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Physical Geography Education: The Postgraduate Research Trends in Turkey

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Abstract

The field of research in physical geography relates to subjects such as place-shaping, climatic events, soil formation, vegetation development, the water cycle, and the nature and use of natural resources including underground mining processes. In order for humans to survive and facilitate their daily lives, they must have sufficient knowledge about many physical events taking place on planet Earth. In physical geographical education, various scientific research projects are carried out to bring rigour to the subject and the teaching of related concepts. Such projects include postgraduate thesis studies. In this research, an examination of the status and general trends for postgraduate theses occur in relation to physical geography education in Turkey. The current study is a mixed methods design and an evaluation of the theses occur through a document review. The theses are retrieved from the database of the National Thesis Center of the Council of Higher Education Institution. A descriptive analysis and bibliometric study on the theses aims to reveal the progress in physical geography education. Results from the research show the most common type of graduate thesis includes writing about the research subject, university, year of admission, institute, writing language, sample, study group/sample size, method/research model, data collection tool, data analysis technique/analysis method, research subject and the subject of physical geography, and the level of instruction/target audience. In response to the less frequently covered topics and methods, suggestions are made for future research and investigation to occur at the level of postgraduate studies.

Keywords
Physical Geographical Education, Scientific Research, Graduate Thesis

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Science is a human activity where questions and problems about natural phenomena are identified, and possible solutions are proposed and tested (Wisconsin Department of Public Instruction, 1986). According to Bilgili (2016), science endeavors to generalize, theorize, and determine the causes of naturally occurring events, the connections between such events, and then use this theoretical knowledge to understand how and when such events may occur in the future. The formation of scientific knowledge relates to a specific period of research. Within a given timeframe, there is a plan to collect and evaluate data which will lead to results that can contribute to and progress the relevant field of science.

Universities have an important role in the development of original studies because they are at the core of scientific research. According to Aydın (2012), the university is not only obliged to transfer the information to younger generations, the university is also obliged to produce new information that increases the quality of life across social, political, economic and cultural dimensions. A definition of a University in Article 3/D of Higher Education Institution Law No. 2547 (Higher Education Institution Law, 1981) states that it [the university] is a higher education institution consisting of faculties, institutes, colleges and similar units with scientific autonomy and public legal personality, providing a high level of education, scientific research, publications and consultancy. Inspired by the environment in which Plato and Aristotle created philosophical discussions with their students without any political or religious pressure, over time, institutions that have an independent and legal personality on a universal scale have formed today's universities (Ortaş, 2004).

According to Saklı and Akdoğar-Akbulut (2017), the academy founded and trained by Platon in Athens at the beginning of the 4th century BC is generally considered to be the first ancestor of Higher Education. The first examples of universities in the west were Bologna University, founded in 1088; Paris University, founded in 1160; and Oxford University, founded in 1167 (Sargın, 2007). Günay and Günay (2011) reports that the first university for the Republic of Turkey was founded in 1933 and that from the Ottoman period, Darülfünun, (which means 'science hostel') was closed and restructured to become 'İstanbul University'. According to Ata (2012), during this transformation process, the western term 'university' was briefly adopted until a Turkish name for the institution was found in the relevant law. Later, İstanbul Technical University was opened in 1944 and Ankara University in 1946 (Avcı, 2012). During the past 86 years, due to a period of rapid development, new universities have opened and the number of colleges amount to 207 (Turkish Council of Higher Education, as of September 2019). An increase in the number of universities brought with it the need for more academics and an acceleration in the provision of postgraduate education.

According to İnce and Korkusuz (2006), postgraduate education is the process of gaining research, professional development, learning to teach, and, creating an ethical academic culture at the highest levels. Aslan (2010) suggest an effective postgraduate education of scientists occurs as a result of the following elements; an ability to work independently and take responsibility; to have research competence; and to demonstrate professional competence, personal competence, field-specific competence and communication competence.

A master's degree is the first step into academic life. At this stage, students try to recognize the area in which they would like to study and then follow the academics who are specialized in this area (Özçakmak, 2017). The master's program can be opened with or without a thesis. In the master's program with thesis, the aim is for the student to capably access, evaluate and interpret information by doing scientific research. The aim of a non-thesis master's program is to provide the student with a deep knowledge about the professional subject and to theoretically demonstrate how to use the existing knowledge in practice (Akın, 2016). "In the doctoral program the aim is to develop a new scientific method that brings innovation to science or to apply a known method to a different field so as to gain the competence to design and perform original research" (Özdemir, 2018, p. 1162).

The history of postgraduate education in Turkey reveals that from the 1930s until the 1970s, postgraduate education consisted only of doctoral education (Bozan, 2012). While undergraduate and postgraduate education in Turkey were based on the European system until 1981, the higher education became completely transformed into the American system after this date (Ağıralioğlu, 2013). Since 1982, postgraduate education has been carried out through institutes under the Council of Higher Education (Karaman and Bakırcı, 2010).

In Turkey, key area of research and institutes are open in Social Sciences, Natural Sciences, Educational Sciences, Health Sciences, Environmental Sciences, Fine Arts, Earth and Space Sciences, Forensic Sciences, Stem Cell Research, Nuclear Sciences, Water Management, Atatürk's Principles and Turkish Revolution History, Marine Sciences and Technology, Oncology, Solar Energy, Turkish World Studies, Black Sea Research, European Union Research, Mevlana Research, and the Water Institute. Such institutes offer postgraduate education in various science-related departments and branches of the arts, including the field of geographical education.

The core of education in geography seeks to understand the causes and consequences of geographical events. During the millennia when the term geography was not clear, people used intergenerational transfer in learning about their habitat, obtaining different products from the soil according to the seasons, finding places and directions, identifying threats and carrying out migration movements, and also benefited from travelogues in the classical geography period (Çalışkan, 2015). Geography teaches holistic thinking because it integrates knowledge from the sciences, social sciences and humanities through the concepts of place and environment together with a spatial perspective. Geography helps interdisciplinary learning to occur by enabling students to see the connections between more specific subjects (Maude, 2010).

Geographical education makes a significant contribution to humans learning to live in harmony with all living species (IGU-CGE, 2016). Geographical knowledge, skills, values, behaviors, attitudes, competences and awareness enhances our understanding about the following areas: the proper use of natural resources; the use of mapping technologies such as geographic information systems; the types relationships between countries; the integration with different cultures; sustainability; the similarities and differences that occur between various

regions of the world; and understanding the time-dependent change of spatial distribution. According to Kocalar and Demirkaya (2014), geographical education has great importance for understanding the main problems facing Turkey and the world, for example the perceptions about climate change, energy dependencies, wars and regional upheavals, processes of globalization, and national and international terrorism.

An education in geography contributes to developing an awareness about and a positive attitude towards areas of great importance in today's world such as environmental problems. Önal and Güngördü (2008) emphasize that one of the main aims of teaching geography is to create awareness about how environmental pollution occurs, its effects on people and how to eliminate such pollution. In this context, the postgraduate programs prepare students for advanced research where they can use contemporary methods and strategies to analyze, evaluate and interpret a spatial problem or subject where more advanced theoretical and practical knowledge is required.

Numerous scientific theses have been prepared due to the increasing numbers of universities, institutes, academics and postgraduate students. The total number of theses available on the National Thesis Center of YÖK webpage (The Council of Higher Education) indicates over 550 thousand are available (552,747 as of September 2019). The list of statistics in the National Thesis Center of YÖK (The Council of Higher Education) is examined by the year of completion, and the data indicates the oldest thesis is from the field of medicine in 1900, a second thesis occurred 59 years later in 1959, and the third one is a doctoral dissertation from 1960. There was no thesis submission in 1961, and new dissertations were added for each year after 1962. Some of the data produced from these theses suggest that data is changing, statistics need updating and new research methods are developing. Accordingly, the analysis of theses by descriptive analysis, content analysis, meta-analysis or bibliometric analysis can help to identify trends and deficiencies in the literature. Thus, when determining the level of thesis required for science, a road map or a guide can be created for future research.

Studies investigating the trends of dissertations from a wide range of disciplines in Turkey have been determined in the literature and some of them are identified below:

- Postgraduate theses in the field of social studies education: Oruç and Ulusoy (2008), Şahin, Göğebakan Yıldız and Duman (2011); Tarman, Acun and Yüksel (2010); and Tarman, Güven and Aktaşlı (2011);
- PhD dissertations in the field of educational sciences: Karadağ (2009);
- Postgraduate theses in the field of museum education: Salbacak (2011);
- Doctoral dissertations in the field of educational sciences: Bağcı (2012); and Fazlıoğulları (2012);
- Postgraduate theses in the field of science education: Doğru, Gençosman, Ataalkın and Şeker (2012); Yavuz (2016); and Köseoğlu (2018);
- Postgraduate theses in the field of environmental education: Yılmaz (2012);
- Postgraduate theses in the field of primary education: Küçükoğlu and Ozan (2013); and Doğan (2018);
- Postgraduate theses in the field of educational administration: Uysal (2013) and Karaca (2018);

- Postgraduate theses in the field of Turkish education: Yağmur-Şahin, Kana and Varışoğlu (2013); and Özçakmak (2017);
- Postgraduate theses in the subject of learning strategies: Keskin (2014);
- Postgraduate theses in the subject of physical education and sports: Ataş (2015); and Mısır (2018);
- Postgraduate theses in the field of music education: Akın (2016); Dağdeviren (2017); and Görler (2017);
- Postgraduate theses in the field of art education: Çal (2016);
- Postgraduate theses in the field of tourism geography: Şardağ (2016); Kervankıran and Şardağ (2019);
- Master's theses in the field of measurement and evaluation in education: Şenyurt (2016);
- Postgraduate theses in the field of tourism: Tayfun, Küçükergin, Aysen, Eren and Özekici (2016); and Akyol (2018);
- PhD dissertations in the field of educational history: Cücük (2017);
- Master's theses in the field of distance education: Durak, Çankaya, Yunkul, Urfa, Topraklıklıoğlu, Arda and İnam (2017); and
- Postgraduate theses in the field of mathematics education: Tereci (2017).

