
Convergent parallel	2	6.25	1	6.25
Embedded	7	21.88	3	18.75
Multiphase	1	3.13	-	0.00
Total	32	100	16	100

When Table 4. was examined, it was found that the quasi-experimental research model was the most preferred model with a distribution of 37.50%. This research model is followed by embedded, case study, single sample and survey model. In doctoral dissertations, the quasi-experimental research model with a distribution of 43.75% was the most preferred model. This research model was followed by embedded and action research model. Considering the thesis levels, it was determined that in both master's and doctoral theses, the quasi-experimental research model was used the most. While experimental, survey, explanatory and multiphase models were preferred in master's theses, they were not preferred in doctoral theses.

The distribution of postgraduate studies published between 2008 and 2022 were examined according to the sample size, and frequency and percentage values were calculated separately as master's and doctoral studies. The data were presented in Table 5.

Table 5
Distribution According to Sample Size

Sample Size	Master's Thesis		Doctoral Thesis	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
0 - 50	11	34.38	7	43.75
51 - 100	17	53.13	6	37.50
101 - 150	-	0.00	2	12.50
151 - 200	2	6.25	-	0.00
201 - 250	-	0.00	1	6.25
251 - 300	-	0.00	-	0.00
301 - 350	1	3.13	-	0.00
351 and above	1	3.13	-	0.00
Total	32	100	16	100

When the preferred sample sizes in Table 5. was examined, it was found that the highest number of sample in master's theses was the range of 51-100 with a value of 53.13%. There was no studies in the 101-150, 201-250 and 251-300 range in master's theses. It was found that the range with the lowest percentage in master's theses was 301-350 and 350 and above. In doctoral theses, unlike master's theses,

the number of theses in the range of 0-51 was higher with a value of 43.75% and there was no study with more than 250 sample.

The distribution of graduate studies published between 2008 and 2022 were examined according to the sample level, and frequency and percentage values were calculated separately as master's theses and doctoral dissertations. The obtained data were presented in Table 6.

Table 6
Distribution According to Sample Level

Sample Level	Master's Thesis		Doctoral Thesis	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Primary School (3)	1	3.13	-	0.00
Primary School (4)	1	3.13	-	0.00
Middle School (5)	4	12.50	2	11.76
Middle School (6)	4	12.50	1	5.88
Middle School (7)	8	25.00	4	23.53
Middle school (8)	-	0.00	2	11.76
Undergraduate	8	25.00	6	35.29
Teachers	6	15.63	2	11.76
Total	33	100	17*	100

* In some studies, more than one sample level was used.

When the sample levels in Table 6. was examined, it was observed that most of the master's theses were conducted on secondary school 7th grade and undergraduate students with a value of 25.00%. It was found that 8th grade students were not included in master's theses and the least preferred sample level was 3rd and 4th grade. In doctoral dissertations, the sample level was mostly undergraduate students with a distribution of 35.29%. It was found that primary school 3rd and 4th grade students were not included in doctoral studies. The least preferred sample level among the sample levels included in the study was found the 6th grade level of secondary school.

Findings Related to Data Collection Method Information

The distribution of graduate studies published between 2008 and 2022 were examined according to data collection tools, and frequency and percentage values were calculated separately for master's and doctoral studies. The obtained data were presented in Table 7.

Table 7
Distribution According to Data Collection Tools

Data Collection Tools	Master's Thesis		Doctoral Thesis	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Self-Efficacy Scale	4	4.55	4	6.06
Attitude Scale	4	4.55	8	12.12
Anxiety Scale	1	1.14	2	2.04
Perception Scale	5	5.68	4	6.06
Motivation Scale	2	2.27	2	3.03
Environment Scale	1	1.14	-	0.00
Belief Scale	-	0.00	1	1.52
Critical Thinking Disposition Scale	2	2.27	2	3.03
Conceptual Understanding Test	5	5.68	5	7.58
Science Process Skills	10	11.37	4	6.06

