



A Meta-Synthesis Study on Investigations of Dissertations on Education Regarding Reasoning Skills in Turkey*

Research Article

Ercument ERSANLI¹, Cem GENCOGLU², Volkan DURAN³

¹Ondokuz Mayıs University, Faculty of Health Sciences, Turkey, ORCID: 0000-0003-4840-3629

²Ministry of National Education, Directorate General of Basic Education, Turkey, ORCID: 0000-0003-2589-8673

³Ondokuz Mayıs University, Faculty of Education, Turkey, ORCID: 0000-0003-0692-0265

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ABSTRACT

The reasoning is a concept that can be used explicitly or implicitly in different scientific disciplines and in different fields. Therefore, it is thought that studies conducted on reasoning will contribute directly and indirectly to many areas from many aspects. Although the concepts of reasoning and thinking are used interchangeably, reasoning is considered to be a more systematic and normative form of thinking in general. As an interdisciplinary concept, reasoning is an important term for both educational sciences and the related literature. The aim of this study is to investigate academic dissertations in the field of education related with the concept of reasoning prepared in Turkey. Master's and doctoral theses from 1998 to 2017 prepared by using qualitative or quantitative research methods, the aims and themes of which are compatible with the content of principles of a scientific research, are included in this study. The data were collected by document analysis technique and analyzed by content analysis. As a result of the study, it was concluded that reasoning in the dissertations was focused as a cognitive variable and investigated especially in Mathematics and Science fields. Secondly, dissertations on educational sciences area focus on reasoning in general rather than their content on specific dimensions. Thirdly, it can be said that in the literature mathematical reasoning skills was investigated according to the subject based dimension of mathematical reasoning and there is a gap between the dimensions of mathematical reasoning according to thinking style and perspective. Fourthly, it is seen that the reasoning was focused as an individual variable in terms of sociological variables rather than sociological phenomena in the field of social sciences in education. It is concluded that the studies investigated in this research are not aiming at creating new theories, models and approaches but rather examining certain skills in terms of some specific measurement tools to confirm some previous models or to test the predictions based on those models.

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Keywords:

Reasoning, Thinking, Meta-synthesis, Dissertation

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1 eersanli@gmail.com (Corresponding AuthorDOI:
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Introduction

The concept of reasoning could be defined as a cognitive skill enabling to make inferences, comparisons and predictions regarding the properties of phenomena by defining, generalizing, abstracting, conceptualizing, analyzing and synthesizing the relevant variables among the concepts and observations through propositions. Most of the conscious, deliberate cognitive processes, especially higher order cognitive skills, are related with reasoning skills in essence (Bolay, 1989; Cihan, 2003; Arslan, 2006; Hocaoğlu, 2007; Yıldız, 2010; Gültekin, 2013; Ergül, 2014; Kayserilioglu, 2017). Reasoning is a special way of thinking that takes all variables into consideration, while it is the ability to understand and to rearrange the thinking of findings in general (Umay, 2003). Consequently, reasoning can be defined as making inferences, comparisons and evaluation on the basis of certain propositions based on available information and assumptions.

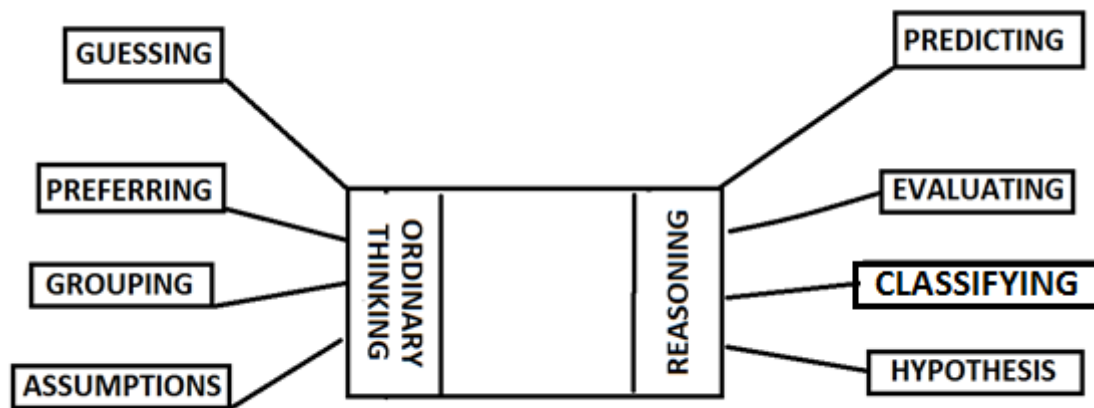


Figure 1. The difference between ordinary thinking and reasoning.

Although the concepts of reasoning and thinking are used interchangeably, in general reasoning is considered to be a more systematic and normative form of thinking (Umay, 2003; Gültekin, 2013). Therefore, systematic thinking which involves reasoning is defined as “critical thinking” in the literature. For example, comprehension of a subject can be defined as a form of thinking but comprehension based on deductive premises is a form of deductive reasoning. Besides, the difference between ordinary thinking and reasoning can be outlined in many ways. For instance, ordinary thinking involves a process of guessing based on intuition and informal experiences, however; the reasoning involves prediction relying on logical and systematic processes based on expertise. Similarly, while thinking involves preferences and options, reasoning involves an evaluation of these options. While ordinary thinking involves grouping according to certain patterns, reasoning involves classifying those patterns according to certain rules and principles. While ordinary thinking is based on assumptions and intuitions, reasoning is based on the hypothesis (Lipman, 1988; Ertaş, 2012). As a result, while thoughts reflect opinions, feelings and attitudes, reasoning skills can be defined as a skill to make justifications based on certain criteria, principles and standards for these opinions (Lipman, 1988).

The reasoning involves the presentation of certain data as claims, with specific reasons and propositions supporting and limiting these reasons (Toulmin, 2003). In other words, reasoning is a skill which emerges by using higher order thinking skills. In this respect, reasoning is related to critical thinking and creative thinking skills (Umay, 2003). To summarize the processes of reasoning in general terms; all reasoning processes involve problem-solving to some extent, they are based on hypotheses that are based on evidence, claims and inferences in a coherent way and they are expressed by ideas and concepts in a systematic and causal way (Paul and Elder, 2016).

As an interdisciplinary concept, reasoning is an important term for both educational sciences and the related literature. It is important to investigate the literature related with reasoning skills in the field of education. Hence, the aim of this study is to investigate academic dissertations on educational sciences area relating the concept of reasoning.

The main objective of this study is to investigate the academic dissertations in educational sciences area related with the concept of reasoning in order to understand whether there is a coherent conclusion based on their findings. Hence, the answers to following three questions were sought in this study:

- 1- Which cognitive, affective, psychomotor area(s) was or were mostly used in the context of the concept of reasoning in the dissertations?
- 2- In which discipline, was the concept of reasoning used more in dissertations?
- 3- What is the main conclusion that can be drawn from all these studies?

Methodology

The research is a qualitative research. In such studies, the aim is to make “analytical generalizations” rather than “statistical generalizations” to construct “theories” or “theoretical propositions” (Yıldırım & Şimşek, 2005). The design of the study was based on the meta-synthesis design. Zimmer (2006) emphasized that qualitative meta-synthesis is an interpretation of the findings of selected studies rather than a secondary analysis of primary data derived from an assimilated literature review or a group of research studies. In this study, the steps of the meta-synthesis study were conducted as follows:

- i) The subject of meta-synthesis was determined,
- ii) Types and fields of researches to be included in the meta-synthesis were determined,
- iii) Criteria for inclusion in the meta-synthesis were determined,
- iv) Research questions were written,
- v) Results were encoded,
- vi) The encoded findings were interpreted and discussed in the context of the literature,
- vii) The results and recommendations were proposed based on the findings.