Outside of Turkey, postgraduate theses have covered various aspects, for example, Horton and Hawkins (2010) completed content analysis for doctoral dissertations in the field of social work. Randolph, Gaiek, White, Slappey, Chastain, Prejean-Harris and Hansard (2012) completed quantitative content analysis for the postgraduate theses of Mercer University in the United States; and Walker and Haley-Mize (2012) used content analysis for the postgraduate theses in the field of special education. Feeney (2013 and 2014) again used content analysis to explore dissertations from different branches of science about news research and the use of newspapers. Canbulat, Avcı and Sipahi (2016) used content analysis for theses from the field of social studies education in the United States of America and Canada. Aidi and Rosli (2018) used bibliometric analysis to examine doctoral dissertations on the web accessibility. In another study, Krueger (2018) used content analysis to address the trends of Virginia doctoral dissertations according to degree type and methodology.

It has been observed that postgraduate theses in the field of geography education were also analyzed for coverage of physical geography education. Kaya (2013) examined the master's theses in geographical education in 2012, and Çifçi (2017) evaluated the postgraduate theses about geographical education in Turkey between 2006 and 2017. Öner and Öner (2017) conducted an analysis and bibliographic survey of 70 postgraduate theses written about geography topics within the scope of social studies education. Although it is not a thesis evaluation, apart from these, İncekara (2009) covered the number and type of studies published in Marmara and Eastern Geographical Review Journals in order to determine the trends of geography education focused article occurring in Turkey. Geçit (2010) identified the main orientations in research from geography education articles between 2000 and 2010. In the light of this information, it is apparent that no evaluation has been made for theses about physical geography education until now. Üsdiken and Pasadeos (1993) are of the view that the study of research or thesis with specific time intervals reveals a line of development in any scientific discipline. Therefore, the aim of this study is

to determine the line of development in the field by examining postgraduate theses in the field of physical geography, to draw attention to the topics that are not studied much and to shed light on the potential for future studies. The oldest thesis from the field of physical geography education was found in 1990. Therefore, the year 1990 can be considered the starting year of this research.

Methodology

Research Design

This study is structured in a mixed model where quantitative and qualitative research methods are used together. The statistical data is presented first in terms of frequencies and percentages, and the description occurs afterwards. According to Bogdan and Biklen (2007), qualitative research has five characteristics: naturalistic, descriptive, process-oriented rather than results and products, and inductive and meaning-oriented. Bibliometry is the study of various elements of academic publications (author, subject, year, number of pages, references, etc.) and includes numerical analysis and statistics in the analysis (Yozgat and Kartaltepe 2009, p. 150). Postgraduate theses or other academic publications are currently examined in terms of several variables, and citation analyses are often performed for foreign publications. The publications contain many quantitative and visual procedures to generalize the patterns and dynamics of research trends in various fields of science, therefore, bibliometric studies are an effective and important tool of analysis (Yaoyang and Boeing, 2013; Francik, Pedryc, Knapczyk, Wójcik, Francik, Łapczyńska-Kordon, 2017). The current study is also a bibliometric analysis research of theses from the field of physical geography education.

The data of the study was obtained through document analysis. Document analysis is a research method used to meticulously and systematically analyze the content of written documents and examine recorded texts and images without the intervention of the researcher (Bowen, 2009; Wach, 2013). Bogdan and Biklen (2007) state three groups of products are used in document analysis. The three groups are (i) personal documents such as letters, diaries, family albums; (ii) official documents such as annuals, newspapers and public records such as TV programs, news reports; and (iii) popular culture documents. Accordingly, the theses examined in this study are included in the official documents group. According to Caulley (1983), 'documents' are used synonymously with the source, whether written or not, whether formal or not, whether primary or not.

Descriptive analysis is used for qualitative research in this study of the theses. Loeb, Dynarski, McFarland, Morris, Reardon and Reber (2017) outline the salient and iterative nature of a descriptive analysis approach: start with the identification of a socially significant phenomenon and then convert the raw data to reported findings of any kind for the target audience using appropriate methods for data visualization. The aim of descriptive analysis is to define the basic properties of raw data in a way that readers can understand and use as appropriate to their needs. For this purpose, the collected data is analyzed, organized and summarized according to data frequency, percentage, average, and standard deviation values (Yıldırım and Şimşek, 2015; Erdem, 2011).

Although no claim of causation exists, a 'descriptive finding' reveals a socially meaningful 'fact' in the data which can also function as a hypothesis, or prioritize possible causal mechanisms, or signal another causal understanding (Loeb et al., 2017). This qualitative study seeks to determine the general orientation of theses from the field of physical geographical education by using quantitative data. The study also intends to be a guide for future areas of research and thesis development.

Data Collection Tools

In the initial phase of the research, the theses for examination for collected through the conduct of advanced search in the National Thesis Center database (catalogue) of the Council of Higher Education. In Turkey, postgraduate theses are currently presented pdf and rar files which are either 'open accesses', 'open access after a certain date' or 'not open access' to researchers and to all segments of the public. A total of 287 theses from the field of physical geographical education, dated from 1990-2019 (until September) were retrieved using Turkish and English keywords. Some of the theses authors were contacted by e-mail or social media; some of the theses authors who were geography teachers were contacted by telephone through the school lists of the Ministry of National Education; and some of the theses were examined and evaluated by request through the Turkish Document Provision System or the Thesis Request System (TÜBESS). Turkish and English keywords were entered into subject and index tabs during a general browsing session in the online catalogue. Keywords in the basic fields included 'geographical education', and 'physical geographical education'; keywords in the subject field included 'geo-location', 'landform', 'map', 'globe', 'parallel and meridian', 'climate', 'soil', 'vegetation', 'hydrography', 'geological time', 'volcano', 'glacier', 'coast', 'karst', 'lake', 'sea', 'ocean', 'forest', 'seasons', 'natural disaster', 'atmosphere', 'pressure'. The identified theses were downloaded to the computer and filed, and then examined in detail. The study is limited to those theses which were transferred through the 'National Thesis Centre' website until September 2019

Data Analysis

The 'thesis review form' is used for the examination of the dissertations in the current study. This approach is inspired by previous studies of thesis and article review and is supported by expert opinion. In order to calculate the reliability of the study, 7 theses were selected at random and were evaluated by an expert from the field of geography and an expert from the field of science education. The final form was returned by the expert reviewers with suggestions for change. Miles and Huberman's (1994) formula [Consensus / (Consensus + difference of opinion) x 100] was applied and the reliability was determined to be 85.71%. Akay and Ültanır (2010) state that more than 70% encodings are considered reliable.

In order to increase the internal validity (plausibility) and external validity (transferability) of the research, data was obtained as carefully as possible. In addition, after compilation of the data and preparation of the tables, an expert from the field of educational science expert was invited to evaluate the frequency and percentage values as a whole and also in terms of consistency. The final arrangements were aligned with recommendations from the expert. For example, the years in which the theses were accepted were initially sorted from

the year in which they were written but in response to expert advice, the ranking of theses was adjusted from old to new.

The study includes 231 master's theses and 56 doctoral dissertations. There are twelve headings used to gain a working knowledge of each thesis: 'thesis type', 'the name of the university', 'thesis accepted in the year of', 'the institute', 'language of the thesis', 'sample type', 'working group/sample size', 'method/model research', 'data collection', 'data analysis technique/method of analysis', 'research subject and the subject of physical geography' and 'the instructional level of the content/target audience'.

Problem Statement

The research question and problem is 'what are the general trends in postgraduate thesis studies from field of physical geographical education in Turkey?' A systematic examination and evaluation of the theses occurred, and answers were organized according to the sub-problems listed below. From the postgraduate theses about physical geography education in Turkey:

1. What is the distribution according to the type of master's and doctorate?
2. What is the distribution according to the university?
3. What is the distribution according to the year it was accepted?
4. What is the distribution according to the institute?
5. What is the distribution according to the spelling language?
6. How is the distribution by sample type?
7. What is the distribution according to the working group/sample size?
8. What is the distribution according to method / research model?
9. What is the distribution according to the data collection tool?
10. What is the distribution according to the data analysis technique/analysis method?
11. What is the distribution according to the research topic and physical geography? and
12. What is the distribution of their content according to the level of instruction/target audience?

Findings

In this part of the research, the data from 287 postgraduate theses about physical geography education in Turkey were interpreted and the findings were presented in tables.

Findings of the First Sub-Problem

The data for the first sub-problem of the study are shown as frequencies and percentages in Table 1.

Table 1
Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education at Master's and Doctorate Levels in Turkey

Type of Thesis	f	%
Master's	231	80.49
Doctorate	56	19.51
Total	287	100

As shown in Table 1, 80.49% of the 287 postgraduate theses about physical geography education are master's theses, and 19.51% are doctoral dissertations. As is known, among the postgraduate students of all universities, the number of doctoral students is less. The most important reasons believed to contribute to the incidence of fewer doctoral students compared to master's students include quota limitation, the student's inability to pass the foreign language threshold, starting a permanent job, marriage, or having children. Thus, every graduate cannot continue to the doctorate education and the number of doctoral students is less than masters.

Findings of the Second Sub-Problem

The data for the second sub-problem of the study are shown as frequencies and percentages in Table 2.