Test				
Scientific Literacy Test	1	1.14	-	0.00
Metacognitive Awareness Scale	2	2.27	2	3.03
Science Teaching Scale	2	2.27	-	0.00
Achievement Test	7	7.95	8	12.12
Mental States Examination	-	0.00	1	1.52
Creative Thinking Test	3	3.41	2	3.03
Kolb Learning Style Inventory	2	2.27	-	0.00
Survey	4	4.55	2	3.03
Semi-structured interview form	17	19.32	11	16.67
Observation Form	2	2.27	1	1.52
Diary	1	1.14	2	3.03
Photo and Video	-	0.00	1	1.52
Worksheets	8	9,09	3	4.55
Student Assignments	1	1.14	-	0.00
Misconceptions Identification Test	1	1.14	-	0.00
Self-Regulation Skill Scale	1	1.14	-	0.00
Logical Thinking Group Test	1	1.14	-	0.00
Innovative Science Experiments Scale	-	0.00	1	1.52
Scale Unused	1	1.14	-	0.00
Total	88*	100	66*	100

*In some studies, more than one data collection tool was used.

When the distribution of master's and doctoral theses according to the data collection tools given in Table 7 was examined, the Semi-structured interview form was used the most in master's theses with a value of 17.05%. This was followed by the Science Process Skills Test with 11.37% and the worksheets with 9.09%. In doctoral theses, the most used tools was semi-structured interview form with 16.67%. It was found that the semi-structured interview form tool used in the studies was the most used data collection tool in master's theses with a value of 19.32% and in doctoral theses with a value of 16.67%.

Findings Related to Data Analysis Method

The distribution of graduate studies published between 2008 and 2022 according to the type of data analysis method used in the research were examined, and frequency and percentage values were calculated separately as master's and doctoral studies. The obtained data were presented in Table 8.

Table 8
Distribution According to Type of Data Analysis Method

Type Of Data Analysis Method	Master's Thesis		Doctoral Thesis	
	Frequency (F)	Percentage (%)	Frequency (F)	Percentage (%)
Qualitative Data Analysis Method	**22**	**26.50**	**20**	**39.22**
Descriptive Analysis	13	15.66	8	15.69
Content Analysis	9	10.84	12	23.53

Quantitative Data Analysis Method	**61**	**73.50**	**31**	**60.78**
Dependent Samples t-Test	16	19.28	7	13.73
Independent Samples t-Test	13	15.66	8	15.69
Mann Whitney U Test	4	4.82	1	1.96
Wilcoxon Test	4	4.82	3	5.88
Kolmogrov-Smirnov and ShapiroWilks	7	8.43	2	3.92
Paired Sample t-Test	1	1.20	-	0.00
ANOVA	5	6.02	2	3.92
ANCOVA	5	6.02	4	7.84
MANCOVA	-	0.00	3	5.88
Pearson Moment Correlation	1	1.20	-	0.00
Kaiser-Meyer-Olkin Test	1	1.20	-	0.00
Shapiro-Wilk	4	4,82	1	1.96
Total	83*	100	51*	100

*In some studies, more than one data analysis method was used.

In Table 8., frequency and percentage values showing the distribution according to the type of data analysis method were examined. In master's theses, the dependent samples t-test with a distribution of 19.28% was used as the data analysis method type, followed by independent samples t-test with 15.66%, descriptive analysis with 15.66% and content analysis with 10.84%. In doctoral dissertations, the most commonly used data analysis method was content analysis with a value of 23.53 %.

DISCUSSION

When the distribution of postgraduate studies on inquiry-based learning approach in science teaching according to the title of the theses, it was determined that master's theses were more in number than doctoral theses. Köseoğlu (2018) conducted a content analysis of the postgraduate studies conducted in the science teaching discipline and found that the majority of the postgraduate theses were at the master's level. Sünger (2019), in his study on the concept of augmented reality, found that master's theses were more numerous than doctoral theses. Tok (2019) reached the same findings in his study in which he conducted a content analysis of the studies on science teaching in Turkey. The results of Özarslan (2019), who examined mathematics and science education together in Turkey, also support the findings. Similar studies that concluded that the number of master's theses is higher than the number of doctoral theses coincide with this result of the study (Genç, 2020). Based on these results, the fact that master's studies are more than doctoral studies can be explained by the fact that the number of master's students is higher than the number of doctoral students (Yavuz, 2016). In addition, the fact that doctoral theses are more difficult, comprehensive and time-consuming to write than master's theses supports the increase in master's studies.