The sample of the research is composed of dissertations in Board of Higher Education (YÖK) National Thesis Center (<https://tez.yok.gov.tr/UlusalTezMerkezi/>). The following criteria were taken into consideration when including the theses in this meta-synthesis study:

- The theses should be conducted for the investigation of reasoning,
- The concept of “reasoning” should be mentioned in the title of the theses,
- The research should be conducted and written clearly in a standardized qualitative or quantitative research design, including problem status, purpose and sub-objectives, methodology, data collection techniques, data analysis, findings and results,
- The theses should be written between 1995 and 2017 as it is very difficult to access the documents on the internet database before the stated date.

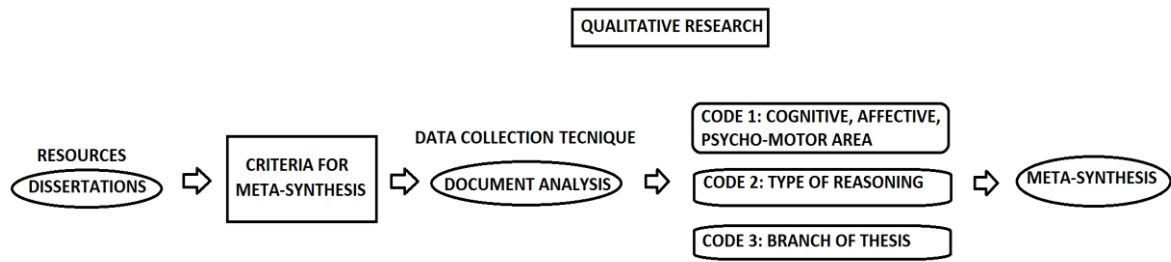


Figure 2. The design of the study.

Meta-synthesis (thematic content analysis) involves a critical interpretation of a subject or concept in terms of various themes or matrix / template (Çalık & Sözbilir, 2014). The data were collected by document analysis technique, where and the articles on the internet and written sources were analyzed as the data sources. While analyzing the findings, three codes were formed based on the research questions. While making the codes, the first code was made by taking into consideration the cognitive, affective and psychomotor areas, the second code was created in terms of scientific discipline in which the dissertation was presented and the third code was created based on the keywords. The first code (Code 1) investigates the area of the dissertations in terms of the taxonomy of Bloom et al. (1956). The second code (Code 2) includes the type of reasoning and the content of the thesis basically deals with. The third code (Code 3) contains the discipline or branch of the thesis.

Findings

In Table 1, the studies examining the reasoning skills and the research codes are given in Table 1.

Table 1. The dissertations including the concept of reasoning in its title.

	Author	Purpose of the Study	Code 1	Code 2	Code 3
1	Öz (2017)	The aim of the study is to examine the process of mathematical reasoning of the 7th grade students.	Cognitive-Science / Mathematics	Mathematical reasoning (Algebraic reasoning)	Department of Elementary Mathematics Education
2	Gözüm (2017)	The aim of this study is to investigate the effect of children's attention ability development on reasoning skills (60-72 months).	Cognitive-Social Sciences1	Logical Reasoning	Department of Child Development and Education
3	Tunç (2016)	The main aim of this study is to examine the proportional reasoning of secondary school mathematics teacher candidates before and after their participation in an implementation-based teaching module for proportional reasoning.	Cognitive-Science / Mathematics	Proportional reasoning	Department of Elementary Mathematics Education
4	Urhan (2016)	In this study, informal reasoning skills and argument quality of the students were investigated in argumentation-based learning environments based on paired discussions.	Cognitive-Science / Mathematics	Informal Reasoning	Department of Elementary Mathematics Education
5	Karslı (2016)	In this study, it is aimed to determine the effect of mathematics teaching based on the learning approach applied to primary school students on the reasoning and association skills of students.	Cognitive-Mathematics	Mathematical reasoning	Department of Elementary Mathematics Education
6	Teleoğlu (2016)	This study was conducted in order to examine the moral reasoning of gifted children who have normal development between 5-7 years of age.	Cognitive-Social Sciences2	Moral Reasoning	Department of Child Development and Education

7	Çolak (2016)	This research was conducted to investigate the effect of Pattern Based Mathematics Education Program on the reasoning skills of 61-72 months old children.	Cognitive-Social Sciences ³	Logical reasoning skills	Department of Child Development and Education
8	Bulut (2015)	In this study, the basic math skills (problem solving, communication, association and reasoning) in primary school mathematics program are examined in the student workbooks that should be prepared by providing the students with the knowledge and skills to be provided in the elementary schools.	Cognitive-Science / Mathematics	Mathematical reasoning	Department of Educational Sciences
9	Metin (2015)	The aim of this study is to reveal the logical reasoning patterns of middle school 8th grade students by discussing their perceptions about pseudo-science and pseudo-scientific practices.	Cognitive-Science / Mathematics	Logical reasoning skills	Department of Elementary Mathematics Education
10	Kazem (2015)	In this study, it is aimed to understand the effect of Lego MoretoMath educational tool on the reasoning, comprehension, problem solving and fluency skills of the use of primary school 2nd grade mathematics courses.	Cognitive-Mathematics	Mathematical reasoning	Department of Computer Education and Instructional Technology
11	Karakaya (2015)	The aim of the study is to investigate the existence of a possible relationship between reasoning in socio-scientific subjects and the nature of scientific knowledge.	Cognitive-Social Sciences	Informal Reasoning	Department of Biology Education
12	Ergin (2015)	The main purpose of the research is to investigate whether the explanatory reasoning and cognitive stimulation behaviors of mothers explain the meaning of their children's receptive language and visual perception skills or not.	Cognitive-Social Sciences ⁴	Explanatory reasoning	Department of Child Development and Education
13	Gül (2015)	The general aim of this study is to examine whether auditory reasoning and processing skills of 5-6 age group children differ according to their explanatory reasoning and cognitive stimulation behaviors.	Cognitive-Social Sciences ⁵	Auditory Reasoning	Department of Child Development and Education
14	Kurbal (2015)	The aim of this study is to investigate the effects of Intelligence Games on 6th grade students' problem solving and reasoning skills.	Cognitive-Science / Mathematics	Mathematical reasoning	Department of Elementary Mathematics Education
15	Baydilek (2015)	It is a qualitative case study for the study of the cognitive processes in the context of implicit curriculum.	Cognitive-Social Sciences ⁶	Logical reasoning skills	Department of Curriculum and Instruction
16	Çiftçi (2015)	The aim of this study is to examine mathematical reasoning skills of secondary mathematics teacher candidates.	Cognitive-Science / Mathematics	Mathematical reasoning	Department of Secondary Science and Mathematics Education
17	Sofuoğlu (2015)	The aim of this study is to investigate the relationship between high school students and mathematics teacher candidates' graphic drawings, reasoning within the context of a model requiring covariance.	Cognitive-Science / Mathematics	Matematico-logical reasoning	Department of Secondary Science and Mathematics Education
18	Kurtulan (2015)	The research was conducted to investigate the relationship between children's cognitive skill levels and social skill levels in early childhood (48-95 months). In the context of this general purpose, the study also	Cognitive-Social Sciences ⁷	Logical reasoning skills	Department of Child Development and Education

