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Science and Social Studies Examining the Thoughts of Teacher Candidates about Concept Teaching

Fen Bilimleri ve Sosyal Bilgiler Öğretmen Adaylarının Kavram Öğretimi Hakkındaki Düşüncelerinin İncelenmesi

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Enes Bodur & Mürşit Akbulut

Öz

Anlamlı ve kalıcı öğrenme, bilginin yapı taşı olan kavramların öğretimi ile mümkündür. Kavramların fazlaca yer aldığı Sosyal Bilgiler ve Fen Bilimleri derslerinde kavram öğretimi önemlidir. Dolayısıyla sosyal bilgiler ve fen bilimleri derslerini öğreten öğretmenlerin ilk olarak kavram öğretimi konusunda yetkin olmaları gerekmektedir. Bu hedef doğrultusunda gerçekleştirilen araştırmada bu bilimlerin öğretiminde dersin uygulayıcısı olacak olan öğretmen adaylarının kavram öğretimine yönelik görüşlerinin ne olduğu ve onların kavram öğretimiyle ilgili yapmış oldukları değerlendirmeler üzerine bir çalışma yapılmıştır. Katılımcıların görüşlerinin tespit edilmesi için bu çalışmada nitel araştırma yöntemleri kullanılmıştır. Araştırmada seçkisiz örnekleme yöntemi kullanılmıştır. Ayrıca 2018-2019 eğitim-öğretim yılında bir devlet üniversitesinde öğrenim gören 50 öğretmen adayı ile yapılmıştır. Veri toplama aracı olarak yarı yapılandırılmış görüşme formuna başvurulmuştur. Elde edilen veriler daha sonra betimsel analiz yapılarak, birtakım kategoriler altında toplanmıştır. Araştırma sonucunda, öğretmen adaylarının kavram öğretiminde daha çok sunuş yoluyla öğretimi tercih ettikleri belirlenmiştir. Araştırmaya katılan öğretmen adaylarının kavram öğretim araç-gereçlerinden en çok kavram haritasını kullandıkları ya da kullanmak istedikleri saptanmıştır. Öğretmen adaylarının kavram öğretiminde en fazla zorlandıkları kavramların somut kavramlardan daha çok soyut kavramlar olduğu sonucuna ulaşılmıştır.

Anahtar Kelimeler: Kavram Öğretimi, Öğretmen Adayları, Fen Eğitimi, Sosyal Bilgiler.

Abstract

Meaningful and lasting learning is possible with the teaching of concepts that are the building blocks of knowledge. It is important to teach concepts in Social Studies and Science courses where concepts are included a lot. Therefore, teachers who teach social studies and science courses should first be proficient in concept teaching. In the research carried out in line with this goal, a study was carried out on what are the opinions of the teacher candidates who will be the practitioners of the course in the teaching of these sciences and their evaluations regarding concept teaching. Qualitative research methods were used in this study to determine the opinions of the participants. In the research, unelected sampling method was used. In addition, in the 2018-2019 academic year, it was held with 50 teacher candidates studying at a public university. A semi-structured interview form was used as a data collection tool. The data obtained were then analyzed and collected under a number of categories. As a result of the research, it was determined that teacher candidates prefer to teach through presentation in concept teaching. It was determined that the teacher candidates who participated in the study used the concept map or wanted to use the concept map the most from the concept teaching tools. It has been concluded that the concepts that teacher candidates have the most difficulty in teaching concepts are more abstract concepts than concrete concepts.

Keywords: Concept Teaching, Teacher Candidates, Science Education, Social Studies

Introduction

Education, which is an indispensable requirement for societies, is the process of creating intentional and terminal behaviors in the person through his own life. Societies can reach an advanced level in all directions when they have only a good education system. We can call the age we are in the information age because in this age, knowledge is increasing. This situation directs teachers and teacher candidates from the traditional (with presentation path) method of learning information to implement different and more modern educational models. A very important function of education today is to teach how to evaluate information by showing methods of obtaining it. The continued increase in knowledge has made it impossible for students to store information, as in traditional education. In order for students to achieve certain goals, it is important that they correctly understand the concepts of various disciplines and their relationships with each other.