It was determined that 81 postgraduate studies on inquiry-based learning were conducted in Turkey. 48 postgraduate study were conducted in science education. It was determined that the first postgraduate study in Turkey was completed in 2008. It was determined that master's studies were mainly conducted in 2019 and doctoral studies were conducted in 2014. In recent years, there has been a significant increase in the number of theses. It was determined that 11 graduate studies were conducted between 2008-2015 and 37 graduate studies were conducted between 2015-2022. Since 2014, the number of graduate studies on inquiry-based learning approach in science education has increased. Tok (2019), in his study on science teaching in Turkey, examined the studies conducted between 2008-2018 and concluded that the number of studies conducted has increased since 2013. The increase in studies on science education since 2013 is in line with the findings of this study.

When the research method of the postgraduate studies on inquiry-based learning approach in science education were examined, it was concluded that the highest distribution was in quantitative research method. This method was followed by mixed research method. The least preferred research method in the studies was qualitative research method. This result is similar to the results of Kula and Sadi's (2016) content analysis of 363 articles in order to determine the trends in science education in Turkey. It was found that mixed research method was preferred more in doctoral studies than in master's studies. This may have provided deeper information and increased data diversity by supporting the quantitative data with qualitative data.

It was concluded that the most preferred research model in the postgraduate studies was the quasi-experimental design. When the literature was examined, Evrekli et al. (2011) stated that the experimental design was mostly preferred in their study in which postgraduate theses in the field of science education conducted between 2005-2009 were examined. Chang & Hsieh (1997) concluded that experimental design was preferred more in their study of doctoral dissertations. In qualitative studies, it was determined that the most preferred research model was case study (Küçüközer, 2016). These studies are in parallel with the findings obtained in this study. It can be said that the fact that the experimental design model is preferred more than other research models in the studies conducted is due to the fact that the data can be accessed more easily and the data can be analyzed in a shorter time.

Considering the sample size of postgraduate studies, it was concluded that the distribution in master's theses was more in the range of 51-100 sample, while the distribution in doctoral studies was more in the range of 0-51 sample. Polat (2013) examined 34 master's theses in science education and concluded that the highest distribution was in the range of 51-100 sample with a rate of 41.2%. Yavuz (2016) reached similar results in the number of samples in doctoral dissertations. Bayraklı (2019) conducted a content analysis of master's theses conducted with experimental research in science education and found that the number of 31-60 individuals was preferred the most, while the number of 91 or more individuals was the least. The reason for this situation may be that the experimental research method is preferred in most of the postgraduate studies. In the experimental research method, there are two groups, an experimental group and a control group, and in order to analyze the data on these groups, there should be at least 25-30 people in each group. This explains why the sample size is over-distributed in the range of 51-100 people (Köseoğlu, 2018).

Considering the sample level of the postgraduate theses used in the study, it was found that more studies were conducted on secondary school 7th grade and undergraduate students. The least studies were conducted at the level of primary school and secondary school 8th grade. A study in parallel with this study belongs to Bayraklı (2019). In his study titled Content analysis of master's theses conducted with experimental research method between 2008-2018 in the field of science education, found that the highest sample level consisted of students at the 7th grade level of secondary school. Küçükoğlu & Ozan (2013) found that secondary school students and undergraduate students were more preferred in terms of sample level in their study. The fact that the sample of middle school students is easily accessible and more in number is an advantage for the researchers. Since the science course takes place in secondary education, it is inevitable to conduct studies on student groups at this level. The reason why 8th grade students were not included much in the studies can be attributed to the high school transition exams.

When the postgraduate studies were examined, it was concluded that interview form, SPS scale, achievement test and conceptual understanding tests were preferred more than other data collection tools. Yavuz (2016) found that interview forms were mostly used as data collection tools in postgraduate studies on project-based instruction in the field of science education in Turkey. Parallel results were found in Sünger's (2019) study in which he analyzed the studies in the field of science education. When Özarslan (2019) examined the studies that addressed the fields of mathematics and science education

together in Turkey, he concluded that achievement tests were mostly used as data collection tools. Kabuklu & Kurnaz (2019) also found that the most preferred data collection tool was the interview form.

When the postgraduate studies on inquiry-based learning approach in science teaching were examined, in some studies, more than one type of data analysis method was used, and it was concluded that dependent samples t-test, independent samples t-test and descriptive analysis types were used more in data analysis method types. In their study, Gülbahar & Alper (2009) found that descriptive analysis, t-test and ANOVA were used more in data analysis method types. Similar results were found in the literature review (Küçüközer, 2016; Polat, 2013; Kula & Sadi, 2016).