		examined whether children's social and cognitive skill levels differ according to demographic characteristics.			
19	Karatoprak (2014)	The aim of this study is to examine the statistical reasoning of mathematics teacher candidates.	Cognitive-Science / Mathematics	Statistical Reasoning	Department of Secondary Science and Mathematics Education
20	Pelen (2014)	The aim of this study is to determine the ability of Grade 6 students to classify their problems of proportional reasoning and their strategies for problem solving in terms of problem type, digital structure of problems	Cognitive-Science / Mathematics	Proportional reasoning	Department of Elementary Mathematics Education
21	Ergül (2014)	This study was conducted to determine the mathematical reasoning skills of children in the fields of measurement and data analysis-probability.	Cognitive-Science / Mathematics	Statistical Reasoning	Department of Child Development and Education
22	Duran (2014)	The aim of this study is to examine pre-service teachers' hypothetical-creative reasoning (perceptions of reasoning skills), scientific epistemological beliefs, learning styles and demographic characteristics.	Cognitive-Social Sciences8	Logical reasoning skills	Department of Curriculum and Instruction
23	Pakmak (2014)	In this study, it is aimed to determine the strategies used by the 6th grade students in quantitative and qualitative proportional reasoning problems and to examine how these strategies are used by students.	Cognitive-Science / Mathematics	Proportional reasoning	Mathematics Education
24	Gültekin (2013)	In this research, the effects of history lessons on the reasoning of students in secondary education were tried to be determined, and the dimensions of teachers and textbooks were also discussed in this context.	Cognitive-Social Sciences9	Logical reasoning skills	Department of History Teaching
25	Şahin (2012)	The aim of this study is to investigate the relationship between the geometric levels of geometric reasoning skills of primary school teachers and Van Hiele geometry levels and whether this reasoning differs according to grades and gender.	Cognitive-Science / Mathematics	Geometric reasoning	Department of Elementary Mathematics Education
26	Gülşen (2012)	This research examines the visual reasoning of mathematics teacher candidates.	Cognitive-Science / Mathematics	Visual Reasoning	Department of Mathematics Education
27	Kurugül (2012)	Within the scope of the thesis, it was aimed to design a program which is an introduction to a design studio integrated with digital design to test and observe its results.	Cognitive-Science / Mathematics	Mathematical reasoning	Department of Information Technology in Architectural Design
28	Altaylı (2012)	The aim of this study is to find an answer to the question of whether the education given according to GME and traditional approach; ?teaching the subject of ratio and proportion and development of proportional reasoning in 7th grade? makes a significant difference on academic success of students.	Cognitive-Science / Mathematics	Proportional reasoning	Department of Elementary Mathematics Education
29	Arıcı (2012)	The aim of this study is to investigate the effect of teaching type (origami-based and traditional teaching) on the spatial visualization, geometry success and geometric reasoning of 10th grade students in some basic subjects related to triangles.	Cognitive-Science / Mathematics	Geometric Reasoning	Department of Secondary Science and Mathematics Education

30	Özbay (2012)	The aim of the study is to observe the development of students in the process of informal inferential reasoning. In this study, it was focused on the informal reasoning process of four students attending 6th grade.	Cognitive-Mathematics	Informal Reasoning	Mathematics Education
31	Çatak (2011)	The aim of this study is to examine the process of pedagogical reasoning for the selection of activities for the lessons of a primary mathematics teacher.	Cognitive-Science / Mathematics	Pedagojical Reasoning	Department of Science and Mathematics Education
32	Baydilek (2010)	The purpose of this study is to determine whether there is a difference in the reasoning forms of children in the age group of 6, and to determine whether they can contribute to reasoning and deductive reasoning skills from their reasoning skills and reasoning forms	Cognitive-Social Sciences10	Logical reasoning skills	Department of Educational Sciences
33	Çelik (2010)	The aim of this study is to investigate the relationship between the proportional reasoning skills and problem-posing skills of seventh and eighth grade primary school students.	Cognitive-Science / Mathematics	Proportional reasoning	Mathematics Education
34	Çoşar (2010)	It is aimed to compare and analyze 89 released Mathematics items of TIMSS 2007 framework with 974 exercise problems of a 6th grade Turkish Mathematics textbook based on the cognitive domains of TIMSS 2007. The study used document review method.	Cognitive-Science / Mathematics	Mathematical reasoning	Department of primary school teaching
35	Çetin (2009)	The aim of this study was to determine the relationship between the proportional reasoning skills of primary school 8th grade students and their problem solving ability of equations.	Cognitive-Science / Mathematics	Proportional reasoning	Department of Elementary Mathematics Education
36	Aladağ (2009)	The aim of this research is to examine the secondary school students' levels of problem solving which requires proportional reasoning ability and which seems like proportional reasoning problems but requires actual answers, solution strategies of the students in these problems and to examine the differences 6th, 7th and 8th grade students.	Cognitive-Science / Mathematics	Proportional reasoning	Department of Elementary Mathematics Education
37	Ünsal (2009)	This study has two aims; first is to determine whether there is a relationship between the general mathematics achievement of 7th grade students and their attitudes towards mathematics and their proportional reasoning skills. The second aim is to determine whether the proportional reasoning skills of the 7th grade students in primary education differ according to gender.	Cognitive-Affective Science / Mathematics	Proportional reasoning	Mathematics Education
38	Gündüz (2008)	The main purpose of this thesis is to develop a new model that will facilitate analysis of students problem solving behaviours and diagnostic assessment of individual and group problem solving performances in the context of physics.	Cognitive-Science	Logical reasoning skills	Physics Education
39	Küpçü (2008)	The aim of this study is to investigate the effect of activity-based instruction on problem solving success of	Cognitive-Mathematics	Proportional reasoning	Department of Elementary

		elementary school students in solving word problems requiring proportional reasoning.			Mathematics Education
40	Kırca (2007)	This study was conducted to investigate the effect of preschool education on the readiness to read and write skills of pre-school primary and elementary school children.	Cognitive-Social Sciences	Logical reasoning skills	Department of Child Development and Education
41	Törün (2005)	In this study, learning styles and clinical reasoning skills of medical school students were examined.	Cognitive-Social Sciences	Clinical Reasoning	Social Sciences Institute

1. The findings regarding the question stated as “Which cognitive, affective, psychomotor area(s) was or were mostly used in the context of the concept of reasoning in the dissertations?”

When Table 1 is examined, it is seen that 40 of the 41 dissertations have been conducted in the cognitive domain, and except the one by Ünsal (2009) examining the relationship between the attitudes and the reasoning skills. When the theses are examined, it is understood that reasoning is considered as a cognitive inference. Accordingly, reasoning is considered as an inference process shaped by cognitive variables. However, it can be said that the reasoning processes of individuals both in social and individual life are not solely depending on cognitive variables in the context of real life. In general, the reasoning process of humans are similar to a very limited method of prediction based on satisfaction rather than the execution of an algorithm (Churchland, 2013). Therefore, it should be kept in mind that not only cognitive factors play a role, but our affective, psychomotor and intuitive factors contribute to this process. In general, reasoning is thought to be a process independent of intuitions and emotions. This is especially the case for the image of the scientists. The classical biographies of famous scientists tend to present scientists as simple, rational machines that work solely on the path of intuition, dependent on a mechanical system (Gould, 1998). This is the case in many novels, books and films. For example, the famous character Mr. Spock in Star Trek, Sheldon in the Big Bang Theory, Arthur Conan Doyle’s Sherlock Holmes character can be given as examples for the depiction of such a scientist depicted as a rational machine. The positivist point of view that objectivity and scientific thought must be neutral and objective is seen as a point of view which necessitates that logical thinking should be cognitive. Hence, this kind of prevailing idea might converge all the dissertations in educational sciences investigated in this paper into the cognitive domain in this respect.