Table 2
Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education at Turkish Universities

	Master		Doctorate		Total	
University	f	%	f	%	f	%
Gazi University	69	24.04	32	11.14	101	35.19
Marmara University	39	13.59	4	1.39	43	14.98
Atatürk University	7	2.43	5	1.74	12	4.18
Karadeniz Technical University	11	3.83	-	-	11	3.83
Çanakkale 18 Mart University	7	2.43	-	-	7	2.43
Mehmet Akif Ersoy University	7	2.43	-	-	7	2.43
Abant İzzet Baysal University	6	2.09	-	-	6	2.09
Ahi Evran University	6	2.09	-	-	6	2.09
Akdeniz University	6	2.09	-	-	6	2.09
Dokuz Eylül University	2	0.70	4	1.39	6	2.09
Middle East Technical University	4	1.39	2	0.70	6	2.09
Selçuk University	4	1.39	2	0.70	6	2.09
Necmettin Erbakan University	4	1.39	1	0.35	5	1.74
Niğde Ömer Halisdemir University	5	1.74	-	-	5	1.74
Adnan Menderes University	4	1.39	-	-	4	1.39
Boğaziçi University	4	1.39	-	-	4	1.39
Giresun University	3	1.04	1	0.35	4	1.39
Erzincan University	2	0.70	1	0.35	3	1.04
Kafkas University	3	1.04	-	-	3	1.04
19 Mayıs University	2	0.70	1	0.35	3	1.04
Aksaray University	2	0.70	-	-	2	0.70
Celal Bayar University	2	0.70	-	-	2	0.70
Çukurova University	2	0.70	-	-	2	0.70
Dumlupınar University	2	0.70	-	-	2	0.70
Fırat University	2	0.70	-	-	2	0.70
Hacettepe University	1	0.35	1	0.35	2	0.70
İnönü University	2	0.70	-	-	2	0.70
Muğla Sıtkı Koçman University	2	0.70	-	-	2	0.70
Sakarya University	2	0.70	-	-	2	0.70
Uludağ University	1	0.35	1	0.35	2	0.70
Uşak University	2	0.70	-	-	2	0.70
Adıyaman University	1	0.35	-	-	1	0.35
Afyon Kocatepe University	1	0.35	-	-	1	0.35
Ağrı İbrahim Çeçen University	1	0.35	-	-	1	0.35
Anadolu University	-	-	1	0.35	1	0.35
Ankara University	1	0.35	-	-	1	0.35

Balıkesir University	1	0.35	-	-	1	0.35
Başkent University	1	0.35	-	-	1	0.35
Cumhuriyet University	1	0.35	-	-	1	0.35
Erciyes University	1	0.35	-	-	1	0.35
Eskişehir Anadolu University	1	0.35	-	-	1	0.35
Fatih University	1	0.35	-	-	1	0.35
Gaziantep University	1	0.35	-	-	1	0.35
Gaziosmanpaşa University	1	0.35	-	-	1	0.35
Mustafa Kemal University	1	0.35	-	-	1	0.35
Yeditepe University	1	0.35	-	-	1	0.35
Yüzüncü Yıl University	1	0.35	-	-	1	0.35
Zonguldak Karaelmas University	1	0.35	-	-	1	0.35
Total	231	80.49	56	19.51	287	100

According to Table 2, the highest number of theses in the field of physical geography education were written at Gazi University with a ratio of 35.19% (n=101). Marmara University came in second place with 14.98% (n=43). Then, Atatürk University was ranked 4.18% (n=12) and Karadeniz Technical University was ranked 3.83% (n=11). A total of 48 universities were included in this list. The mentioned universities have various institutes, departments and programs in physical geography education.

When examining the theses, it was observed changes occurred in the names of the identified institutes and departments from time to time. For example, at most of the theses in the field of physical geography, the graduate programs opened in the field of educational sciences at Gazi University have been made under the name of Institute of Social Sciences and Graduate School of Natural and Applied Sciences, since 1983 (Gazi University Graduate School of Educational Sciences, 2017). In the Graduate School of Educational Sciences, it is observed that theses started to be made since 2001.

After the opening of Gazi University Graduate School of Educational Sciences, it was identified that theses on physical geography education were written within the Department of Geography Education, Department of Secondary Social Studies Education, Department of Geography Teaching, Turkish and Social Sciences Education. The second-place theses on physical geography education written in the Institute of Educational Sciences at Marmara University belongs to the Department of Secondary Social Studies Education, Department of Geography Teaching and Social Studies Teacher Education Division of Department of Primary Education. The education of the third-ranked graduate students at Atatürk University was carried out by the Institute of Social Sciences and the Graduate School of Natural and Applied Sciences until 2010 (Atatürk University Institute of Educational Sciences, n.d.). After 2010, the Graduate School of Educational Sciences was opened. The theses on physical geography education were prepared at the Department of Secondary Social Studies Education in Institute of Social Sciences before 2010, however, after 2010 they were prepared within the following institutes of departments: Geography Education Division of Department of Secondary Social Studies Education and Social Studies Education Division of Department of Primary Education in Graduate School of Educational Sciences. Other than the above, the theses from the field of physical geography education were prepared in education programs and in many other programs at different universities including:

- Zonguldak Karaelmas University from the Institute of Social Sciences Department, Education Programs and Teaching;
- Çanakkale Onsekiz Mart University from the Institute of Social Sciences, Geography Education Division of Department of Social Sciences;
- Eskişehir Anadolu University from Graduate School of Natural and Applied Sciences and the Department of Remote Sensing and Geographic Information Systems;
- Kafkas University from the Institute of Social Sciences, Social Studies Education Division of Primary Education Department; and
- Karadeniz Technical University from the Institute of Education Sciences, Department of Secondary Social Sciences Education, Geography Education Division.

It is thought that the main reason for these differences is that some issues (global climate change, mapping skills, e.g.) can be addressed with an interdisciplinary approach or may be related to the interests of academics in the cadres.

Findings of the Third Sub-Problem

The data about the third sub-problem of the study is shown as frequencies and percentages in table 3.

Table 3
Distribution of the Completed Postgraduate Theses in the Field of Physical Geography Education According to the Accepted Years in Turkey

	Master		Doctorate		Total	
Year	f	%	f	%	f	%
1990	-	-	1	0.35	1	0.35
2000	3	1.04	-	-	3	1.04
2002	7	2.43	-	-	7	2.43
2003	23	8.01	2	0.70	25	8.71
2004	14	4.88	2	0.70	16	5.58
2005	4	1.39	-	-	4	1.39
2006	17	5.92	5	1.74	22	7.66
2007	9	3.14	6	2.09	15	5.23
2008	11	3.83	6	2.09	17	5.92
2009	15	5.23	3	1.04	18	6.27
2010	28	9.76	3	1.04	31	10.80
2011	11	3.83	2	0.70	13	4.53
2012	13	4.53	6	2.09	19	6.62
2013	10	3.49	4	1.39	14	4.88
2014	16	5.58	3	1.04	19	6.62
2015	7	2.43	2	0.70	9	3.14
2016	16	5.58	3	1.04	19	6.62
2017	9	3.14	4	1.39	13	4.53
2018	16	5.58	2	0.70	18	6.27
2019	2	0.70	2	0.70	4	1.39
Total	231	80.49	56	19.51	287	100

The distribution by year is prepared chronologically so as not to be distracted. The Table shows that the most master's theses in the field of physical geography were written in 2010 (10.80%, n=31). In total, the year 2003 came in second place with 25 theses (8.71%). Third place was in 2006 with 7.66% (n=22). There were 19 (6.62%) theses from the field of physical geography education in 2012, 2014 and

2016. The year 2010 is also the year in which the maximum number of master's theses are written. The years with the most doctoral theses were 2007, 2008 and 2012 (2.09% each) with 6 studies.

In 2010 the trend of the research topic in physical geography for master's degrees include: concept teaching (such as national parks, glacial topography, landforms, global warming and the greenhouse effect); teaching methods and techniques (such as scientific discussion-oriented method, the Earth, Sun and Moon, collaborative method, external forces, internal forces, active learning techniques, landforms and ecosystems, the method of analogy with the Earth's shape and movements, computer-aided teaching techniques, and movements with the shape of the world); the use of materials; program (such as the location of earthquakes in geography education programs in Germany and Turkey, teacher opinions on program problems); textbook review (for example 10 per classroom); measuring student achievement and attitude; getting teacher's opinion; extracurricular activities (such as homework).

In 2007, the most studied subjects in the theses were spatial cognition and location knowledge, climate teaching with active learning methods, use of technology in teaching, teacher opinion towards the program, teaching of external forces with multiple intelligence methods, and student attitude. Selection of thesis topics is thought to be proposed by the advisor, or be from the advisors' field of study, or the subjects of interest to the student, or changes in quotas, or the fact that a larger proportion of students admitted into programs at some universities will submit their theses in such topics and the general trend of the recent period may be effective.

The current thesis titles encountered during a literature review based on the National Thesis Center page can also provide significant inspiration to the advisor or faculty member and postgraduate student when determining the subject to complete for a thesis. Barutçu and Onaylı (2016) say that the most important challenges faced by postgraduate students in the selection of their theses subject are: the inability to find a subject that matches the subject of interest of their theses advisor, or the inability of the student to narrow the subject down, or the ability to obtain scale permits, and the inability to obtain feedback from the advisor.

Findings of the Fourth Sub-Problem

The data for the fourth sub-problem of the study are shown as frequencies and percentages in Table 4.

Table 4
Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education According to the Institutes in Turkey

	Master		Doctorate		Total	
Institute	f	%	f	%	f	%
Educational Sciences	149	51.92	46	16.03	195	67.94
Social Sciences	77	26.83	9	3.13	86	29.96
Natural Sciences	4	1.39	1	0.35	5	1.74
Environmental Sciences	1	0.35	-	-	1	0.35
Total	231	80.49	56	19.51	287	100

The Institute of Educational Sciences is ranked first among the institutes where theses were performed with a total of 195 theses on physical geography education (67.94%) (Table 4). 86 Theses (29.96%) in total were written in the field of physical geography education from the Institutes of Social Sciences. In third place were 5 theses (1.74%) in the field of physical geography education from the Institutes of Natural Sciences; and in fourth place, 1 thesis (0.35%) in the field of physical geography education belongs to the Institutes of Environmental Sciences. As explained in Table 2, although theses related to education are expected to be prepared in the Institutes of Educational Sciences, some of these theses related to education were prepared within the Institutes of Social Sciences because it was before the time of the Institutes of Educational Sciences being open. The case is the same for theses on physical geography education.

For example, Aksoy (2000) wrote his thesis entitled 'concept-based geomorphology teaching' within the Institute of Social Sciences at Gazi University. Alım's (2003) doctoral dissertation titled 'evaluation of ninth grade geography curriculum according to teacher and student views' was prepared from the Institute of Social Sciences at Atatürk University. Yeşiltaş (2006) prepared a thesis about 'the influence of using materials on the success level of the students in teaching the subjects of social sciences in physical geography (the sample of Kars province)' at Kafkas University in the Institute of Social Sciences, Social Studies Education Division of the Department of Primary Education. Çalışkan (2008) has prepared his thesis titled 'excursion-observation method in fluvial geomorphology subject and assessment' at Ankara University in the Institute of Social Sciences, Department of Geography (Physical Geography). This department is not related to education, it is pure geography science area.

Karakök (2011) wrote his master's thesis 'the effect of success level of teacher candidate of land trip in education of physical geography subjects and the problems encountering in education of physical geography subject's' in Social Studies Teaching Division of Department of Primary Education in Social Sciences Institute at Niğde University. Zorlu (2017) wrote his master's thesis titled 'a mixed method study on pre-service teachers' informal reasonings aimed at origin of global warming' in the Department of Primary Education in the Institute of Social Sciences at Aksaray University. Gedik's (2018) recently prepared thesis titled 'student views on global warming (as a socio scientific issue) in social studies lesson', Department of Turkish and Social Sciences Education which belongs to the in the Institute of Social Sciences at Ahi Evran University.