While descriptive analysis and t-tests were used more in master's studies, descriptive analysis and content analysis method types were used more in doctoral studies. Güngör & Saraçoğlu (2023) reached parallel results with the findings of the study. The reason for the high number of descriptive analysis and content analysis studies can be considered as the use of quantitative + qualitative data analysis methods together in studies using the mixed research model, which enables quantitative data to be supported by qualitative data (Kaya, 2022).

SUGGESTIONS

Based on the results obtained from the process and discussion part of the research, some suggestions were presented for new researchers who will conduct studies in graduate thesis applications related to the inquiry-based learning approach used in science.

It is suggested that studies on inquiry-based learning approach in science teaching should be increased in future studies. In addition, it is also recommended that content analysis studies related to studies on inquiry-based learning approach in science education should be conducted periodically.

When the postgraduate theses on inquiry-based learning approach in science teaching were examined according to the research model, it was found that the distribution was highly quantitative. It is recommended that studies using different research models should be increased in future studies.

It was determined that the majority of postgraduate theses were conducted with secondary school and undergraduate students. It is recommended that the sample level of the studies should be more at the primary school level. In addition, when we consider the educational life of students, we come across the relationship between school, family and teacher. For this reason, studies in which school administrators and parents are selected as samples can be conducted.

It was determined that the majority of postgraduate theses are master's studies. It is noteworthy that there are few studies conducted at the doctoral level. It is recommended that doctoral studies, which are original studies and contribute a lot to the field, should prefer inquiry-based learning approach in science teaching as a subject and increase their number.

The number of samples used in the studies examined was between 51-100 sample at the graduate level. Therefore, it was determined that sample groups consisting of a small number of individuals were preferred. It is recommended to use different sample groups and increase the sample size in future studies.

In the research, it was found that interview form and achievement test were mostly preferred as data collection tools. It was seen that the number of studies in which more than one data collection tool was used was less than the studies in which one data collection tool was used. In future studies, it is recommended that more than one data collection tool should be used to increase the validity and reliability of the studies by providing data diversity.

Ethic

This study is based on the master's thesis entitled "A content analysis related to theses about inquiry-based teaching in science education between 2008 – 2022", submitted under the supervision of Hayriye Nevin GENÇ on 22 March 2023 date.

Ethics Committee Approval

The main data source documents of this study are the postgraduate theses included in the research. Systematic content analysis of these documents was conducted in the study. Therefore, this study does not require ethics committee permission.

Author Contributions

Research Design (CRediT 1) Author 1 (%50) – Author 2 (%50)

Data Collection (CRediT 2) Author 1 (%80) – Author 2 (%20)

Research - Data analysis - Validation (CRediT 3-4-6-11) Author 1 (%60) – Author 2 (%40)

Writing the Article (CRediT 12-13) Author 1 (%50) – Author 2 (%50)

Revision and Improvement of the Text (CRediT 14) Author 1 (%20) – Author 2 (%80)

Finance

This study was not supported by any funding.

Conflict of Interest

The authors declare that they have no conflict of interest.

Sustainable Development Goals (SDG)

Sustainable Development Goals: Does not support

REFERENCES

Asal, R. (2020). *The effect of engineering design based science teaching on primary school 4th grade students' scientific creativity and critical thinking skills.* [Master dissertation]. Gazi University.

Ayas, A. (1995). Fen bilimlerinde program geliştirme ve uygulama teknikleri üzerine bir çalışma: İki çağdaş yaklaşımın değerlendirilmesi. *Hacettepe University Journal of Education, 11,* 149-155. http://www.efdergi.hacettepe.edu.tr/yonetim/icerik/makaleler/1231-published.pdf

Bayraklı, S. (2019). *Content analysis of master theses which were conducted with experimental research in science education between the years of 2008-2018.* [Master dissertation]. Marmara University.

Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. A., Karadeniz, Ş. & Demirel, F. (2013). *Bilimsel araştırma yöntemleri.* Ankara: Pegem Akademi Yayıncılık. https://depo.pegem.net/9789944919289.pdf

Chang, P. L. & Hsieh, P. N. (1997). A qualitativereview of doctoral of dissertationmanagement in Taiwan. *Higher Education, 33,* 115-136. http://hdl.handle.net/11536/14558

Çalık, M. & Sözbilir, M. (2014). Parameters of content analysis. *Education and Science, 39*(174), 33-38. http://dx.doi.org/10.15390/EB.2014.3412

Çepni, S. (2007). *Performansların değerlendirilmesi*. E. Karip (Ed.), Ölçme ve değerlendirme içinde (s. 193-239). Ankara: Pegem A.