Cognitive domain is important because reasoning is based on the information process in cognition but cognition is not solely a biological machine yet a socially constructed structure shaped by many social, economic and cultural variables and it is important to investigate those variables in the context of reasoning in this sense. In this context, it can be said that the theses on informal reasoning skills are significant to fill the gap in the literature in which the themes of dissertations were restricted in formal reasoning skills. Informal reasoning refers to the use of logical thought, and the principles of logic, outside of a formal setting. In informal reasoning, students and individuals draw inferences from uncertain premises as they encounter with ill-structured, open-ended, and debatable problems without definitive solutions (Sadler & Zeidler, 2005; Teig, Schrerer, 2016; Karakaya, 2015; Urhan, 2016). However, when the theses in educational sciences area were examined in terms of informal reasoning skills, it was seen that there were only two thesis on this subject. It should also be noted that both informal and formal reasoning are used to manipulate existing information and share the same goal of generating new knowledge, that is cognitive aspects of reasoning (Teig, Schrerer, 2016). Therefore, it can be said that theses do not integrate the reasoning in terms of all the domains of human cognition along with the sociological factors in a wholistic way.

Furthermore, some of the reasoning types investigated in dissertations such as mathematical, informal and pedagogical reasoning are more general in nature while some of them are more specific like proportional reasoning. Moreover, although there are specific concepts such as Moral Reasoning, Informal Reasoning,

Proportional Reasoning, they are thought to be inadequate to synthesize the findings in a coherent way. Hence, it is important to investigate variables in terms of more specific terms rather than with general concepts.

To sum up, it is found that dissertations are restricted within the boundaries of cognitive domains and characterized by general notions rather than specific terms. Even though some of them use specific terms, they investigate those variables in terms of more general concepts rather than specific terms.

2. The findings regarding the question stated as “In which discipline, was the concept of reasoning used more in dissertations?”

In this study it was found that out of the 41 theses included in this study, 28 of the dissertations addressed the notion of reasoning in Science and Mathematics and 13 of them discussed the notion of reasoning in social sciences. In this context, more emphasis is placed on reasoning in the field of Science and Mathematics.

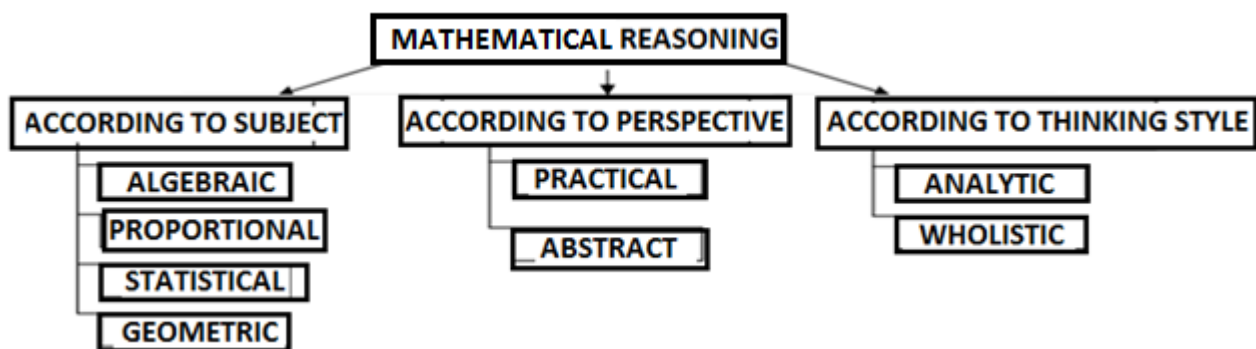


Figure 3. The Dimensions of Mathematical Reasoning (Umay, 2003).

As can be seen in Figure 3, mathematical reasoning can be divided into three based primarily on subject based reasoning, reasoning according to thinking style, reasoning according to perspective in the context of the classification of mathematical reasoning (Umay, 2003). 9 of the theses were classified under the title of algebraic reasoning, 9 of them were classified under the proportional reasoning, 2 of them were classified under the geometric reasoning, 2 of them were classified under the statistical reasoning and 4 of them were classified in other dimensions. In general, it can be said that in the literature the mathematical reasoning skills were investigated in terms of algebraic reasoning and proportion reasoning according to the subject. Hence, there is a gap in other dimensions of mathematical reasoning. It should also be noted that, the concept of reasoning is less studied in the dissertations related with natural sciences such as Physics, Biology Education etc. when compared to dissertations in Mathematics Education.

When the studies in the field of social sciences in education are examined, it is seen that reasoning skill is discussed as logical reasoning (8) explanatory (1), auditory reasoning (1), moral reasoning (1), clinical reasoning (1), informal reasoning (1). However, these studies investigated the concept of “reasoning” as a cognitive phenomenon in terms of cognitive behaviors and various demographic variables (Duran, 2014; Ergül, 2014; Ergin, 2015; Gültekin, 2013; Karakaya 2012; Karatoprak, 2014; Kurbal, 2015). For example, some studies show that some types of reasoning skills don’t differ according to variables such as gender, school type (public or private school), previously having preschool education or not and taking private lessons but they show that there are some significant differences according to schools, classes and socio-cultural level. Nevertheless, in some studies, it can be seen that reasoning differs in terms of gender (Gültekin, 2013, Ünsal, 2009; Kurtulan, 2015). Besides, some studies have shown that maternal education, socio-economic level, preschool education period may be related to reasoning skills at certain ages (Kurtulan, 2015). In addition, there were studies showing that participants were sufficient in terms of reasoning skills according to current textbooks (Gültekin, 2013). Moreover, there are studies showing that gifted people are more successful than

normal students in terms of moral reasoning skills (Teleoğlu, 2016). Hence, the dissertations investigated in this study in the field of social sciences address the reasoning skills in terms of sociological variables, it can be seen that the reasoning is focused as an individual variable in terms of sociological variables rather than sociological phenomena.

Finally, it is seen that the dissertations investigated in this paper are the studies aimed at examining certain skills in terms of some specific measurement tools rather than proposing teaching or learning models regarding the reasoning for more effective teaching or healthy diagnosis and assesment of students. As seen by the first result of this research, many researches are confined into the boundaries of cognitive perspective. However, the field of education needs more contemporary approaches and methods especially in our modern society developing so fastly by the integration of technology and communication.

3- The findings regarding the question stated as "What is the main conclusion that can be drawn from all these studies?"

In this research, theses are examined in the concept of "reasoning". It is preferred to study in terms of the study areas and taxonomic contexts of theses at basic level because it is difficult to combine different interdisciplinary perspectives from a wide range of fields, subjects and objectives. The main results obtained in this context can be given as follows:

- 1- Theses are prepared predominantly to emphasize cognitive elements. However, reasoning is not just a cognitive process. There are many different taxonomic variables that affect the reasoning processes and this can be varied and expanded according to the basics of taxonomy.
- 2- Theses were mostly conducted in Mathematics and Science. However, in these disciplines, certain types of reasoning has been emphasized more, such as algebraic and proportional reasoning. However, reasoning has a much wider and specific term in terms of science, mathematics and social sciences.
- 3- In general, reasoning skill is considered as a variable that is affected by various social variables. However, reasoning is a cultural and sociological phenomenon acquired through learning. This can be exemplified by the fact that certain cultures and civilizations, in certain periods of humanity, produced works with more qualifications.
- 4- It is seen that the dissertations investigated in this paper are the studies aimed at examining certain skills in terms of some specific measurement tools rather than researching or understanding the elements related to the basic functioning of mind and reasoning. In this context, it can be said that researches based on creating and proposing scientific models regarding the reasoning in the literature were scarce and there is a gap in the literature in that sense.