Examples of theses written within the Institute of Natural and Applied Sciences are:

- 'A review on the use of maps in primary education' written by Buğdaycı (2012), and it is a doctoral dissertation from the Department of Map Engineering in the Institute of Natural and Applied Sciences at Selçuk University.
- Soysal (2012) prepared a thesis titled 'primary and secondary school students' opinions towards biodiversity loss' at Ahi Evran University, in the Institute of Sciences and Department of Primary Education.
- Polat (2018) wrote a thesis about geographical location and map information, titled 'the usage of geographical information system in teaching

geography within the Fatih Project' at Eskişehir Anadolu University, in the Institute of Natural Sciences, and it was also delivered to the Department of Remote Sensing and Geographic Information Systems.

Due to the presence of interdisciplinary topics in physical geography education and the fields of study of academics, the range of programs in which theses are prepared has expanded.

Findings of the Fifth Sub-Problem

The data for the fifth sub-problem of the study are shown as frequencies and percentages in Table 5.

Table 5
Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education According to the Written Language in Turkey

	Master		Doctorate		Total	
Language	f	%	f	%	f	%
Turkish	223	77.70	54	18.81	277	96.51
English	8	2.78	2	0.70	10	3.49
Total	231	80.49	56	19.51	287	100

According to Table 5, 277 (96.51%) theses in the field of physical geographical education in Turkey were written in Turkish and 10 (3.49%) were written in English. There is no thesis produced in any other language. The regulations of various universities on the language of thesis writing were examined. For example, at the Graduate School of Educational Sciences at Gazi University (2014) "the language of thesis writing is primarily Turkish" and "thesis in the Department of Foreign Languages education within the institute can be prepared in a foreign language" are included in the writing guide of Gazi University Graduate School of Educational Sciences. None of the theses studied at Gazi University, where the most physical geographical education thesis is produced, were written in English language. English language theses in the field of physical geographical education were written to fit the Graduate Education and Training Regulation of Boğaziçi University in *Section II of the Principles Regarding Education and Training article 14* (BOUN, 2017) include the information that "the language of instruction at the university is English". At Dokuz Eylül University in the Graduate School of Natural and Applied Sciences state, in accordance with *article 26/1,* that "the master's and doctoral theses belong to 100% of the English language programs and will be written in English (DEU, 2017, p. 12)." In addition, for example, the Institute of Social Sciences at Necmettin Erbakan University has a foreign language thesis preparation directive (Necmettin Erbakan University Institute of Social Sciences, n.d.) shown in *Article 8/14 from the second part of the regulation about the principles* to be followed for teaching foreign languages in higher education institutions and teaching in foreign languages. According to the clause, "in programs where courses are only given in a specific foreign language, it is obligatory to conduct exams in this foreign language and to write assignments and thesis in this foreign language" (Official Gazette, 2016). Out of the 10 physical geographical education theses written in English, 6 were prepared at Middle East Technical University (which produced 2 doctoral dissertations) and 4 were prepared at Boğaziçi University. Within the scope of the

research subject, no thesis was written in any other language other than the language of study.

As an example of English language master's theses on physical geography; Middle East Technical University, Yıldırım (2013) written by 'role of Extra-curricular activities pre-the students' knowledge, skills, and attitudes toward climate change, climate change adaptation and mitigation' named and Boğaziçi University, Ceyhan (2016) written by 'pre-service teachers' plausibility perceptions of global climate change: the role of cognitive, behavioral and personal variable'.

Ateş (2015) wrote a doctoral dissertation from the field of physical geography education in the English language. The thesis was titled 'the role of future time perspective, environmental attitudes, perceived knowledge, self-efficacy of cooperation and gender in predicting university students' beliefs and behavioral intention about global climate change'. Having a post graduate thesis written in English will make it easier for foreign scientists to make use of it and for the thesis to be cited by accessing not only the summary but the entire text content. However, the level of knowledge of English has not reached very high levels in both academicians and graduate students in Turkey, and translation is a major financial burden.

Findings of the Sixth Sub-Problem

The data for the sixth sub-problem of the study are shown as frequencies and percentages in Table 6.

Table 6

Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education by Sample Type in Turkey

			Master		Doctorate		Total	
Sample			f	%	f	%	f	%
Student	Preschool		1	0.35	1	0.35	2	0.70
	4th grade		3	1.04	1	0.35	4	1.39
	5th grade		4	1.39	4	1.39	8	2.78
	6th grade		30	10.45	5	1.74	35	12.19
	7th grade		6	2.09	-	-	6	2.09
	8th grade		5	1.74	1	0.35	6	2.09
	9th grade		40	13.94	18	6.27	58	20.21
	10th grade		13	4.53	4	1.39	17	5.92
	11th grade		2	0.70	1	0.35	3	1.04
	12th grade		2	0.70	-	-	2	0.70
	Primary school mixed		5	1.74	1	0.35	6	2.09
	High school mixed		10	3.49	3	1.04	13	4.53
	Primary school and High school mixed		2	0.70	-	-	2	0.70
	University	Faculty of Education	24	8.36	4	1.39	28	9.76
		Other	1	0.35	1	0.35	2	0.70
	Subtotal		*148*	*51.57*	*44*	*15.33*	*192*	*66.89*
Teacher	Preschool		2	0.70	-	-	2	0.70
	Primary school		18	6.27	-	-	18	6.27
	High School		18	6.27	2	0.70	20	6.96
	Subtotal		*38*	*13.24*	*2*	*0.70*	*40*	*13.94*
Theoretical/Object			22	7.66	3	1.04	25	8.71

Teacher + Student	Teacher + Primary school students	7	2.43	2	0.70	9	3.14
	Teacher + High school students	8	2.78	1	0.35	9	3.14
	Teacher + Primary and High school students	1	0.35	-	-	1	0.35
	Teacher + Faculty of Education students	1	0.35	1	0.35	2	0.70
	Subtotal	*17*	*5.92*	*4*	*1.39*	*21*	*7.32*
Teacher + Manager (High school)		2	0.70	-	-	2	0.70
Teacher + Student (High school) + Manager		1	0.35	-	-	1	0.35
Teacher + Student (Primary school) + Academician		-	-	1	0.35	1	0.35
Public		1	0.35	-	-	1	0.35
Student (Primary school, High school and University) + Public		-	-	1	0.35	1	0.35
Academician + Expert		-	-	1	0.35	1	0.35
National park visitors (Domestic)		1	0.35	-	-	1	0.35
Primary school (7th and 8th grades) + Parents		1	0.35	-	-	1	0.35
Total		231	80.49	56	19.51	287	100

In the theses, it is observed that the maximum number of students (66.89%, n=192) were taken as a sample (Table 6). Second place are teachers (13.94%, n=40) and third place is a theoretical/object (8.71%, n=25). The theses that sample teachers and students together are ranked fourth with a rate of 7.32% (n=21).

Findings of the Seventh Sub-Problem

The data for the seventh sub-problem of the study are shown as frequencies and percentages in Table 7.

Table 7
Distribution of Completed Postgraduate Theses in the Field of Physical Geographical Education by Working Group/Sample Size in Turkey

	Master		Doctorate		Total	
Working Group/ Sample Size	f	%	f	%	f	%
1-10	4	1.39	2	0.70	6	2.09
11-30	14	4.88	4	1.39	18	6.27
31-50	33	11.50	5	1.74	38	13.24
51-100	67	23.34	24	8.36	91	31.70
101-300	58	20.21	7	2.43	65	22.64
301-500	14	4.88	2	0.70	16	5.58
501-750	15	5.23	2	0.70	17	5.92
751-1000	4	1.39	2	0.70	6	2.09
1000 +	3	1.04	4	1.39	7	2.43
Other (Theoretical/Object)	19	6.62	4	1.39	23	8.01
Total	231	80.49	56	19.51	287	100

The information in Table 7 is sorted from small to large according to the number of samples grouped. In other words, the smallest value is given from 1-10 to 1000 and above, where 1000+ is the largest value. As a result, the largest sample group found in the theses sample size is located in the middle of the table. When the distribution according to the working group/sample size is examined, it is revealed that 51-100% (31.70%, n=91) is the most preferred group. In second place were samples between 101 and 300 (22.64%, n=65) and in third place were sample sizes between 31 and 50 (13.24%, n=38). In 23 theses (8.01%), it was

observed that theoretical studies or objects were concentrated. Working group usage between 1 and 10 (2.09%, n=6) and 751-1000 (2.09%, n=6) is the lowest rank.

Findings of the Eight Sub-Problem

The data for the eight sub-problem of the study are shown as frequencies and percentages in Table 8.

Table 8
Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education According to Method/Research Model in Turkey

			Master		Doctorate		Total	
	Method/Research Design		f	%	f	%	f	%
Quantitative	Experimental (Pre-test/Post-test)		83	28.92	31	10.80	114	39.72
	Survey		79	27.52	10	3.49	89	31.01
	Subtotal		*162*	*56.44*	*41*	*14.29*	*203*	*70.73*
Qualitative	Descriptive	Case study	16	5.58	3	1.04	19	6.62
		Action	1	0.35	-	-	1	0.35
	Document analysis		13	4.53	2	0.70	15	5.23
	Phenomenology		11	3.83	1	0.35	12	4.18
	Subtotal		*41*	*14.29*	*6*	*2.09*	*47*	*16.37*
Mixed (Quantitative + Qualitative)			28	9.76	9	3.14	37	12.89
Total			231	80.49	56	19.51	287	100

According to the method/research model, from the distribution of the graduate theses on physical geographical education given in Table 8, it is observed that quantitative research occurs more than qualitative research (70.73%, n=203). In the quantitative group, there are a total of 114 dissertations (39.72%) performed as experimental (pre-test/post-test) design and a total of 89 dissertations (31.01%) performed as survey. It was determined that the qualitative studies were only 47 (16.37%) in total, while the mixed design researches, in which quantitative and qualitative were used together, were 37 (12.89%) in total.

Findings of the Ninth Sub-Problem

The data for the ninth sub-problem of the study are shown as frequencies and percentages in Table 9a and 9b.