Çiltaş, A., Güler, G. & Sözbilir, M. (2012). Türkiye'de matematik eğitimi araştırmaları:bir içerik analizi çalışması. *Kuram ve Uygulamada Eğitim Bilimleri*, *12*(1), 565-580.

Demirel, Ö. (2004). *Eğitimde Program Geliştirme. (14. Baskı).* Ankara: Pegem A Yayıncılık.

Derman, A., Pınar, A., & Akkurt, N. D. (2023). Kimyasal tepkimelerde hız, denge ve enerji konularıyla ilgili yapılan çalışmaların içerik analizi. *Ahmet Keleşoğlu Eğitim Fakültesi Dergisi*, *5*(3), 621-638. https://doi.org/10.38151/akef.2023.75.

Dickson, R., Cherry, M. G. & Boland, A. (2014). *Carrying Out a Systematic Review as a Master's Thesis*. In Doing a Systemic Review: A Student's Guide, edited by Angela Boland, M. Gemma Cherry, and Rumona Dickson. London: SAGE Publications Ltd.

Eroğlu, S. (2006). *The effect of audio visual-material usage of third grade high school students' learning biotechnological conception and their attitude.* [Master dissertation]. Gazi University.

Evrekli, E., İnel, D., Deniş, H. & Balım, A. G. (2011). Methodological and Statistical Problems in Graduate Theses in the Field of Science Education. *Elementary Education Online, 10*(1), 206-218. https://dergipark.org.tr/tr/download/article-file/90698

Falkingham, L. T. & Reeves, R. (1998). Context analysis- A technique for analysing research in a field, applied to literature on the management of R & D at the section level. *Scientometrics*, *42*(2), 97-120. https://link.springer.com/article/10.1007/BF02458351

Genç, H. N. (2020). A content analysis related to theses about concept cartoons in science education: The case of Turkey (2007-2019). *International Journal of Humanities and Education, 6*(13), 267-290. https://dergipark.org.tr/en/download/article-file/1079344

Gülbahar, Y. & Alper, A. (2009). A content analysis of the studies in instructional technologies area. *Ankara University, Journal of Faculty of Educational Sciences, 42*(2), 93-111. https://dergipark.org.tr/tr/pub/auebfd/issue/38389/445194

Güngör, B. A. & Saraçoğlu, S. (2023) Content analysis of theses on context-based learning approach in science education. *Anadolu Journal of Educational Sciences International*, *13*(2), 564-598. https://dergipark.org.tr/tr/pub/ajesi/issue/79200/1118396

Hançer, A. H., Şensoy, Ö. & Yıldırım, H. İ. (2003). An evalation about the importance of contemporary science education at elemantary schools and how this kind of science teaching must be. *Pamukkale University Journal of Education, 13*(13), 80-88. https://dergipark.org.tr/tr/pub/pauefd/issue/11130/133116

Kaltakçı Gürel, D., Sak, M., Ünal, Z. Ş., Özbek, V. & Şen, S. (2017). Content analysis of physics education articles published ın Turkey between 1995 and 2015. *Mehmet Akif Ersoy University Journal of Education Faculty, 42*, 143-167. https://dergipark.org.tr/tr/pub/maeuefd/issue/30534/330328

Kabuklu, Ü. N. & Kurnaz, M. A. (2019). Thematic review of context-based instruction studies made in Turkey in science education. *Asian Journal of Instruction, 7*(1), 32-53. https://dergipark.org.tr/en/pub/aji/issue/46556/515698

Kanlı, U., Gülçiçek, Ç., Göksu, V., Önder, N., Oktay, Ö., Eraslan, F. & Güneş, B. (2014). Content analysis of physics education studies published in national science and mathematics education congress proceedings. *Gazi University Journal of Gazi Education Faculty, 34*(2), 127-153. https://dergipark.org.tr/en/pub/gefad/issue/6729/90477

Karaman, P. & Karaman, A. (2016). Opinions of science teachers about the revised science education

program. *Erzincan University Journal of Education Faculty, 18*(1), 243-269. https://dergipark.org.tr/en/pub/erziefd/issue/24415/258760

Kaya, V. (2022). *Content analysis of graduate thesis and articles on the context (Life) based approach in science education in Turkey.* [Master dissertation]. Kocaeli University.