Instead of passing the information directly to the student, the teacher is seen as a guide that directs them to the information and helps establish the inter-concept relationship (Yilmaz & Çolak, 2012). In this way, education systems that lead to new learnings were created by restructuring the information learned by the students. As a result of this situation, the learned information is made meaningful and permanent. The most important feature of meaningful and permanent learning is to use teaching methods and techniques in accordance with the structure of the concept and to show the relationships between concepts to the students. Because it is necessary to explain the newly learned concepts by associating them with previously learned concepts. While concepts form the basis of knowledge, inter-concept relationships enable scientific principles to occur (Çolak, 2010). The concept is; it can be defined as a form of information that reflects the changing common characteristics of different facts and objects that are generally understood in the mind (Yildirim & Gazel, 2018). Since concepts are the building blocks of human thought, they consist of the sum of the observable properties of objects or events (Merrill, 1983).

Concepts are the element that organizes and combines a lot of information in a particular field. One of the methods that education is often associated with is concept teaching. It will become very difficult for us to recognize ourselves and comprehend our world without the main conceptual knowledge in geography, sociology, economics, political science, history, etc. (Memişoğlu & Tarhan, 2016). Concepts are the basic elements of knowledge as well as concept teaching within education is a fundamental element (Doğru & Cerrah Özsevgeç, 2018). Students' ability to transfer information through permanent learning can be opportunities with good application of concept teaching.

In the teaching process of concepts, the method of learning through presentation and learning through invention is generally used. Traditional concept teaching; it consists of stages such as giving the concept to the student by the teacher, giving the definition of the concept, and then giving the descriptive and differential characteristics of the concept. Ordinary methods in concept teaching are not enough for students to learn concepts. One of the techniques that is fresh in concept teaching is that generalize based on the most appropriate example that meets the concept. In this technique, the student discovers the pedivent features by examining a wide range of examples of the concept and thus has the opportunity to generalize. In the generalization part of teaching using experience, teaching is based on low age levels; the use of definitions in concept creation can work at higher education levels (Memişoğlu & Tarhan, 2016). The common problem in the teaching of concepts is due to the fact that a definitive verbal definition of the concepts has not yet been made (Çaycı, 2007).

Considering the developmental characteristics of the students in the first step of primary education, it can be commented that ordinary techniques in concept teaching will not work. According to the method of learning through invention developed by J.S. Bruner, the student's effective participation in the learning process can only be through invention. According to the method of teaching through invention, the role of the teacher is to create a system in which the student can access the information through his/her own

efforts, rather than giving the ready-made information to the student. The main elements underlying this are thinking, experimenting and finding. This depends on the teacher not directly conveying concepts and principles to the students, but using experimental methods, ensuring that he or she has access to the principles and concepts himself (Taşdemir, 2000). It is possible to tell students that concept teaching is easier through invention, which allows them to make sense of information themselves by reaching generalizations. In the modern teaching methods developed, the permanence of learning is conceptual, not transactional. If the student or individual is able to adapt the information he/she has learned to new situations, he or she has grasped the knowledge learned. (Çolak, 2010).

According to Bruner, who made a great contribution to science teaching by bringing concept teaching and the path of invention, he argues that steps such as name, definition, characteristics and understanding of the concept should be followed in concept teaching (Özmen, 2004). In the teaching of disciplines such as Social Studies and Science, it is very important to learn concepts (Doğru & Yüzbaşıoğlu, 2021). Identifying the concept as the focus of teaching positively affects the academic achievements of students, making their learning and remembering easier. In addition, it helps to distinguish misconception by personalizing teaching. Learning the concept also improves problem solving and reasoning skills (Çoban & Akşit 2018). The Social Studies course varies considerably because it includes social and humanities. Teachers should provide opportunities for the student's learning lives by taking into account their developmental processes when transferring this diversity to students (Zarrillo, 2008).

When we look at the concepts aimed at teaching in social studies, it is seen that there are approximately 91 concepts in 4th grade, 121 in 5th grades, 124 in 6th grades and 121 in 7th grades (Memişoğlu & Tarhan, 2016). The teaching of concepts is provided by following the steps of introduction, development and consolidation according to the class levels. Therefore, when teaching any concept, it is necessary to examine the preliminary information and apply it in order before the introduction phase is completed, before the development phase is completed, without going to the consolidation stage. Concept-oriented education is especially important in the teaching of memorization-oriented courses, as it prevents social studies and science courses from being taught by memorization (Doğanay, 2005).