Table 9a
Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education According to the Data Collection Tool (According to the Total Number of Data Collection Tools) In Turkey

	Master		Doctorate		Total	
Data Collection Tool	f	%	f	%	f	%
Success test	104	26.53	32	8.16	136	34.69
Survey	90	22.96	13	3.32	103	26.28
Scales	34	8.67	21	5.36	55	14.03
Interview form	37	9.44	16	4.08	53	13.52
Documents	24	6.12	5	1.27	29	7.40
Observation form	8	2.04	8	2.04	16	4.08
Total	297	75.77	95	24.23	392*	100

The data collection tools shown in Table 9a are not given by the number of studies, but by how many times they have been used because most studies have more than one data collection tool. In other words, a total of 392 data collection tools were applied in 287 theses studied. Within the data collection tools of the examined dissertations, success tests were used 136 times (34.69%) and placed at the top. The poll that followed was used 103 times, compared to 26.28%. The numbers used by the third-row scale (14.03%, n=55) and the fourth-row interview form (13.52%, n=53) are very close together. Documents used as data collection tools in 29 studies (7.40%) and observation forms, which were data collection tools in 16 studies (4.08%), ranked in the last two.

Table 9b

Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education According to the Data Collection Tool (According to Total Number of Theses) In Turkey

	Master		Doctorate		Total	
Data Collection Tool	f	%	f	%	f	%
Success test	68	23.69	8	2.78	76	26.47
Survey	56	19.51	5	1.74	61	21.25
Success test + Scale	12	4.18	14	4.88	26	9.06
Documents	17	5.92	2	0.70	19	6.62
Scale	14	4.88	4	1.39	18	6.27
Interview form	14	4.88	3	1.04	17	5.92
Survet + Success test	12	4.18	2	0.70	14	4.88
Survey + Interview form	10	3.49	2	0.70	12	4.18
Success test + Interview form	4	1.39	3	1.04	7	2.43
Survey + Documents	3	1.04	2	0.70	5	1.74
Survey + Scale	4	1.39	-	-	4	1.39
Interview form	2	0.70	1	0.35	3	1.04
Interview form + Observation form	2	0.70	1	0.35	3	1.04
Success test + Observation form	1	0.35	1	0.35	2	0.70
Interview form + Documents	2	0.70	-	-	2	0.70
Success test + Scale + Interview form	1	0.35	1	0.35	2	0.70
Survey+ Interview form+ Observation form	1	0.35	1	0.35	2	0.70
Survey + Success test + Interview form	2	0.70	-	-	2	0.70
Survey + Scale + Success test	2	0.70	-	-	2	0.70
Interview form + Observation form+ Documents	1	0.35	1	0.35	2	0.70
Other (Fieldwork, Geographic information systems applications)	1	0.35	1	0.35	2	0.70
Success test + Documents	1	0.35	-	-	1	0.35
Interview form + Scale	-	-	1	0.35	1	0.35
Success test + Scale + Interview form	1	0.35	-	-	1	0.35
Success test + Interview form + Observation form	-	-	1	0.35	1	0.35
Success test + Scale + Interview form + Observation form	-	-	1	0.35	1	0.35
Success test + Survey + Interview form + Observation form	-	-	1	0.35	1	0.35
Total	231	80.49	56	19.51	287	100

In Table 9b, the data collection tool/toolset used for each thesis is given separately. Thus, the total number and the number of theses (n=287) are equalized. Table 9b is intended to show the diversity of data collection tools used together. As shown, the success test alone (23.69%, n=68) was the most widely used data collection tool for a master's theses. In doctoral dissertations, the

studies in which the success test and scale (4.88%, n=14) are used together are the highest. According to Table 9b, up to 4 data collection tools were used together, namely 'success test, scale, interview form, observation form' and 'success test, questionnaire, interview form, observation form'.

Findings of the Tenth Sub-Problem

The data for the tenth sub-problem of the study are shown as frequencies and percentages in Table 10.

Table 10
Distribution of the Completed Postgraduate Theses on Physical Geographical Education According to Data Analysis Technique/Analysis Method in Turkey

				Master		Doctorate		Total	
Data Analysis				f	%	f	%	f	%
Quantitative	Descriptive			207	31.55	40	6.10	247	37.65
	Predictive	Hypothesis	Comparison	169	25.76	32	4.88	201	30.64
			Variance	60	9.14	32	4.88	92	14.02
			Normality	14	2.13	4	0.61	18	2.74
		Subtotal		*243*	*37.04*	*68*	*10.36*	*311*	*47.40*
		Correlation	Pearson	12	1.83	1	0.15	13	1.98
			Regression	2	0.30	1	0.15	3	0.45
			Spearman	1	0.15	-	-	1	0.15
		Subtotal		*15*	*2.29*	*2*	*0.30*	*17*	*2.59*
	Subtotal			*258*	*39.33*	*70*	*10.67*	*328*	*50.00*
Subtotal				*465*	*70.88*	*110*	*16.77*	*575*	*87.65*
Qualitative	Descriptive			34	5.18	13	1.98	47	7.16
	Content			26	3.96	8	1.22	34	5.18
Subtotal				*60*	*9.15*	*21*	*3.20*	*81*	*12.35*
Total				525	80.03	131	19.97	656*	100

In Table 10, data analysis techniques/analysis methods of the examined dissertations examined. Since more than one data analysis method was used for most of the theses, a total of 656 data analysis methods were applied in 287 theses. This ratio is 2.28 times the number of theses examined. Of the total data analysis techniques, 525 (80.03%) were used in master's theses and 131 (19.97%) in doctoral dissertations. Quantitative descriptive (37.65%, n=247) and predictive (50.00%, n=328) data analysis techniques are included in a thesis are more than qualitative analysis. In first place is the test frequency/percentage (21.80%, n=143); in second place is the t test (18.29%, n=120); in third place is arithmetic mean / standard deviation (15.85%, n=104); and in fourth place is ANOVA (12.95%, n=54).

According to Table 10, descriptive analyses with 47 theses are ranked fifth (7.16%) and content analyses with 34 theses are ranked sixth (5.18%). Statistics such as frequency, percentage, arithmetic mean, standard deviation, mode, median are among the descriptive analyses. Hypothesis and correlation analysis are types of predictive analysis. Hypothesis tests used in dissertations; the comparison (t-test, chi-square, Mann-Whitney U, Kruskal-Wallis, LSD post-hoc multiple comparison, Tukey's HSD for multiple comparisons, Wilcoxon signed rank, All-pairwise multiple comparisons, Bon ferroni, Cross-table, C Dunnett, Scheffe

multiple comparison, Friedman, Paired sample), variance (ANOVA, ANCOVA, MANOVA) and normality (Kolmogorov Smirnov, Shapiro-Wilk, Levene, Skewness, Kurtosis) testing has been. The correlation analysis used in the theses are Pearson, Regression and Spearman tests. The most widely used analyses in the study were those in the predictive group with 50.00% (n=328).

Findings of the Eleventh Sub-Problem

The data for the eleventh sub-problem of the study are shown as frequencies and percentages in Table 11.

Table 11
Distribution of the Completed Postgraduate Theses in the Field of Physical Geographical Education According to the Research Topic and Physical Geographical in Turkey

		Master		Doctorate		Total	
Research topic	Physical geography topic	f	%	f	%	f	%
1. Success-attitude-awareness-competence-opinion (for students, teachers, and administrators)	Natural systems	27	9.41	5	1.74	32	11.14
	Environmental awareness	14	4.88	3	1.04	17	5.92
	Thematic maps and mapping skills	13	4.53	3	1.04	16	5.58
	Natural disasters	7	2.43	1	0.35	8	2.78
	Curriculum and textbooks	5	1.74	1	0.35	6	2.09
	Geographical problems and projects	2	0.70	-	-	2	0.70
	Teaching local geography	1	0.35	1	0.35	2	0.70.
	Geography homework	1	0.35	-	-	1	0.35
	Subtotal	*70*	*24.39*	*14*	*4.88*	*84*	*29.27*
2. Approach-strategy-method-technique and application	Natural systems	47	16.37	14	4.88	61	21.25
	Trip-observation method and fieldwork	6	2.09	1	0.35	7	2.43
	Environmental knowledge	1	0.35	2	0.70	3	1.04
	Natural disasters	2	0.70	2	0.70	4	1.39
	Map-globe knowledge and skills	-	-	2	0.70	2	0.70
	Interdisciplinary course processing (environment, ecosystem, energy resources, culture)	1	0.35	-	-	1	0.35
	Local geographic terms	1	0.35	-	-	1	0.35
	Subtotal	*58*	*20.21*	*21*	*7.32*	*79*	*27.52*
3. Teaching subject and concept	Natural systems	24	8.36	1	0.35	25	8.71
	Environmental problems and environmental awareness, contemporary world problems	6	2.09	1	0.35	7	2.43
	Use of extra-curricular resources and materials	3	1.04	3	1.04	6	2.09
	Teaching map knowledge	1	0.35	4	1.39	5	1.74
	Natural disasters	2	0.70	1	0.35	3	1.04
	Concept teaching with sightseeing activities	1	0.35	-	-	1	0.35
	Subtotal	*37*	*12.89*	*10*	*3.49*	*47*	*16.37*
4. Technology, computer and laboratory	Natural systems	14	4.88	2	0.70	16	5.58
	Materials and geography laboratory	3	1.04	1	0.35	4	1.39
	9th grade geography topics	1	0.35	-	-	1	0.35