Köseoğlu, S. (2018*). Analysis of graduate theses completed in the field of science teacher education between the years 2010 and 2017 in Turkey.* [Master dissertation]. Abant İzzet Baysal University.

Kula, W. F. & Sadi, Ö. (2016). Science education trends in Turkey: A content analysis from 2005 to 2014. *Elementary Education Online, 15*(2), 594-614. https://earsiv.kmu.edu.tr/xmlui/handle/11492/2175?locale-attribute=tr

Küçüközer, A. (2016). An overview of the doctoral thesis in science education. *Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 10*(1), 107-141. https://dergipark.org.tr/tr/pub/balikesirnef/issue/24340/257983

Küçükoğlu, A. & Ozan, C. (2013). A content analysis about master theses and dissertations in classroom teacher education. *International Journal Of Eurasia Social Sciences, 4*(12), 27-47. https://dergipark.org.tr/tr/pub/ijoess/issue/8530/105925

Maytar, F. (2008). *Fen ve teknoloji öğretiminde proje ve araştırma tabanlı öğrenme. Fen ve teknoloji öğretiminde yeni yaklaşımlar*. Ankara: Pegem Akademi.

MEB, (2018). *İlköğretim kurumları (ilkokullar ve ortaokullar) fen bilimleri dersi (3, 4, 5, 6, 7 ve 8. sınıflar) öğretim programı.* Talim ve Terbiye Kurulu Başkanlığı, Ankara.

Miles, M. B. & Huberman, A. M. (1994). Qualitative data analysis: An expanded source book (2nd ed.). Thousand Oaks, CA: Sage.

Mogalakwe, M. (2006). The use of documentary research methods in social research. *African Sociological Review 10*(1): 221-230.

NRC (National Research Council), (2000). *Inquiry and the national science education standards.* Washington: National Academy Press.

Özalp, M. T. & Kaymakcı, S. (2022). Analysis of postgraduate theses on feedback in educational sciences in Turkey. *Journal of Ahmet Keleşoğlu Education Faculty*, *4*(2), 468-483. https://dergipark.org.tr/en/pub/akef/issue/72486/1179958

Özarslan, M. (2019). The comparison of gifted and talented students and non gifted students' perception of biology: Metaphoric study. *Pamukkale University Journal of Education, 45*(45), 310-334. https://dergipark.org.tr/tr/pub/pauefd/issue/41649/430063

Öztürk, Z., Özel, M. (2021). Probleme dayalı öğrenme yönteminin öğrencilerin bilimsel süreç becerilerine etkisi. *Buca Eğitim Fakültesi Dergisi, 0*(51), 1 - 31.

Polat, M. (2013). A research into completed post-graduate theses in the field of physical science: Celal Bayar University sample. *Buca Faculty of Education Journal, 35*, 46-58. https://dergipark.org.tr/tr/pub/deubefd/issue/25114/265147

Sünger, İ. (2019). *A content analysis on augmented reality concept.* [Master dissertation]. Balıkesir University.

Şenyiğit, Ç. (2021). Fen bilgisi eğitiminde sorgulamaya dayalı öğrenmeye ilişkin eğilimler (2004-2020): Lisansüstü çalışmaların sistematik bir derlemesi. *YYU Journal of Education Faculty, 18*(1), 652-684. doi:10.33711/yyuefd.919585.

Tok, G. (2019). *Content analysis of science teachers research in Turkey.* [Master dissertation]. Uşak University.

Yaşa, N. & Koçak, N. (2022). Misconception on acid-base concept: A content analysis. *Journal of Ahmet Keleşoğlu Education Faculty*, *4*(1), 1-24. https://dergipark.org.tr/tr/pub/akef/issue/68985/1092123

Yavuz, G. (2016). *A content analysis related to completed theses in the field of project-based learning in science education: The case of Turkey (2002-2014).* [Master dissertation]. Bülent Ecevit University.

Yıldırım, A. & Şimşek, H. (2011). *Sosyal bilimlerde nitel araştırma yöntemleri.* Ankara: Seçkin Yayıncılık.