Discussion

The concept of reasoning in educational sciences is basically investigated in terms of behaviourist, cognitive and constructivist approaches. The behaviourist approach focuses on observable behaviors, hence the internal processes of cognition is not taken as a main objective. Accordingly, reasoning is a phenomenon embodied in behavior and actions. Hence, it is preferred to investigate observable quantities of reasoning in casual ways, rather than talking about reasoning in a black box (mind) in behaviourist approaches. The cognitive approach attributes reasoning to the cognitive information process of mind where the information is elaborated in a process having a particular aim for achieving a goal or for solving a problem. The cognitive approaches consider behaviors as a result of thinking. Additonaly, reasoning is a process of information in the cognitive system. Cognitive theorists have mostly been concerned with the components, structure, functions of cognition regarding cognition as device which is analogous to computers. For example, in the Gestalt

perspective, cognitive functions are reduced into perception and the principles guiding those functions such as proximity, similarity, closure, good continuation etc. Similarly, Cognitive Information Processing (CIP) theory focuses on the information processing aspects of the cognition as sensory memory, short-term memory, long-term memory in terms of attention, rehearsal, chunking, encoding and retrieval (Mayer, 1992; Doğan, 2007; Gültekin, 2013). Constructivist perspective, on the other hand, emphasizes that human beings create their own knowledge based on their reality and experiences resulting that each individuals's interconnection and interpretation of knowledge is different from each other, so that the process of reasoning differs according to individual differences (Erginsoy, 2010). However, constructivist approach also focus on the information procession aspects of the cognition by emphasizing the subject and his/her will and experiences more than the CIP do.

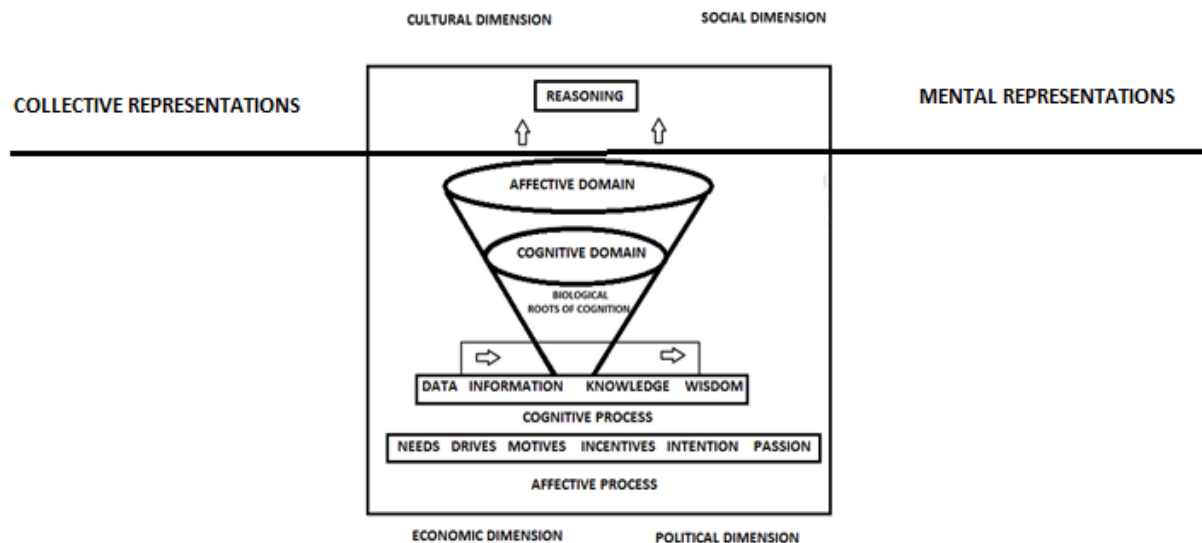


Figure 4. Reasoning does not solely belong to cognitive domain.

Reasoning does not solely belong to cognitive domain, but it is constructed in cultural, economic, social and political domains as well as in affective and psychomotor domains and it is not created solely by mental representations but directed by collective representations (Figure 4). However, in this study, it was found that all dissertations investigated in this research were restricted within the boundaries of cognitive schemes. Nevertheless, the reasoning consists of affective, social and cultural aspects in a way that is very different from cognitive perspective which is analogous to the information processes on a computer. The human cognitive structure is organized in the social context according to the following four schemes: 1) caring others 2) recognizing the psychological conditions of others 3) problem solving in social context 4) learning social practices (Churchland, 2013). In this context, it can be said that reasoning is a multi-layered and dimensional concept. More importantly, reasoning is not a latent and implicit cognitive faculty that emerges in an individual's development process, but a sociological phenomenon built, shaped and directed by sociological processes. Many studies and researchers emphasize that social variables are influenced by reasoning skills. For instance, Lévy-Bruhl reasoning of individuals living in "primitive tribes" differs from the individuals living in "modern society" and this difference is not the result of individual perception or information processing but rather is due to the collective representations of these tribes. Although, there have been many criticism against his views, Lévy-Bruhl's pluralism that led him to think that several types of mentality can exist among men, has deep implications regarding the cultural and social aspects of reasoning (Salmon, 2009). So it is important to consider and focus on the social aspects of reasoning in a holistic ways.

Furthermore, focusing merely on the cognitive aspects of mind might not also give us to see the whole picture of cognition objectively. For example, Damasio (2006) stated that the mind was perhaps not as pure

as most of us desired, and that emotions and feelings were the natural part of human cognition that were leaked into the castle of reason. There are many types of researches reporting the existence of negative thoughts accompanied by delusions and hallucinations in the decision-making processes of individuals having mood disorders (Uğur, 2008). Likewise, Changeux and Ricoeur (2007) emphasized that some researchers try to validate the idea that human beings were some sort of robots and automats that don't have any emotional and creative attributes and they investigate cognitive problems by reducing cognition into a "fly in a jar" problem. Therefore, he stated that schemes related with emotions and creativity were neglected. Kahneman (2003) also emphasized that the human mind contains two different systems, system 1 and system 2. System 1 is unconscious, fast, utilitarian and contextual, system 2 contains conscious, slow and logical decisions (Urhan, 2016). As can be seen, when examined from different perspectives, reasoning is not only a skill with an algorithmic nature.

"At a practical level, Bruner who is an important figure in educational sciences puts forward that as a result of cultural differences, children from different cultural backgrounds make sense of their experiences in different ways. For example, categorizations for communication (including sign language) will differ across cultures, and practitioners owe it to the families with whom they work, to familiarize themselves with these so that everyone is clear and can engage in a learning environment that is enabling and reciprocal in nature" (Conkbayır, Pascal, 2014: 94). Therefore, Barbara Rogoff's (2003) ideas regarding human development as a process of people's changing, participation in sociocultural activities of their communities and her examples regarding human development can be used for the current status of the concept of reasoning in dissertations. According to Rogoff (2003: 52), "Rather than individual development being influenced by (and influencing) culture, from her perspective, people develop as they participate in and contribute to cultural activities that themselves develop with the involvement of people in successive generations". In her book (*The Cultural Nature of Human Development*), she emphasized the transformation-of-participation perspective where development is a "transformation of participation in a sociocultural activity" not a transmission of discrete cultural knowledge or skills in which the depiction of solitary individual isolated from all variables as well as the purpose and setting of the activity are removed or describing cognitive phenomena the boxes-with-arrows diagrams of the relation of culture and human development where the "cultural influences" are added as discrete units. In this context, it can be said that the reasoning skills are limited by cognitive dimension in the literature and there is a big gap in terms of affective and social dimensions in this area. Although in some theses, it is emphasized that reasoning skills are implicitly related to social and psychological processes even if they are taken as a cognitive skill. For example, Öz (2017) emphasized that mathematical reasoning is related with the opportunities offered to individuals. Similarly, in the Kurbal (2015) thesis, it was emphasized that the reasoning was related to affective elements in the context of intelligence games and the effect of attitudes and interests. However, it was found that the number of theses aiming to examine the relationship between affective elements, interests, attitudes and reasoning was not sufficient.