When looking at the studies carried out in this context; studies aimed at measuring the contributions of methods such as concept puzzles, concept cartoons, concept maps to success (Yılmaz & Çolak, 2012; Aktepe et al., 2017; Tokcan & Alkan, 2013; Sidekli et al., 2014; Tokcan & Özdemir, 2018; Kısa, 2007; Aydoğdu et al., 2020). It also relates to concept puzzles, concept caricature, concept map, etc. (Novak et al., 1983; Kocaarslan, 2012; Evrekli et al., 2007; 2003; Akengin & Süer, 2011; Bektüzün & Yel, 2019). In addition, the concept teaching applied by teachers, research to identify and eliminate misconceptions (Akbaş, 2013; Aykutlu & Şen, 2011). Studies on concept teaching were carried out by (Kayacan, 2010; Bitlisli, 2014; Çepni, 2019; Sever et al., 2009; Akyol Gök, 2014; Aslan, 2012; Aycan 2010) in general. When we looked at the studies on the content of the program, it was seen that (Ciritci, 2012; Eroğlu, 2008) was doing research. Examples include the work of (Tural, 2011), which has covered the subject in terms of concept teaching. (Memişoğlu & Tarhan, 2016) study on the opinions of teachers in the teaching of concepts.

When the studies carried out are examined, it is often seen that there are studies that measure the effect of conceptual misconceptions and concept teaching methods on success. However, it is noticeable that a lot of work has been done on the use of concept teaching techniques. Most of these studies are quantitative and experimental research. When the literature was examined, it was observed that the researches involving the thoughts of the teacher candidates about concept teaching were limited. The fact that there are too many concepts in both social studies and science courses, which is a multidisciplinary course, and that these concepts often have abstract meaning, increases the burden of teachers for concept teaching. It is very important that teacher candidates have proficiency in concept teaching in their future professional lives. Conversely, the concepts that form the basis of knowledge cannot be well learned,

which leads to the outswing of educational objectives. Considering this goal, it should be considered that the study is important to unearth the thoughts and opinions of teacher candidates about concept teaching.

Purpose of the Research

In this research, it is aimed to determine the opinions of teacher candidates about concept teaching. In line with this goal, the following questions were prepared for social studies and science teacher candidates and tried to find answers to them:

1. What is the definition of concepts and their importance in teaching?

2. What are the methods they apply in concept teaching (the stage, technique and evaluation they apply)?

3. What are the reasons for benefiting from the concept teaching measurement techniques, teaching rankings and concepts they benefit from?

4. What are the concepts in which "Conceptual Misconceptions" are detected?

5. What are their thoughts about the problems they have most in concept teaching and the solutions for it?

Methods

The aim of the research is to examine the opinions of teacher candidates regarding concept teaching. The method of this study constitutes a fact science pattern from qualitative research patterns. The fact science pattern is a research pattern that studies the phenomena that have general ideas but cannot be fully assimilated and cover the study of perceptions, orientations and concepts (Memişoğlu & Tarhan, 2016). Data analysis in studies using this pattern is used to unearth lives and meanings. While the results obtained in studies carried out with this method are expressed in a descriptive way, mostly direct citations are used. In addition, it is aimed to explain and interpret the findings reached within certain systematics.

Participants

In the 2018-2019 academic year, the participants of this study were 50 (Social Studies and Science Teaching) teacher candidates who studied teaching practice at a public university in the Western Black Sea Region, studied in the 2nd grade and were in total. Participants were given a interview form and participants were selected by un selective sampling method. Participants were taken into research on a voluntary basis. Table 1 refers to the descriptive characteristics of the participants.

Table 1. Descriptive Characteristics of Teacher Candidates

		f	%
Gender	Female	29	58
	Male	21	42
Programme	Social Studies Teaching	26	52
	Science Teaching	24	48

According to table 1, 50 teacher candidates, including 29 women and 21 men, participated in the study; 26 teacher candidates from Social Studies and 24 from Science teacher candidates participated in the research program.