APPENDIX

Rank	Examined Dissertation
1	Açıkgöz, D. (2019). *Investigation of science teachers 'attitudes to inquiry-based teaching according to some variables.* [Master dissertation]. Amasya University.
2	Aksoy, Y. (2019). *Determining primary school teachers' understanding of inquiry-based science teaching.* [Master dissertation]. Muğla Sıtkı Koçman University.
3	Alakoyun, L. (2020). *The effectiveness of process oriented guided inquiry learning in teaching pure substances and mixtures to middle school students.* [Master dissertation]. Çukurova University.
4	Alkış Küçükaydın, M. (2017). *An investigation of primary school teachers' pck towards science subjects using an inquiry-based approach.* [Doctoral dissertation]. Amasya University.
5	Arı, Ü. (2017). *Investigation of effect of scaffolded inquiry-based instruction.* [Doctoral dissertation]. Fırat University.
6	Atlı, H. (2021). *The effects of activity-based and inquiry-based education in science education on attitudes, motivation and anxiety of 5th grade students.* [Master dissertation]. Gazi University.
7	Atun, T. (2016). *Effect of inquiry based science teaching on self-regulated learning skills development in 5th grade students.* [Master dissertation]. Hacettepe University.
8	Bilir, U. (2015). *Impact of inquiry-based learning process on academic achievement of students in science teaching.* [Master dissertation]. Uludağ University.
9	Can, Y. (2019). *The effect of inquiry based learning approach on the 7th grade students conceptual understanding of pressure concept.* [Master dissertation]. Balıkesir University.
10	Ceylan, A. (2019). *The effect of v-diagram usage on science process skills and general chemistry laboratory perceptions of pre-service science teachers in inquiry based learning environment.* [Master dissertation]. Aydın Adnan Menderes University.
11	Cin, M. (2018). *The effect of inquiry based learning with innovative science experiments on student's conceptual understanding level, epistemological beliefs and attitudes towards science course.* [Master dissertation]. Dokuz Eylül University.
12	Coşkun, A. (2021). *Examples of science history and its scientific inquiry opinions and*

science achievements of 7th grade students of investigation-based cell subject teaching effect. [Master dissertation]. Aydın Adnan Menderes University.

13 Çambay, Ö. (2022). *An examination of the effect of guided-inquiry-based instruction on conceptual understanding, inquiry learning skills, and learning styles of students.* [Doctoral dissertation]. Fırat University.

14 Çamlıbel, D. (2018). *The effectiveness of teaching methods based on inquiry supported by interactive board in science teaching.* [Master dissertation]. Kırıkkale University.

15 Çavuşlu, Z. (2014). *Determining pre-service science teachers' self-efficacy beliefs about inquiry based science.* [Master dissertation]. Çanakkale Onsekiz Mart University.

16 Demirkıran, Z. A. (2016). *The effects of research and inguiry-based applications in science studies course.* [Master dissertation]. İstanbul Aydın University.

17 Dinçol Özgür, S. (2016). *The effect of inquiry based learning on gifted and talented students' understanding of acids-bases concepts and motivation towards science learning.* [Doctoral dissertation]. Hacettepe University.

18 Duban, N. (2008). *Conducting science and technology course through inquiry-based learning approach in primary education: An action research.* [Doctoral dissertation]. Anadolu University.

19 Ecevit, T. (2018). *The effectiveness of argumentation based inquiry teaching practices in science teacher education.* [Doctoral dissertation]. Hacettepe University.

20 Ercan, E. (2019). *The effect of inquiry based laboratory on students' self efficacy, creativity perception and science process skills.* [Master dissertation]. Hacettepe University.

21 Gedik, İ. (2019). *The effect of inquiry based learning approach on conceptual change and durability processes of middle school 6th grade students about the concept of density.* [Master dissertation]. Balıkesir University.

22 Güney, S. (2017). *Investigation of teacher feedbacks in inquiry based learning in science classes.* [Master dissertation]. Adnan Menderes University.

23 Güney, T. (2015). *The effect of simulation aided science laboratory applications based on inquiry on science process skill: An example of the force and motion unit.* [Master dissertation]. Kırıkkale University.

24 Kaplan Parsa, M. (2016). *Effect of collaborative inquiry-based learning environment on creative thinking, inquiry learning skills, attitudes towards Science and Technology lesson.* [Doctoral dissertation]. Marmara University.