Secondly, when the dissertations in educational sciences area are investigated, it is seen that they focus on reasoning in general, rather than their content from specific dimensions. As Avicenna points out, "Every cognition is a replica of what is realized. If it is the realization of a concrete and material thing, it takes the abstracted form of this concrete and material thing. But the classification and abstraction might have different degrees separately. Due to the fact that this form can be shaped by a number of conditions and situations so that this form doesn't belong the matter in this aspect. Sometimes, abstraction of the form can be done by isolating it from all the material relations of it." (Cihan, 2003: 104). Hence, depending the degree of abstraction, there might be many reasoning styles and types covering very distinctive topics and areas. For example, there are many reasoning types in literature such as moral reasoning, goal-directed reasoning, analogical reasoning, pros and cons reasoning/conductive reasoning, residue reasoning, decompositional reasoning, epistemic reasoning, integrative reasoning, fuzzy reasoning, teleological reasoning, systemic reasoning, meta-reasoning,

empirical reasoning, dialectic reasoning, grammatic reasoning, dynamic reasoning, diagrammatic reasoning, alethic reasoning, static reasoning, counterfactual reasoning, introspective reasoning, defeasible reasoning, evidential reasoning, probative reasoning, comparative reasoning, syllogistic reasoning, modal reasoning, qualitative reasoning, exemplar reasoning, etc. (Gültekin, 2013). Scientific method shows its character in its specificity in the diversity of the usage of concepts rather than being interested in general notions in a vague manner. Although there are specific concepts such as moral reasoning, informal reasoning, proportional reasoning focused by researches in the literature, they are thought to be insufficient to synthesize the findings in a coherent way in a meta-synthesis study like this. Hence, it is important to investigate variables in terms of more specific terms rather than general concepts.

It can be said that in the literature mathematical reasoning skills was investigated according to the subject based dimension of mathematical reasoning rather than thinking style and perspective in the context of the classification of mathematical reasoning. Hence, there is a gap in other dimensions of mathematical reasoning. It should be noted that, the concept of reasoning is less studied in the dissertations related with natural sciences such as Physics and Biology Education, etc. when compared to dissertations in Mathematics Education. Reasoning skills core elements of Mathematics and natural sciences hence more researches concerning different dimensions should be conducted in this area.

In general, although studies in the field of social sciences address the reasoning skills in terms of sociological variables, it was seen that the reasoning was focused as an individual variable in terms of sociological variables rather than sociological phenomena. In this context, it is seen that the qualitative and quantitative studies including the social, cultural and ethnographic dimensions of reasoning are limited, and reasoning is taken as an atomic variable which is affected by various sociological variables rather than a sociological phenomena. However, reasoning is a concept that has been created, learned and developed in the social processes. Therefore, it can be claimed that the literature is incomplete.

It is seen that the studies investigated in this research aimed at examining certain skills in terms of some specific measurement tools rather than creating and proposing scientific models regarding reasoning. However, today's conditions requires more contemporary approaches and methods in education especially for technology, internet integrated instructions as well as for multicultural classes and compensating inequality for accessing education all over the world.

Conclusion and Recommendation

In this study, firstly, it was found that all dissertations investigated are in terms of cognitive perspective. However, the reasoning consists of affective, social and cultural aspects in a way that is very different from cognitive perspective which is analogous to the information processes on a computer. Secondly, dissertations in educational sciences area focus on reasoning in general sense, rather than its content on specific dimensions. The dissertations focusing on specific concepts such as moral reasoning, informal reasoning, proportional reasoning are thought to be insufficient to synthesize the findings coherently in a meta-synthesis study like this. Thirdly, it can be said that in the literature, mathematical reasoning skills were investigated according to the subject based dimension of mathematical reasoning and there is a gap in the dimensions of mathematical reasoning according to thinking style and perspective. Fourthly, it is seen that the reasoning was focused as an individual variable in terms of sociological variables rather than sociological phenomena in the field of social sciences in education. Finally, it is concluded that the studies investigated in this research are not aiming at creating new theories, models and approaches but rather they are examining certain skills in terms of some specific measurement tools to confirm some previous models or to test the predictions based on those models.

It can be said that the basic limitation of this study is to examine the concept of "reasoning" in a wide area. Instead of focusing on a particular discipline, investigation of the concept of reasoning in a broader sense because of the limited number of dissertations in a particular branch has caused that the specific and specific

sub-problems of those dissertations were not examined in detail and synthesized in a coherent way. In this context, the study aimed mainly at examining the general tendency in dissertations on abstract and conceptual levels. The second limitation of the study is that the theses that don't have an online access aren't included in the study. The third limitation of the study is that only the summary and conclusion sections rather than all of the theses are investigated by the content analysis, so a more in-depth analysis could not be done. The fourth limitation of the study is that articles and other sources other than theses aren't addressed thus; the literature is restricted within the boundaries of online dissertations. The fifth and the last limitation of the study is that the keywords such as "cognition", "inference", "induction", etc. are not used in the screening process. Hence, based on these limitations, subsequent researches could be conducted to remedy and modify those limitations.

The recommendations can be stated as follows;

- There are many types of thinking and reasoning skills in literature. In this context, it is also a necessity to carry out studies involving the relation of these reasoning skills and thinking skills, especially less focused ones, in literature, and these two terms shouldn't be used interchangeably as a term.
- The reasoning skills can be examined in terms of different learning taxonomies. Bloom et al. 'S Cognitive Domain Taxonomy, SOLO taxonomy by J. B. Biggs and K. Colins, Cognitive Developmental Steps in Adults by Koblowitz, Perry's study of epistemological beliefs, Romizowski's knowledge classification, taxonomy of educational goals developed by Marzano can be given examples to be used for subsequent researches.
- Reasoning can be investigated not only in terms of the dimensions of reasoning, but also in terms of the subject, content and context of reasoning.
- The extent to which the reasoning skills in a given discipline and particular dimension can be examined and the results achieved can be investigated through meta-analysis and meta-synthesis methods and the gaps in the literature can be determined.
- Finally, reasoning skills can be studied in specific years, in articles or projects.