Data Collection

One way to access systematic and comparable information is that conduct the interview using a form with specific boundaries and content (Yıldırım & Şimşek, 2006). In the data collection phase of this

research, a two-part interview form was applied. The questions in the first part of this form find answers to the descriptive characteristics of the participants in the research, while the questions in the second part are related to concept teaching. The participants of the study were given preliminary information about the questions on the form and the participants were asked to give detailed answers to the questions. Half an hour of interviews were held with each of the Social Studies and Science teacher candidates. When creating the data of the study, the information on the interview form was taken into account. The final form was finalized by taking expert opinion.

Data Analysis

Descriptive analysis technique was used when analyzing the data obtained. This study consists of a descriptive study of social studies and science teacher candidates in Turkey on concept teaching and concept perception. Descriptive analysis is a type of qualitative data analysis that involves summarizing and interpreting the data obtained by various data collection techniques according to predetermined themes. The main purpose of this type of analysis is that present the findings to the reader in a summarized and interpreted form. The purpose of the descriptive analysis is to bring the findings to the reader by editing and interpreting them (Özen & Hendekçi 2016).

Interview forms were encoded as ÖA1, ÖA2, ÖA3 and the data obtained were analyzed. Then, the interview forms were read more than once and the information obtained was understood. The data was then classified into certain categories. Percentage calculations were made according to the frequency values of the categories created. The number of participants remained lower than the number of frequencies due to the fact that the participants of the study answered some of the problem sentences more than once. However, percentages were calculated based on the number of participants. In addition to the frequency values, the opinions given in parentt brackets are included in which of the participants. Interview forms and categories created were re-examined a week later to ensure reliability. Then, expert opinion was taken and the appropriate categories were created.

Since descriptive analysis was used in the study, it was deemed appropriate to include direct excerpts from the participants in order to increase validity. For this purpose, some of the examples that often assimilate the expressions of individuals are indicated unchanged. Memişoğlu & Tarhan's (2016) work was used when creating the tables in the study.

Findings and Comments

The opinions of the teacher candidates about concept teaching are presented in the tables below.

1.Findings on the Concept Definition, Place and Importance of Teacher Candidates in Teaching

Table 2. Concept Descriptions of Teacher Candidates

Definition of Concept	f	%
Words that coincide with facts	16	32
Keywords of the subject	15	30
General name of items	8	16
Does not make any definitions	11	22

The concept definition was expressed by 16 of the teacher candidates as "words that correspond to facts". The answer of 15 people was "keywords of the subject". In addition, 8 people described it as "the general name of the substances". The remaining 11 teacher candidates did not provide a description of the concept.

Table 3. Importance of Concept Teaching in Education according to Teacher Candidates

	f	%
It is important to make the teaching process effective.	28	56
It is important because there are a large number of concepts in the units.	8	16
Irrelevant answer	6	12
Concept teaching is important because it is the first step of learning.	4	8
It is important because it provides embodiment of abstract expressions.	4	8

According to Table 3, a significant majority of participants stated that concept teaching can be effective throughout the learning process for the importance of concept teaching in the field of education.

Some of the statements given by the participants about the importance of concept and concept teaching in education are as follows: "The concept has a very important place in the explanation of the subjects. The concept provides an objective understanding of subjective topics in particular. It should be taught as a step in the transition to embodying abstract concepts in particular. Concept teaching contributes to the readiness of students. In particular, it is very important to explain certain concepts related to the topics in order for the program to achieve its objectives."

2. Teacher Candidates' Opinions on Applications in Concept Teaching (for application steps, methods and evaluation)

2.1. What steps are given importance when teaching concepts in the application process?

Table 4. Steps of Teacher Candidates in Concept Teaching (Memişoğlu &Tarhan, 2016).

Steps of Concept Teaching	f	%
Review preliminary information	25	23,8
Making a comment	15	14,28
Defining	15	14,28
Associating and exemplifying daily life	15	14,28
Benefit from concept map, etc. techniques	12	11,42
Identification and sampling of students	8	7,61
Drawing Attention	8	7,61
I don't know the stages	3	2,85
Clue	1	0,95
Induction	1	0,95
Again	1	0,95
Assessment	1	0,95

When the applications of the participants during the course were examined, it was determined that a very high proportion preferred the presentation path in concept teaching and the invention path of all three participants. Seven participants made statements that went off the subject. The idea that the teaching method is not suitable for the level of the students has attracted attention among the participants. Table 4 shows the steps participants take when using these techniques.