	Subtotal	*18*	*6.27*	*3*	*1.04*	*21*	*7.32*
5. Textbook and resource review	Content and visuals in textbooks	6	2.09	-	-	6	2.09
	Natural systems	4	1.39	1	0.35	5	1.74
	Map information	4	1.39	-	-	4	1.39
	Geographical analogy and metaphors	1	0.35	-	-	1	0.35
	Subtotal	*15*	*5.23*	*1*	*0.35*	*16*	*5.58*
6. Extra-curricular activities	Nature and geopark education, natural heritage and fieldworks	5	1.74	1	0.35	6	2.09
	Geographic thinking skills (field trip, panel participation, quiz, documentary watching)	4	1.39	-	-	4	1.39
	Climate-based natural disasters, climate change	1	0.35	1	0.35	2	0.70
	Subtotal	*10*	*3.49*	*2*	*0.70*	*12*	*4.18*
7. Geographic information systems	Natural systems	5	1.74	2	0.70	7	2.43
	Thematic maps and map use	2	0.70	-	-	2	0.70
	Natural systems	1	0.35	-	-	1	0.35
	Subtotal	*8*	*2.78*	*2*	*0.70*	*10*	*3.49*
8. Measurement and evaluation	Natural systems	4	1.39	-	-	4	1.39
	Natural disasters	1	0.35	-	-	1	0.35
	Readiness (for grade 9)	1	0.35	-	-	1	0.35
	Map literacy level	1	0.35	-	-	1	0.35
	Environmental knowledge levels	1	0.35	-	-	1	0.35
	Spatial cognition skills	1	0.35	-	-	1	0.35
	Climate literacy	-	-	1	0.35	1	0.35
	Subtotal	*9*	*3.14*	*1*	*0.35*	*10*	*3.49*
9. Evaluation of Geography Curriculum	Natural systems	2	0.70	-	-	2	0.70
	Environmental issues	2	0.70	-	-	2	0.70
	9th grade curriculum	-	-	1	0.35	1	0.35
	Map skills	-	-	1	0.35	1	0.35
	Program and university entrance exam questions	1	0.35	-	-	1	0.35
	Subtotal	*5*	*1.74*	*2*	*0.70*	*7*	*2.43*
10. International comparison	Earthquake	1	0.35	-	-	1	0.35
	Subtotal	*1*	*0.35*	*0*	*0*	*1*	*0.35*
Total		231	80.49	56	19.51	287	100

Postgraduate theses in the field of physical geography education have 10 items according to the research subject (Table 11). Among these, 84 theses rank first with (29.27%), success-attitude-awareness-competence-opinion (for students, teachers, and administrators). There are 79 theses (%27.52) using approach-strategy-methodology-technical, and 47 application theses (%16.37) about the concept of topic teaching. There are 21 theses (%7.32) about technology-computer and laboratory studies, and 16 theses 16 (%5.58) focused on textbooks and literature reviews. There are 12 theses (%4.18) about extracurricular activities, 10 theses about geographical information systems (%3.49) and 10 theses about measurement and assessment (%3.49). There are 7 theses (%2.43) about an evaluation of educational programs in geography and 1 thesis about an (%0.35) international comparison.

In the field of physical geography, it is observed that the natural systems (52.94%, n=152) are most often covered. Other areas of study for the thesies

include map information (10.81%, n=31); environmental information (10.44%, n=30); natural disasters (6.96%, n=20) and fieldwork (4.87%, n=14). Theses about 'success-attitude-awareness-competence-feedback (students, teachers, and administrators)' in physical geography education are located in the first place, and some examples include:

- Yeşiltaş (2006) 'the influence of using materials on the success level of the students in teaching the subjects of social sciences in physical geography (the sample of Kars province)';
- Türk (2009) 'the teacher views of the gaining of the learning of natural systems of the 9th grade geography curriculum';
- Gedik (2018) 'student views on global warming (as a socio scientific issue) in social studies lesson'; and
- Gündoğan (2018) 'impact on student achievement the use of models and concept map in teaching karst topography'.
- Some theses' titles use an 'approach-strategy-method-technique and application' and some examples are:
- Midilli (2003) 'comparing the method of explaining and question-answer, at high school 2nd grade level for teaching the plants of Turkey concepts';
- Tunç (2006) 'excursion observation method in geography teaching, the influence of this method on the students' success and a comparison of this method with the other educational methods'; and
- Uyanık (2006) 'teaching the concepts of karst topography with demonstration method'.

Some of the theses relate to 'subject and concept teaching' and examples include: Aydoğan (2006) 'determining the level of learning the basic concepts of streams subjects in the external forces unit of high school 1st grade students and increasing this level'; and Bulut (2014) 'determining the misconceptions of social science teacher candidates about the structure of the world'.

On the subject of 'technology-computer and laboratory', the thesis entitled 'the effects of laboratory work in geography teaching on student success', which was written by Dündar (2010), and which is the subject of physical geography, within the scope of the 9th grade external forces unit. There is a thesis about 'textbooks and resource reviews' written by Aksoy (2014), titled 'evaluating secondary education geography text books natural systems chapters using constructive approach'; and on the subject of 'extracurricular activities', there is a thesis written by Gündüz (2011) about 'the evolution of the extra-curriculum activities of the ninth-grade geography lessons according to the ideas of the teacher'.

In addition to the above:

- Erdoğan (2009) wrote a thesis about 'geographic information systems' entitled 'natural disasters in secondary education geography courses with geographic information systems applications teaching the study' on the subject of.
- Badur (2012) wrote a thesis about 'measurement-evaluation' and 'the readiness levels of students for 9th grade geography course subjects'.
- Finally, on 'evaluation of the geography curriculum', written by Alım (2003) 'evaluation of 9th class geography teaching curriculum according to the

opinions of teachers and students' named and related to international comparisons' and on 'international comparison', written by Erdem (2010) 'the place of earthquakes taught in geography teaching in Germany (Bavaria state) and the general high schools in Turkey' named theses are the examples.

Findings of the Twelfth Sub-Problem

The data for the twelfth sub-problem of the study are shown as frequencies and percentages in Table 12

Table 12
Distribution of the Content of the Postgraduate Theses Completed in the Field of Physical Geographical Education According to the Level of Education/Target Group in Turkey

	Master		Doctorate		Total	
Target group	f	%	f	%	f	%
Secondary school	111	38.68	30	10.45	141	49.13
Primary school	83	28.92	17	5.92	100	34.85
University	27	9.41	7	2.43	34	11.84
Primary and secondary school	5	1.74	-	-	5	1.74
Preschool	3	1.04	1	0.35	4	1.39
Mixed	2	0.70	1	0.35	3	1.04
Total	231	80.49	56	19.51	287	100

When the content of a physical geography education theses is prepared in Turkey it is evaluated in terms of the level of education, and it is observed that they are mostly oriented towards secondary education (49.13%, n=141) (Table 12). Second place is primary school level (34.85%, n=100), while third place is university level (11.84%, n=34), where the majority of is composed of teacher candidates.

In fourth place, primary and high school level (1.74%, n=5) were studied together. preschool (1.39%, n=4) and mixed studies (1.04%, n=3) of various grade levels ranked last. For example, Tarman (2017) worked with a preschool group of students for her doctoral dissertation titled 'the impact of maps and globes using education about map and globe reading and interpreting skills of five-year-olds'. Also, Ak (2012) wrote a master's thesis about 'primary 6 and 7' entitled 'examination of student behavior and attitude in teaching the subject of climate change and its effects in a classroom social studies course'.

For 'secondary school education 9' Açıkgöz (2007) sampled secondary education 9th grade students for the master's study about 'secondary education 9th grade students' level of understanding the concepts of landslide, slump, erosion and misconceptions. Çalışkan (2008) worked with college students for his thesis titled 'excursion-observation method in fluvial geomorphology subject and assessment' which was prepared at Ankara University in the Department of Geography.

Conclusions, Discussion & Suggestions

In the current research, 287 postgraduate theses written in the field of physical geography education were examined and evaluated using a document

analysis method. For this purpose, 'thesis type', 'the name of the university', 'year of acceptance', 'the institute', 'language', 'sample type', 'working group/sample size', 'method/model research', 'data collection', 'data analysis technique/method of analysis', 'research subject and the subject of physical geography' and 'the instructional level of the content/target audience' were identified as the headings for the sub-problems; also, descriptive analysis was used to evaluate the theses.

The following paragraphs will focus on the results of the findings about the sub-problems covered in the research. The number of postgraduate theses in the field of physical geography education is 287. Within this value, master's theses have a ratio of 80.49% (n=231) and doctoral dissertations have a ratio of 19.51% (n=56). Accordingly, the number of master's theses is 4.125 times greater than the number of doctoral dissertations produced. As is known, institutes at universities reserve more quotas for master's degree candidates and for those who want to continue their academic career, and also for those who wish to develop their knowledge of a foreign language knowledge for a PhD education.

In most theses' analyses completed to date, the number of master's theses appear to be greater than the number of doctoral dissertations. Examples of such studies are in chronological order; Sarı (2011); Yağmur-Şahin, Kana and Varışoğlu (2013); Güçlü-Nergiz (2014); Keskin (2014); Altınışık (2015); Yapalı (2015); Akın (2016); Göksu (2016); Tayfun, Küçükergin, Aysen, Eren ve Özekici (2016); Yavuz (2016); Ateşli (2017); Çifçi (2017); Dağdeviren (2017); Öner and Öner (2017); Özçakmak (2017); Tereci (2017); Aidi and Rosli (2018); Akyol (2018); Daşdemir, Cengiz and Aksoy (2018); Doğan (2018); Karaca (2018); and Tosun-Sümer and Güven (2018).

There is a total of 207 universities in Turkey. In the study, it was determined that there were 48 universities where theses related to physical geographical education are produced which is 1 in 4.31 of the total number of universities. It is clear that not all universities have a postgraduate program that can handle physical geography education. Of the 48 universities identified, most of the theses were written at Gazi University (35.19%, n=101). This is followed by Marmara University (14.98%, n=43). Ataturk University 4.18% (n=12) is third, and next is Karadeniz Technical University in 4th place with 3.83% (n=11). Furthermore, there are one by (5.95% in total) at 17 universities, two by (7.70% in total) at 11 universities, three by (3.12% in total) at 3 universities, four by (4.17% in total) at 2 universities, five by (3.48% in total) at 6 universities, six by (12.54% in total) and seven by (4.86% in total) at 2 universities. The University in which it is made is the Gazi University at the most, and there are other theses examined studies: Ayhan (2006); Akça-Üstündağ (2009); Tarman, Güven ve Aktaşlı (2011); Elbir and Bağcı (2013); Güçlü-Nergiz (2014); Tümer (2014); Yapalı (2015); Akın (2016); Arıca (2017); Durak, Çankaya, Yunkul, Urfa, Topraklıklıoğlu, Arda and İnam (2017); Özçakmak (2017); Akyol (2018) and Mısır (2018). As with this research, other studies where Gazi University is ranked first and Marmara University is ranked second are sampled as Şahin, Göğebakan-Yıldız and Duman (2011); Bağcı (2012); Kaya (2013); Ataş (2015); Tereci (2017); Karaca (2018); Köseoğlu (2018); and Özdemir (2018). Furthermore, and also as with this research, the first three ranks were made by Gazi, Marmara and Atatürk Universities and similar studies were conducted by Çifçi (2017) and Öner and Öner (2017). All three universities were established long

ago and have a well-established history. In this respect, the academics of Gazi, Marmara and Atatürk Universities have been doing thesis studies on various topics of geography education for many years.