Türkiye'de Eğitim Bilimleri Alanında Akıl Yürütme Becerisi Üzerine Yapılan Araştırmalara İlişkin Bir Meta-Sentez*

Ercüment ERSANLI¹, Cem GENÇOĞLU², Volkan DURAN³

¹ Doç. Dr., Ondokuz Mayıs Üniversitesi, Sağlık Bilimleri Fakültesi, Türkiye, ORCID: 0000-0003-4840-3629

² Dr., Türkiye Milli Eğitim Bakanlığı, Temel Eğitim Genel Müdürlüğü, Türkiye, ORCID: 0000-0003-2589-8673

³ Ar. Gör., Ondokuz Mayıs Üniversitesi, Eğitim Fakültesi, Türkiye, ORCID: 0000-0003-0692-0265

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Özet

Akıl yürütme kavramı farklı bilimsel disiplinlerde ve farklı alanlarda açık veya örtük bir biçimde karşımıza çıkan bir konudur. Bu nedenle akıl yürütme üzerine yapılacak çalışmaların dolaylı ve doğrudan birçok alana katkı sağlayacağı düşünülmektedir. Genel olarak, akıl yürütme ve düşünme becerisinin birbirinin yerine kullanılmasına rağmen, akıl yürütmenin, düşünmenin daha sistemli ve kurallı bir hali olduğu ifade edilmektedir. Disiplinler arası bir kavram olarak akıl yürütme hem eğitim bilimleri hem de ilgili literatür açısından önemli bir kavramdır. Bu çalışmada akıl yürütme kavramıyla ilişkili olan Türkiye’de hazırlanmış yüksek lisans ve doktora tezlerinde “akıl yürütme kavramının ele alınışının” incelenmesi hedeflenmiştir. Bu çerçevede bu çalışmanın amacına hizmet edebilecek, nitel veya nicel araştırma yöntemlerini kullanarak hazırlanmış, 1998 ve 2017 arasında kabul edilmiş yüksek lisans ve doktora tezleri araştırma kapsamına alınmıştır. Çalışmada veriler doküman analizi tekniğiyle toplanmış ve içerik analiziyle incelenmiştir. Araştırma sonucunda, tezlerin akıl yürütmeye bilişsel bir değişken olarak odaklanıldığı ve özellikle matematik ve fen bilimleri alanında incelendiği sonucuna varılmıştır. İkinci olarak, eğitim alanındaki tezlerde içeriğe özgü boyutlardan ziyade genel anlamda akıl yürütmeye odaklanıldığı görülmüştür. Üçüncü olarak, matematiksel akıl yürütme becerilerinin matematiksel akıl yürütmenin konuya dayalı boyutuna göre araştırıldığı matematiksel akıl yürütme becerilerinin diğer boyutları olan düşünme stiline göre ve bakış açısına göre ve bunun alt boyutlarına göre yeterli çalışma olmadığı bu nedenle literatürde bir boşluk olduğu tespit edilmiştir. Dördüncüsü, eğitimle ilgili sosyal bilimler alanındaki tezlerde akıl yürütmenin sosyolojik fenomenler açısından incelemekten ziyade, akıl yürütmenin sosyolojik değişkenler açısından bireysel bir değişken olarak ele alındığı tespit edilmiştir. Bu çalışmada incelenen çalışmaların, yeni teoriler, modeller ve yaklaşımlar yaratmayı amaçlamaktan ziyade, daha önceki bazı modellerin teyit edilmesi için belirli bazı ölçme araçlarına göre belirli becerileri inceledikleri veya bunlara dayanan tahminleri test edecek şekilde yapılandırıldıkları tespit edilmiştir.

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Keywords:

Akıl Yürütme, Düşünme, Meta-sentez, Tez

Genişletilmiş Özet

Akıl yürütme kavramı, maddenin özelliklerini ve şekillerini genelleyerek, soyutlayarak, tanımlayarak kavramsallaştıran ve kavramlar arasında ilişkiler oluşturarak, önermeler üzerinden, öngörü, çıkarım, karşılaştırma yapmayı sağlayan bilişsel bir beceri olarak tanımlanabilir. İnsanların doğayı ve kendisini

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¹ersanli@gmail.com (Sorumlu Yazar)

anlamaya yönelik eğilimleri temel olarak iki düzlem değerlendirilmiştir. İlki doğayı gözlemleyerek ve deneyimleyerek doğayı anlama çabası olarak, ikincisi ise insanın kendisini tanıması ve anlaması olarak ortaya çıkmıştır. Bununla beraber, hangi anlayış ele alınıralsa alınsın, verilerin ve bilginin temel olarak işlenmesinde insanın en sonunda karşılaştığı süreçlerden birisi akıl yürütme olmuştur (Bolay, 1989; Cihan, 2003; Arslan, 2006; Hocoğlu, 2007; Gültekin, 2013; Ergül, 2014; Çay and Demir, 2015; Kayserilioglu, 2017; Yıldız, 2010).

Literatür incelendiği zaman, bazı çalışmalarda akıl yürütme ve düşünme becerisinin birbirinin yerine kullanıldığı, bazı çalışmalarda ise akıl yürütme kavramı kullanılmış olsa bile bu kavramın içerik olarak düşünme becerisi yerine ele alındığı söylenebilir. Hâlbuki akıl yürütme diğer düşünme türlerinin ve düşünme sürecinin tümünde yer alan bir unsur olarak çok temel bir düşünmedir ve hem düşünmenin bir alt unsuru hem de düşünmeyi kapsayan özel bir kavram olarak nitelendirilebilir (Gültekin, 2013). Temel olarak tümevarımsal, tümdengelimsel, abduktif ve feshedilebilir olarak dört tür akıl yürütme becerisi olduğu söylenebilir (Kamer, 2014). Bunların dışında, belirli alana özgü farklı akıl yürütme türlerinin de mevcut olduğu vurgulanabilir. Akıl yürütme, bilimdeki bütün disiplinlerden, gündelik hayata kadar her alanda işimize yarayacak ve gerekli bir beceridir. Sadece felsefe veya matematik gibi bir alanla sınırlandırılmayacak kadar geniş ve disiplinlerarası bir konu olmakla beraber akıl yürütme hem eğitim bilimleri hem de literatür açısından önemli bir kavramdır.

Araştırmanın Amacı

Bu çalışmanın temel amacını, Türkiye’de akıl yürütme kavramı üzerine yapılan tezlerin genel olarak hangi kavramsal alanlarda yapıldığı ve bunlardan disiplinler arası bir sonuç çıkarılıp çıkarılmayacağı oluşturmaktadır. Bu çalışmada aşağıdaki üç soruya cevap aranmıştır.

- 1- Tezlerde akıl yürütme kavramı hangi alanda (bilişsel, duyuşsal, psikomotor) yapılmıştır?
- 2- Tezlerde akıl yürütme kavramı hangi disiplin alanında daha çok kullanılmıştır?
- 3- İncelenen çalışmalardan çıkarılabilecek temel sonuç nedir?

Yöntem

Araştırma nitel bir araştırmadır. Bu tür çalışmalarda amaç, bir evrene “istatistiksel genellemeler” yapmak yerine “analitik genellemeler” yapmak, yani “kuram oluşturmak” veya “kuramsal önermelerde” bulunmaktır (Yıldırım ve Şimşek, 2005). Çalışmanın deseni meta-sentez çalışma desenine göre hazırlanmıştır. Zimmer (2006) nitel meta-sentezin belirli bir alanın asimile edilmiş bir literatür taraması ya da bir grup araştırma çalışmasından elde edilen birincil verilerin ikincil bir analizinden daha ziyade, seçilen çalışmaların bulgularının bir yorumu olduğunu vurgulamıştır. Bu çalışmada meta-sentez çalışmasının aşamaları şu şekilde yapılmıştır:

- i) Meta-sentez konusu belirlenmiş,
- ii) Meta-senteze dahil edilecek çalışma türü ve alanları belirlenmiş,
- iii) Meta-senteze dahil edilme kriterleri tespit edilmiş,
- iv) Araştırma soruları belirlenmiş,
- v) Bulgular kodlanmış,
- vi) Kodlanan bulgular yorumlanmış ve literatür bağlamında tartışılmış,
- vii) Sonuçlara ulaşılması ve önerilerin geliştirilmiştir.