When table 4 is examined, teacher candidates first mention the necessity of reviewing preliminary information in concept teaching. Then there are the stages of explaining, defining and associating with daily life. A participant mentioned tips, induction, repetition and methods of evaluating the concept. Three of the teacher candidates said they had no idea about the steps of concept teaching. Some of the participants' statements are as follows: "In courses where abstract concepts such as social studies and science are numerose, clues are needed to better understand the concepts by the students." (ÖA1). "The concept is very important in the learning of the subject. In particular, it is necessary to connect with daily life (ÖA2)."

2.2. Which of the concept teaching methods are most effective?

Table 5. Effective Methods that Teacher Candidates Consider regarding Concept Teaching

Concept Teaching Methods	f	%
Associating and exemplifying daily life	17	29,31
Concept Map, Mind Map, etc. techniques	15	25,86
Making a Comment	8	13,79
Direct Teaching	5	8,62
Discussion	4	6,89
Storytelling	3	5,17
Learning by doing	3	5,17
Grouping	2	3,44
Control of Preliminary Information	1	1,72

When table 5 is examined, it is stated that it is most effective to associate and give examples with daily life for concept teaching according to the opinions of teacher candidates. In addition, it has been stated that it is necessary to use other methods for each concept. Concept and mind map techniques have also been noted to have a significant impact by the participants. In addition, it was determined that the methods of discussion and living learning, which are the methods actively participated in by the students, were used in certain proportions compared to the participants. Some participants have the following views: "Techniques and effective methods to be applied when teaching concepts may vary from person to person. However, it is possible to sort within these techniques." (ÖA1). According to another teacher candidate; It is important that the subjects are associated with daily life and that appropriate examples are given. In addition, concept maps provide a better understanding of concepts in particular." (ÖA2). It is a very important technique especially in the teaching of abstract concepts, since mind maps reveal concept confusion and misconceptions (ÖA3)."

2.3. What are your preferred methods in the concept teaching process?

In line with the previous result, they ranked the method of associating and exemplifying the teacher candidates with daily life in concept teaching among the most preferred methods. In addition, they stated that they use methods such as concept map, mind maps, presentation and invention path, example giving, definition.

A few of the answers given by the teacher candidates are: "I can measure the level of knowledge of the students using the explaining technique and adjust the course processing path accordingly." (ÖA1). "I use the concept map. Because this method allows us to analyze by dividing the concept that is meant to be taught." (ÖA2). "I involve students in the process by using the method of learning by doing." (ÖA3). "I use the mind map, puzzles and concept caricatures (ÖA4)."

Table 6. Strategies for Examining The Concept Teaching of Teacher Candidates

	f	%
Unit At The End	24	32,43
Using Q&A Method Instantly and At The End of a Lesson	20	27,02
With Students' Descriptions	12	16,21
Fill in the Blank	8	10,81
Puzzle	4	5,40
True-False Test	3	4,05
Irrelevant Answer	2	2,70
Not Fully Evaluated	1	1,35

When table 6 is examined, 20 of the teacher candidates use the question and answer method during and after the course to evaluate concept teaching. In contrast, 24 candidates stated that they evaluated through unit evaluation tests and exams at the end of the unit. Other evaluation methods included the identification of the students and the right-to-false test. Some of the teacher candidates' opinions are as follows: "By creating the opportunity to continuously evaluate students during the teaching process, we can understand whether the student understands the subject better." (ÖA2). "I understand with the right-wrong test whether concepts are understood in the minds of students. (ÖA1)' "The concepts of the students can be understood by the filling in the gap method (ÖA3)."