As interpreted under Table 2, before the Institutes of Educational Sciences were opened, the educational theses were written within the Institutes of Social Sciences. The theses on physical geographical education were written in the Department of Turkish and Social Sciences Education, the Department of Primary Education, the Department of Remote Sensing and Geographic Information Systems, Education Programs and Teaching, Department of Map Engineering. The reasons for this are that some of the subjects of physical geographical education (such as map knowledge and climate changes) are interdisciplinary and that the faculty members working on these subjects are in such positions.

Some of the universities for postgraduate education in the field of physical geography are ranked according to the number of students. For example, in first place, Gazi University, has 23 master's and 7 PhD students in the Department of Geography Education, and 6 master's and 5 PhD students in the Department of Geography Teaching, and 48 master's and 16 PhD students in the Department of Social Studies Education that they all are affiliated with the Graduate School of Educational Sciences. There are 1 master's and 18 doctoral students enrolled in the Department of Social Studies Education (Gazi University Information Systems, 2020). These numbers are relatively high, which explains why Gazi University is in the first place. There are 18 master's and 13 doctoral students in the Geography Teaching Division of the Department of Secondary Social Studies Education at Marmara University Institute of Educational Sciences (this information was obtained by e-mail from the institute in writing).

In the third row, Atatürk University, 187 students are enrolled in the Department of Turkish and Social Sciences Education in Institute of Educational Sciences, and 101 of them are master's and 86 of them are doctoral students. Also, in the Department of Geography Education, there are 23 postgraduate students, including 17 master's and 6 doctoral students (this information was received from the institute in writing by e-mail). However, as explained in the interpretation of Table 2, it should be considered that theses on physical geography education were prepared in departments such as Classroom Teaching, Education Programs and Education, Preschool Education, Map Engineering, Geographic Information Systems previously in social sciences institutes and that they can be prepared in the future.

For example; Akdemir (2009) studied about general physical geography courses with university students in his thesis titled 'the investigation of the effects of using the smart board on the achievement of students in geography course' in Zonguldak Karaelmas University Institute of Social Sciences Department of Education Programs and Teaching. At Giresun University, from the Institute of Social Sciences and Department of Primary Education, Kelleci (2014), presented a thesis called 'an examination into perceptions of preservice classroom teachers in relation to notion of climate via metaphor'. At Hacettepe University Division of Preschool Education, Tarman (2017) prepared a doctoral dissertation about 'the effect of map and globe education on five years old children's map and globe reading and interpretation skills.

When we look at the acceptance years of the postgraduate theses in the field of physical geographical education, it is seen that the oldest thesis belongs to the year 1990. However, after 1 thesis in 1990 (0.35%), there was no physical geography education subject thesis for 10 years up to 2000 (1.04%, n=3). The year 2001 remained within the scope of the study. From 2002 onwards, related theses are available, consecutively each year. The most theses about physical geography education were written in 2010 (10.80%, n=31). It was followed by the year 2003 with 25 theses (8.71%) and the year 2006 with 22 theses (7.66%). By September 2019, 4 theses (1.39%) were available. The master's theses were delivered in 2010 (9.76%, n=28) and the doctoral dissertations were delivered in 2007, 2008 and 2012 (6.27% in total). Accordingly, it can be said an increase occurred after 2002. 2010 was the year in which the highest number of theses were written in the as studied by Tümer (2014) and Yapalı (2015). Ateşli's (2017) content analysis survey for postgraduate theses published in the field of independent audit and internal audit determined that the most dissertations were written in 2010 and this is similar to the current research.

In the study by Çifçi (2017), which examined the trends of postgraduate theses in geography education in Turkey between 2006 and 2017, it was determined that 2010 was the most productive period in terms of contribution to the field. Furthermore, Karaca (2018) examined postgraduate theses in the field of education management, and also determined that 2010 was a productive year with 250 of the 1142 theses being prepared. It is thought that the selection of more physical geography education focused theses' subjects in 2010, 2003 and 2006 were primarily related to the interests of the consultant academics. In addition, the demands of the student, the change of quotas from time to time, the completion rate of theses, and the general trend of recent developments in education can also be important. Because all the faculty members who are theses' advisors and all the students who are going to prepare the theses frequently visit the National Thesis Center web page in order to be inspired by the current issues and take care not to process the same theses subject as covered previously.

The Institute of Educational Sciences (67.94%, n=195) was ranked first for theses in physical geography education by a clear margin. The nearest institute was Social Sciences (29.96%, n=86), with the difference being 2.26 times. There were 5 theses (1.74%) in the Institutes of Natural Sciences and 1 thesis (0.35%) in the Institutes of Environmental Sciences for physical geographical education. In fact, universities in Turkey have a wide variety of institutes. However, in institutes such as Technical Health, Fine Arts, Forensic Sciences, Stem Cell, Nuclear Sciences, there are no theses on physical geography education. As with this study, examples of other similar thesis analysis studies where educational sciences occur in first place and the Institute of Social Sciences occurs in the second place include: Kaya (2013); Akın (2016); Tayfun, Küçükergin, Aysen, Eren and Özekici (2016) and Özdemir (2018). Additionally, Tarman, Güven and Aktaşlı (2011); Köseoğlu (2018); and Mısır (2018) discovered that Institutes of Educational Sciences are in the top position for their respective research subjects.

The existing departments and programs of the universities were evaluated in order to determine which programs were written for research and which Programs were not written for thesis. For example, the total number of

departments and programs affiliated with the Institute of Educational Sciences at Gazi University's is 64 (Gazi University Information Systems, 2020). Geography Education Division of Secondary Social Studies Education, Department of Turkish and Social Sciences Education, Department of Geography Teaching and Department of Social Studies Education have theses written on the subjects of physical geography education. The total number of programs that are not directly related to our research subject is quite large, for example, Family Economics and Nutrition Education, Music Education, Education for the Mentally Handicapped. In addition, a thesis subject related to physical geographical education can be determined with students of different levels of education in programs such as Educational Technology or Measurement and Evaluation in Education. In this research, it was determined that there were very few thesis studies on measurement and evaluation, especially in education, and this was evaluated as an important deficiency.

Marmara University's Institute of Educational Sciences, which ranked second in the highest number of thesis writing, has 9 departments and 25 programs at the level of master's degree with thesis, while 7 departments and 19 programs in the doctorate degree (Marmara University Institute of Educational Sciences, 2020). Theses produced at Marmara University in the Geography Teaching Division of Department of Secondary Social Studies Education; Social Studies Teaching Division of Department of Primary Education focus mostly on the teaching of geography within the field of elementary education. Today, both Geography Teaching and Social Studies Teaching Programs are located within the Department of Turkish and Social Sciences Education. The subject of physical geography education has not been found in the graduate theses within Marmara University's Education Programs and Teaching and International and Comparative Education Program, and it is thought that it may be discussed in future theses. In addition, it was determined that theses on physical geography education were also written in with a focus on Classroom Teaching and Preschool Teaching Programs at many universities.

At Hacettepe University, in the Hacettepe University Division of Preschool Education Tarman (2017) examples of theses in the field of physical geography education include a doctoral dissertation together with a master's thesis presented by Zorlu (2017) at Aksaray University in the Institute of Social Sciences and Department Primary Education in Turkish language. In the fifth sub-problem of the research, the writing language of the graduate theses is discussed. Turkish theses (96.51%, n = 277) are 27.7 times higher than English theses (3.49%, n=10).

Accordingly, students who are not citizens of the Republic of Turkey can submit a thesis written in English, except for graduate thesis in universities such as Boğaziçi University and Middle East Technical University where they are taught in foreign languages. Tereci (2017) is of the opinion that English language theses are a mark of quality for universities and this is indicative of the university's place in the world rankings. As in this study, other analysis studies that emphasize that the language used in theses are mainly Turkish include: Fazlıoğulları (2012); Güçlü-Nergiz (2014); Şardağ (2016); Çilingir (2017); Tereci (2017) and Köseoğlu (2018).

In the current study, postgraduate theses in the field of physical geography education were classified in detail in terms of sample type. For example, students

are divided from the preschool grade as 4, 5, 6, 7, 8, 9, 10, 11, and 12th grade, primary education mixed, secondary education mixed, primary and secondary education mixed, university education faculties (prospective teachers) and other university students.

For example, students in pre-school classes 4, 5, 6, 7, 8, 9, 10, 11, and 12th grades mixed primary, mixed high school, mixed primary and secondary, a college of education faculty (teachers) and other college students. Students are the largest sample group in the examined dissertations. 192 of the 287 theses (66.89%) were conducted with students and (20.21%, n=58) of them are 9th grades, (12.19%, n = 35) of them are 6th grades, 9.76%, n=28) of them are university students (teacher candidates) in faculties of education. teachers (13.94%, n=40) constitute the second population sample group and general trend has been towards involving employees in secondary schools (6.96%, n=20) more in the theses.

Undoubtedly, the most important reason for this is that the geography field is taught independently in secondary education and by field experts, while the courses such as life studies and social studies are included in the curriculum prior to secondary education. 25 of the theses (8.71%) were designed as a theoretical/object study. Other samples include administrators, academics, experts, parents, local residents and visitors. There are several similar studies in the field that indicate that the maximum number of students were taken as samples. Bağcı (2012); Altınışık (2015); Şenyurt (2016); Öner and Öner (2017); Tereci (2017); Daşdemir, Cengiz and Aksoy (2018) and Doğan (2018) are among them. In the theses examined by Çifçi (2017) and Özçakmak (2017), it was determined that the maximum number of secondary school students were sampled to coincide with this research.

The working group/sample size between 51-100% (31.70%, n=91) was determined to be the first in both master's and doctoral theses. The sample size between 101and 300 (22.64%, n=65) and 31-50 (13.24%, n=38) make up the other higher groups. There are 6 studies conducted between 1-10 and 751-1000 people (2.09% for both interval) and 7 studies conducted with 1000 and over (2.43%). 23 (8.01%) theses are either theoretical or based on documentation. Yavuz (2016) and Köseoğlu (2018), in their own analysis work, concluded that the sample size of the overall survey was between 51 and 100, as in this research.