Araştırmanın örneklemini YÖK Ulusal Tez Veri Tabanındaki tezler oluşturmaktadır. Tezler ele alınırken şu kriterlere dikkat edilmiştir:

- Araştırmanın akıl yürütme konusunda yapılan çalışmalara yönelik yapılmış olması,
- Başlığında “akıl yürütme” kavramının geçiyor olması,
- Araştırmanın, standart bir nitel veya nicel araştırma çerçevesinde problem durumunu, amaç ve alt amaçları, yöntemi, veri toplama tekniklerini, verilerin analizini, bulgular ve sonuçlarını içerecek şekilde açıkça yürütülmüş ve yazılmış olması,
- Daha önceki dokümanlara internet veri tabanında ulaşılması çok zor olması nedeniyle araştırmaların 1998-2017 yılları arasında yapılmış olması.

Veriler doküman analizi tekniği ile internetten ve yazılı kaynaklardaki tezler incelenerek toplanmıştır. Meta-sentez (tematik içerik analizi); bir konu veya kavram üzerine yapılan araştırmaların çeşitli tema veya ana şablonlar (matrix/template) açısından eleştirel bir biçimde yorumlanması ve bir senteze ulaşılmasını içerir (Çalık ve Sözbilir, 2014).

Bulgular analiz edilirken araştırma soruları üzerinden üç kod oluşturularak ilk iki soruya cevap aranmış üçüncü soruda ise özetlerde ve tezlerde yer alan sonuçlar üzerinden bir sentez oluşturulmaya çalışılmıştır. Kodlar yapılırken, birinci kod içerisinde bilişsel, duyuşsal ve psikomotor alanla ilgili kavram veya ölçme aracı göz önüne alınarak yapılmış, diğer kodlar ise YÖK Ulusal Tez Merkezinde verilen disiplin ve ilgili bilim dalı ve anahtar kelimeler üzerinden yapılmıştır. Birinci kod (Kod 1), Bloom ve arkadaşlarının (1956) taksonomisine göre hangi taksonomik alanda tezin yazıldığı ve tezin ilişkili olduğu disiplini içermektedir. İkinci kod (Kod 2), tezin içeriğinin temel olarak ele aldığı akıl yürütme türü veya becerisini içermektedir. Üçüncü kod (Kod 3), ise tezin, yayınlanmış olduğu Bilim Dalı'nı içermektedir.

Tartışma, Sonuç ve Öneriler

Bu araştırmada temel olarak “akıl yürütme” kavramı bağlamında tezler incelendiği için birbirinden çok farklı alanlarda, konularda ve amaçlarda yapılan çalışmaları, disiplinler arası bir perspektifle ele almak zor olduğu için temel düzeyde tezlerin çalışma alanları ve taksonomik bağlamları açısından çalışma yapmak uygun görülmüştür. Bu bağlamda elde edilen temel sonuçlar şu şekilde verilebilir:

- 1- Tezler baskın olarak bilişsel öğelere vurgu yapacak şekilde hazırlanmıştır. Halbuki akıl yürütme sadece bilişsel bir süreç değildir. Akıl yürütme süreçlerini etkileyen birçok farklı taksonomik değişken vardır ve bu temel alınan taksonomiye göre çeşitlendirilebilir ve genişletilebilir.
- 2- İkinci olarak, eğitim alanındaki tezlerde genel olarak içeriğe özgü boyutlardan ziyade genel anlamda akıl yürütmeye odaklanıldığı görülmüştür.
- 3- Matematiksel akıl yürütme becerilerinin matematiksel akıl yürütmenin konuya dayalı boyutuna göre araştırıldığı matematiksel akıl yürütme becerilerinin diğer boyutları olan düşünme stiline göre ve bakış açısına göre ve bunun alt boyutlarına göre yeterli çalışma olmadığı bu nedenle literatürde bir boşluk olduğu tespit edilmiştir. Tezler daha çok Fen-Matematik alanında ve Matematik disiplini yapılmıştır. Bununla beraber, bu disiplin içerisinde de orantısız akıl yürütme gibi belirli akıl yürütme türü ön plana çıkmıştır. Halbuki akıl yürütme gerek Fen-Matematik gerekse sosyal bilimler açısından çok daha geniş ve özgün alanlara sahiptir. Ayrıca, her Bilim Dalının temelinde akıl yürütme vardır bu nedenle akıl yürütme becerisi ile ilgili çalışmaların disiplinler arası bir bakış açısıyla her alanda yapılması gerekmektedir.

- 4- Genelde akıl yürütme becerisi, bireysel olarak çeşitli sosyal deđişkenlerden etkilenilen bir deđişken olarak ele alınmıştır. Hâlbuki akıl yürütme, öğrenmeyle edinilen, kültürel ve sosyolojik bir olgudur. İnsanlığın belirli dönemlerinde, belirli kültür ve medeniyetlerin, daha nitelikli eserler vermesi bununla açıklanabilir.
- 5- Zihnin ve akıl yürütmenin temel işleyişine ilişkin öğeleri araştırmaya veya anlamlandırmaya yönelik çalışmalardan çok belirli becerileri belirli ölçme araçları açısından ele almaya dönük çalışmaların olduđu görülmektedir. Bu bağlamda model geliştirecek ve çeşitli kuramlara odaklı çalışmalar açısından literatürde bir eksiklik olarak mevcut olduđu söylenebilir

Bu çalışmanın temel sınırlılıđını, "akıl yürütme" kavramını geniş bir alanda alınması olduđu söylenebilir. Belirli bir disipline odaklanmak yerine geniş bir alanda "akıl yürütme" kavramının incelenmesi, araştırmalardaki özel ve özgün alt problemlerin çalışma içerisinde incelenmemesine, incelse bile farklı disiplinlerdeki çalışmalarla kopuk bir sonuç sergilemesine neden olacağı için dahil edilmemesine sebep olmuştur. Bu bağlamda çalışma, temel olarak, soyut ve kavramsal düzeyde tezlerdeki genel eğilimin incelenmesini hedeflemiştir. Çalışmanın ikinci sınırlılıđı, sadece online doküman ve tezlerin incelenmesi nedeniyle online olarak ulaşıma açılmayan tezlerin çalışmaya dahil edilememesidir. Çalışmanın üçüncü sınırlılıđı, tezlerin tamamının içerik analiziyle ele alınmasından ziyade özet ve sonuç bölümlerinin ele alınması olduđu söylenebilir ki bu nedenle daha derinlemesine bir analiz yapılamamıştır. Çalışmanın dördüncü sınırlılıđı ise, tezler dışındaki makaleler ve diđer kaynakların ele alınamamasıdır ki bu nedenle literatürü tamamen ve bütüncül şekilde ele alınmasından ziyade belirli tezler üzerinden ele alınmasına sebep olmuştur. Çalışmanın beşinci sınırlılıđı ise, literatürde akıl yürütme yerine kullanılacak muhakeme, usa vurma, biliş gibi kelimelerin taramada kullanılmamasıdır.

Öneri olarak belirli bir disiplinde akıl yürütme becerisinin hangi boyutlarda incelendiđi ve ulaşılan sonuçları meta-analiz ve meta-sentez yöntemleriyle ele alınabilir ve eksiklikler tespit edilebilir. Ayrıca, akıl yürütme becerileri üzerine belirli yıllarda yapılmış, makaleler veya projelerde sonraki çalışmalarda incelenebilir.

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