3. Findings regarding The Measurement Techniques, Teaching Stage and Reasons for Benefits that Teacher Candidates Prefer or Intend to Use in Concept Teaching

3.1. Examination of the concept teaching options (measurement tools) that teacher candidates benefit from during the courses and exams

Tablo 7. Öğretmen Adaylarının Faydalandıkları Kavram Öğretim Öğeleri

Concept Teaching Elements	f	%
Concept Map	32	33,33
Mind Map	21	21,87
Fishbone	15	15,62
Matching	10	10,41
Puzzle	5	5,20
Irrelevant Answer	5	5,20
Concept Caricature	3	3,12
Word Association Test	2	2,08
Concept Networks	2	2,08
Fill in the Blank	1	1,04

It has been determined that teacher candidates use the concept map the most in the use of materials. The concept map is followed by the mind map and fishbone respectively.

3.2. Teacher candidates should use the order and concept map to explain the concepts in the concept teaching process

It is stated that more than half of the teacher candidates explain the concepts at the beginning of the course and the others explain them when necessary. 58.26% of the participants also benefit from concept maps as needed.

3.3. Reasons why teacher candidates prefer concept maps

Table 8. Reasons Why Teacher Candidates Prefer Concept Maps

	f	%
Makes topics clearer and creates active learning	38	49,35
Embodies the subject	12	15,58
Ensures that the subject is seen as a whole	12	15,58
Provides permanence in learning	8	10,38
Makes inter-concept relationships appear	3	3,89
Saves time and effort	3	3,89
Improves vocabulary	1	1,29

According to Table 8, one of the reasons for using concept maps is to make topics more understandable and create active learning with 38 people. In addition to these reasons, the fact that the subject is seen and embodied as a whole and provides permanence in learning are also reasons to benefit

from concept maps. Some of the statements of the teacher candidates are as follows: "Embodiment of the subject helps to understand the subject(ÖA1)." "It is important for students to improve their vocabulary... (ÖA2)"

4.Findings on Concepts and Topics in which Teacher Candidates Detect "Conceptual Misconceptions"

It has been stated that there are more conceptual misconceptions about history, citizenship and geography than social studies teacher candidates. Among the reasons for the occurrcurions of conceptual misconceptions are in history and citizenship issues; forms of governance, central government, law, constitution, statute, regulation, public, public opinion, organization, democracy, theocracy, written rules, legislative, executive, sovereignty, independence, majority, pluralism, principle, revolution. Geography topics include delta, basin, language of maps, shape of the world; In the subjects of science, it has been stated that conceptual misconceptions occur due to cell divisions, basic components of living things, classification, energy, strength and movement, intangibles of concepts such as heat and temperature, having aneular names and unlikely adaptation to real life. Some of the opinions of the participants are as follows: "The way students are managed in History, central administration (such as law, regulation, statutes); There are a lot of misconceptions about Citizenship such as public opinion, public opinion, written rules." (ÖA1). 'In science; like cells, divisions, electricity.' (ÖA2) 'In these subjects, the similarity of names and the presence of abstract concepts often increase misconceptions (ÖA3).”

5.Findings on the Problems Experienced by Teacher Candidates in Concept Teaching and the Solutions They Produce

5.1. Problems experienced by teacher candidates in concept teaching

Table 9. Problems Experienced by Teacher Candidates in Concept Teaching

Problems in Concept Teaching	f	%
Not allocating the time needed to exemplify and embody	12	38,70
Concepts do not overlap with the student level	8	25,80
Small number of concept maps in textbooks	5	16,12
Failure to identify pre-information and misconceptions	3	9,67
Long-term concept teaching techniques	2	6,45
Students are not interested in reading books	1	3,22

5.2. Teacher Candidates Who Participated in the Study Made the Following Recommendations:

Table 10: Teacher Candidates' Suggestions on Concept Teaching

Suggestions	f	%
Examples containing social concepts should be used a lot and visual tools should be used more and adapted to daily life.	12	33,33
It should be noted that the concepts are suitable for the student level.	10	27,77
Tools such as concept map should be more present in textbooks.	6	16,66
Preliminary information and misconceptions of concept should be checked before the new learning step.	5	13,88
Original methods for concept teaching should be created.	3	8,33

When table 9 and 10 were examined, it was determined that some basic problems such as not enough time to exemplify and embody the problems experienced in the concept teaching of teacher candidates, concepts not being directed towards the student level, and moving to new concept teaching without revealing preliminary information and conceptual misconceptions. In response to these problems, the solution methods of the teacher candidates have been such as giving the concepts according to the student level, taking the step of new learnings after the misconceptions of the concept are eliminated, and it is more appropriate to prefer techniques with many examples and visual tools for abstract concepts.