Quantitative methods were used in 203 (70.73%) of postgraduate theses in the field of physical geographical education. In the method sections of the theses, it is stated that 114 of them (39.72%) were experimental design (pre-test/post- test) and 89 (31.01%) were survey designs. The qualitative method was used in 47 theses (16.37%). Within the qualitative method, it was determined that the following designs were used: descriptive pattern (6.62%, n=19 for case study and 0.35%, n=1 for action); document analysis (5.23%, n=15); and phenomenological designed (4.18%, n=12). Only 12.89% or 37 Theses were prepared using mixed methods (quantitative + qualitative). The work of Tümer (2014), Altınışık (2015), Yavuz (2016), and Çifçi (2017) similarly supports the conclusion that most experimental and second-order screening methods are used in most dissertations. Studies by Kara-Aydemir (2017) and Köseoğlu (2018) also determine that the most experimental method is applied in theses in Science Education.

Other studies proving that quantitative methods are used more can be listed as follows: Fazlıoğulları (2012), who examined the doctoral theses of educational sciences; Şardağ (2012), who conducted content analysis on postgraduate theses on tourism geography; Uysal (2013), who evaluated doctoral dissertations in education management, inspection, planning and economics; Keskin (2014), who examined postgraduate theses on learning strategies; Ataş (2015) who examined master's theses in physical education and sports; Durak, Çankaya, Yunkul, Urfa, Topraklıklıoğlu, Arda and İnam (2017) who examined master's theses on distance education; Öner and Öner (2017), who analyzed postgraduate theses on geography subjects in social studies education; Karaca (2018), who studied postgraduate theses in the field of education management; and Egypt (2018), who studied doctoral theses in physical education.

From the examined dissertations, it was evaluated that the most successful data collection tools were success tests (34.69%, n=136). Surveys in 103 theses (26.28%), scales in 55 theses (14.03%), interviews in 53 theses (13.52%), documents in 29 theses (7.40%) and observation forms in 16 theses (4.08%) were used as data collection tools. Sarı (2011) concluded that most achievement tests were used as a data collection tool for master's theses in the field of chemistry education. Similarly, success, knowledge and skills tests came first as a data collection tool in a study conducted by Daşdemir, Cengiz and Aksoy (2018) about science-technology-engineering-mathematics (STEM) education trends. In the study by Öner and Öner (2017), as in this research, the success test is also in first place, while the survey is in second place. While the most used data collection tool for master's theses was the success test (23.69%, n=68), the most successful test and scale (4.88%, n=14) were used together as the data collection tool for doctoral dissertations. When we look at the studies in which more than one data collection tool occurred for physical geography education, it is seen that there is a maximum of 4 types. 'Success test + scale + interview form + observation form' (0.35%, n=1) and 'success test + survey + interview form + observation form' (0.35%, n=1) which represent two different groups of 4 data collection tools used together.

More use of the success test and questionnaire in theses are associated with a greater choice of quantitative methods and higher sample numbers. Since statistical generalizations are made in quantitative methods, these data collection tools are quite suitable. For example, Sarı (2011) examined theses in the field of chemistry education, and it was determined that the data tool used most in the theses was the test, and the second tool used as a single data tool was the survey. As can be seen, these results are similar to those from the theses in physical geography education.

When the data analysis techniques/analysis methods of the examined dissertations were evaluated, it was determined that more than one data analysis was used in most dissertations. It is stated that only 1 analysis was applied in 86 (37.23%) out of 231 master's theses, and 21 (37.50%) out of 56 doctoral dissertations. Accordingly, from the 287 postgraduate theses studied, 107 (37.28%) are analyzed via a single-technique. In the remaining 180 theses (62.72%), more than one analysis technique was used.

The use of more than one data analysis technique is chosen according to the purpose and needs of the study. In this way, an interdisciplinary bridge is also established, requiring the researcher to obtain detailed statistical knowledge and to continuously improve themselves. Since more than one technique is used in most dissertations, when we look at the number of analysis techniques rather than the number of dissertations, it is seen that 656 data analyses were performed across 287 postgraduate studies. This ratio doubles the number of theses to 2.28. For the master's theses, 525 (80.03%) used the analysis method, and 131 (19.97%) of doctoral dissertations also used this method. It is observed that quantitative descriptive (37.65%, n=247) and predictive (50.00%, n=328) data analysis techniques are used as a result of more use of the method/research model of the dissertations studied.

Statistics such as frequency, percentage, arithmetic mean, standard deviation, mode, median are given together in the classification. Predictive analyses are subdivided into hypothesis and correlations. Within the hypothesis the following categories were located: (i) the comparison (t-test, chi-square, Mann-Whitney U, Kruskal-Wallis, LSD post-hoc multiple comparison Tukey's HSD for multiple comparisons, Wilcoxon signed rank, All-pairwise multiple comparisons, Bon ferroni, Cross-table, C Dunnett, Scheffe multiple comparison, Friedman, Paired sample); (ii) variance (ANOVA, ANCOVA, MANOVA); and (iii) normality tests (Kolmogorov Smirnov, Shapiro-Wilk, Levene, Skewness, Kurtosis). Pearson, regression and Spearman tests were also given in correlation. The most common test was frequency/percentage (21.80%, n=143), Second was t-test (18.29%, n=120), third, the arithmetic mean/standard deviation (15.85%, n=104), and fourth, the ANOVA (12.95%, n=54). Descriptive analysis techniques in qualitative studies come in fifth place (7.16%, n=47), while content analysis comes in sixth place (5.18%, n=34). Similar to these results, a first-place study of predictive analyses was conducted by Öner and Öner (2017).

Another evaluation of the study is on the distribution of graduate theses to the research topic and physical geography. The research subjects of the examined dissertations were collected under 10 headings. The first ranked research subject, used in 84 theses (29.27%) was success-attitude-awareness-competence-opinion (for students, teachers, and administrators). This is followed by an approach-strategy-method-technique and application which was used in 79 theses (27.52%), followed by teaching subjects and concepts which was used in 47 theses (16.37%), and then technology-computer and laboratory subjects which was used in 21 theses (7.32%). The other 6 rankings for the theses covered the research topics of textbook and resource analysis (%5.58, n=16); followed by extracurricular activities (%4.18, n=12); then Geographic Information Systems (%3.49, n=10) and assessment (%3.49, n=10); with evaluation of geography teaching program (%2.43, n=7) and international comparison (%0.35, n=1) being the lowest ranked.

When we look at the classification of physical geography subjects, it is seen that the subjects of natural systems (52.94%, n=152) were covered most frequently. Also, 31 theses were focused on map knowledge (10.81%); 30 theses covered environmental knowledge (10.44%); 20 theses were about natural disasters (6.96%); and 14 theses on and fieldwork (4.87%). Physical geographical subjects most encountered in the theses were geographic location information,

spatial cognition, parallel-meridian, map and chart reading, the Earth, plate movements, movements of the world and the results-atmospheric precipitation-pressure-winds, climate zones, global climate change, landforms, internal and external forces, natural disasters, especially earthquakes and education, teaching the use of tools in physical geography, using Google Earth, environmental issues, ecology and ecosystem concepts. In contrast, streams, soil, reduced biodiversity, karst-coastal-glacial-volcano topography concepts, plant recognition, and geopark education are not mentioned much so these could be beneficial areas to research in future theses in the field of physical geography education.

In the last sub-problem of the research, the content of the physical geography education thesis in Turkey is discussed in terms of the level of instruction/target audience. Nearly half of the theses were secondary education focused (49.13%, n=141). Furthermore, the primary level (34.85%, n=100), followed by the university level (11.84%, n=34), then the primary + secondary level (1.74%, n=5), and then combined studies (1.04%, n=3) were conducted, consisting of pre-school (1.39%, n=4) and different grades/levels of education (1.04%). Sarı (2011) and Kaya (2013) also determined that the theses they examined in their studies were focused at the highest level of secondary education. The case also supports this research.

As a result of examining the postgraduate studies in the field of physical geographical education, the following recommendations are made for future studies:

- It may be encouraged to increase thesis studies on physical geography education, and especially at a smaller number of doctoral level studies.
- Structured English abstracts may be encouraged to enable researchers from various countries to access more easily and detailed information.
- The sample type can be diversified. In particular, more studies can be carried out with the teacher-candidates studying in education faculties. Studies focused on the awareness, perceptions, concerns adequacy academic, vocational views, use of instructional technology, tendencies and values, of geography teacher candidates will contribute to the discipline in the future. Therefore, the opinions of prospective teachers, who are likely to play an active role in the geography education process, are of great importance for future research.
- While many studies have varied in the use of data collection tools, there are more studies that use a single data collection method, such as a success test or survey. The presence of diversity can enable access to more qualified studies.
- The number of quantitative studies for postgraduate thesis is higher than the other types of studies. The number of qualitative studies and especially mixed (qualitative + quantitative) studies needs to be increased and this could be an area for future research. In addition, the number of action studies is very small and no meta-analysis studies have been found. Therefore, it would be appropriate for graduate students to be directed to such research models.
- The subject of success-attitude-awareness-competence-opinion (for student-teacher-administrator) was emphasized in theses about educational research. The second topic to be emphasized was approach-strategy-

method-technique and application. It is suggested that two different strategies or techniques be used instead of the traditional method for comparison. Subject and concept teaching should also be diversified in future research. Furthermore, the number of studies dealing with measurement and evaluation is very low so future studies should be focused especially on alternative measurement and evaluation methods. Dissertations involving international comparisons appear to be in the lowest order. By increasing these, a contribution can be made to the development of the geography curriculum.

- Topics in physical geography that have not been studied or are studied very little include lakes, groundwater resources, oceans and seas, soil properties and types, the relationship between vegetation and climate, plant communities, geographic, wind formation and types, scale calculations, time difference calculations and field studies on the teaching of particular subjects such as studies on other issues that may be associated with and daily life can be planned. Because it is particularly difficult to calculate scale and time differences, many physical geography terms and the functioning of events cannot be adequately understood by students if they are not supported by field studies. Course packages are offered for the elimination of these deficiencies in the graduate education programs. For example, at Dokuz Eylül University, the postgraduate program in geography education covers 'to benefit from the land: climatological data evaluation'; and the geography education program at Gazi University is in 'terrestrial hydrography'. At Marmara University, the geography education program in about 'fieldwork in geography education and geography education in orienteering'. In most programs, courses about geographical information systems are given and for them to be reflected the future issues of theses will be very useful.
- Finally, it is suggested for thesis research to support interdisciplinary studies related to the field of physical geography education]

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