25 Karapınar, A. (2016). *The impact of inquiry-based learning environment on scientific process skills, inquiry skills and scientifik reasoning skills of pre-service teachers.* [Master dissertation]. Celal Bayar University.

26 Kayacan, K. (2014). *The effect of inquiry based learning enriched with self regulated activities on preservice science teachers ' conceptual understanding about force and motion and academic self efficacy.* [Doctoral dissertation]. Gazi University.

27 Keçeci, G. (2014). *The effects of inquiry-based science teaching on students' science process skills and attitudes.* [Doctoral dissertation]. Fırat University.

28 Kırıcı, M. G. (2019). *The effect of STEM supported research questioning based learning*

approach on the conceptual understanding and scientific creativity of 7th grade students. [Master dissertation]. Van Yüzüncü Yıl University.

29 Kırıktaş, H. (2014). *The effect of inquiry based science teaching on pre-servive-science teachers' academic achievement, science process skills and attitudes towards biology laboratory practice.* [Master dissertation]. Dokuz Eylül University.

30 Kırılmazkaya, G. (2014). *The effects of web based inquiry science teaching development on preservice teachers concept learning and scientific process skills.* [Doctoral dissertation]. Fırat University.

31 Koyunlu Ünlü, Z. (2015). *An action research of supporting inquiry learning with instruction technologies in science and technology course.* [Doctoral dissertation]. Gazi University.

32 Oktan, S. (2022). *Reflections on quided inquiry based science laboratory applications.* [Master dissertation]. Akdeniz University.

33 Ordu, S. (2019). *Determining science teachers epistemological beliefs and exploring their influence on science teachers practices.* [Master dissertation]. Zonguldak Bülent Ecevit University.

34 Ozan, C. E. (2018). *Effective learning based on guided inquiry in science education.* [Master dissertation]. Amasya University.

35 Öz, R. (2015). *The effect of science center applications developed according to inquiry based learning approach on 7th graders' academic achievement, scientific literacy and skills of inquiry learning.* [Master dissertation]. Marmara University.

36 Özer, M. (2019). *Evaluation of effect of technology supported inquiry based science teaching: Light and sound example.* [Master dissertation]. Giresun University.

37 Saka, T. (2018). *Development and evaluation of teacher workbook material based on guided inquiry for teaching 5th grade physic topics.* [Doctoral dissertation]. Trabzon University.

38 Salur, İ. (2019). *The effect of inquiry based teaching tezDetay.jspon science teacher candidates' achievements, inquiry learning and critical thinking skills.* [Master dissertation]. Necmettin Erbakan University.

39 Saylan Kırmızıgül, A. (2019). *The comparison of computer-aided, activity-based and inquiry-based teaching approaches in science education.* [Doctoral dissertation]. Erciyes University.

40 Silsüpür, T. (2022). *Investigation of in- Service primary teachers' self-efficacy beliefs on inquiry-based teaching.* [Master dissertation]. Kırıkkale University.

41 Şahintepe, S. (2018). *The effect of inquiry based learning approach on the students' metacognitive awareness and science process skills.* [Master dissertation]. Afyon Kocatepe University.

42 Tuncar, M. (2019). *Inquiry-based learning components in Turkey and Singapore's 3'rd grade science curriculum.* [Master dissertation]. Hacettepe University.

43 Ulu, C. (2011). *The effect of using inquiry based approach known as the science writing heuristic on concept learning, science process and metacognition skills in science teaching.* [Doctoral dissertation]. Marmara University.

44 Usta Gezer, S. (2014). *The effects of reflective inquiry based general biology laboratory activities' on preservice science teachers' laboratory self-efficacy perceptions, critical thinking tendencies and scientific process skills.* [Doctoral dissertation]. Marmara University.

45 Uysal, M. G. (2019). *The effect of technology integrated inquiry based teaching approach to secondary school students 'conceptual understanding of eclipses.* [Master dissertation]. Balıkesir University.

46 Ünal, A. (2018). *Effects of the inquiry based and social network aided laboratory activities on students' various perceptions, attitudes and success.* [Doctoral dissertation]. Kastamonu University.

47 Ünlü, P. (2021). *Reflections of prospective science teachers on science practices at home based on open ended inquiry.* [Master dissertation]. Akdeniz University.

48 Varlı, B. (2018). *The effect of inquiry based learning approach to science success, inquiry, self regulation and meta cognitive skills.* [Master dissertation]. Amasya University.