Result and Discussion

When defining the concept, 16 of the teacher candidates are words that correspond to the facts; 15 are keywords of the subject; 8 expressed as the general name of the substances. This is because the word concept can be defined in more than one way. If we define this word, objects that are similar or different from each other can be called events with a baldness or a name. To make a broad definition, it is the information structure that finds meaning in memory and indicates the variable but common characteristics of various objects and phenomena. The concept is expressed in words when it comes to human thoughts (Memişoğlu & Tarhan, 2016). Accordingly, the definition that teacher candidates refer to as 'words that correspond to facts' corresponds to the concept definition. Although the expressions mentioned in the classifications 'Keywords of the subject' and 'general name of the articles' do not meet the clear definition of the concept, it is observed that the teacher candidates have a general idea related to the concepts. The participants of the study commented that it contributes greatly to the teaching process about concept teaching and is very useful and important because concepts are frequently encountered in science and social studies education. In contrast, 11 of the teacher candidates made irrelevant statements.

When the applications in the courses were examined, 13 of the participants preferred the presentation path in the concept teaching steps, while 5 preferred the invention path. While the invention path was used in concept teaching, it started by using the most appropriate example that replaced the concept, while the majority of teacher candidates started by defining. Some of the obstacles to understanding concepts in the concept teaching process are the use of ordinary techniques including Q&A, straight narrative, starting the course without sufficient knowledge of the students and not giving enough space to new methods such as concept maps, concept networks, semantic analysis tables (Güneş et al., 2010). Social Studies teachers care 58.26% about reviewing preliminary information. Since previously acquired information relates to later knowledge, previous information is a very important factor (Dündar, 2008). Because of natural and social factors, the preliminary knowledge of the concepts that students have allows new learning to occur, so that the incomplete or inaccurate preliminary information may restrict or, more importantly, prevent new learning. (Novak, 1984).

According to the teacher candidates, the first of the concept teaching techniques is to use methods and materials such as concept map, while adaptation to daily life is in the second place and sampling in the third place. In the light of these data, it is seen that the concept map method has a lot of place among the methods used in concept teaching. Similar results were reached in the study in which Memişoğlu & Tarhan (2016) gave their opinions on the concept teaching of social studies teachers. In some studies reached (Kiliçoğlu, 2011; Çolak, 2010; Akyol Gök, 2014; Süer, 2010; Tokcan & Alkan, 2013; 2003; Çaycı, 2007) concept map, concept caricature methods have been compared with traditional education and it has been concluded that these methods have a positive effect on academic success. However, it is seen that the studies on social studies and science teacher candidates on topics such as comparison, listing, grouping, classification and interpretation, which are concept teaching techniques, are very limited.

When the effectiveness of concept teaching is examined, teacher candidates use the question and answer technique during or at the end of the course; they stated that they prefer evaluation tests and exams at the end of the unit. In order for education to benefit greatly, it is important to evaluate every step of the teaching process and to communicate feedback at that moment. In parallel, when the opinions of the

participants are examined, only 8 of them evaluate this subject during the course, at the end of the course and at the end of the unit.

Teacher candidates have benefited greatly from the concept map method during the course and throughout the exams. The concept map is followed by the mind map and fishbone method respectively. When the participants were examined for their use of concept networks, concept caricature, word association testing and gap filling techniques, it turned out that very few teacher candidates benefited from these techniques. In addition, the methods that the participants did not express include structured girids, diagnostic branched trees, semantic analysis tables, spider maps, etc. titles.

Teacher candidates prefer the beginning of the course or the most appropriate time as the time to explain the concepts. Defining concepts at the beginning of the course serves the goal of attracting attention and informing about teaching, but concepts should be conveyed at the most ideal times in order to ensure meaningful and lasting learning. In addition, teacher candidates benefit from the concept map technique as much as they find necessary. In addition, most candidates benefit from methods and materials such as concept map, concept caricature, and space filling. Among these articles, the concept map is the most preferred method. In parallel with the results of the study carried out by Coştu et al. (2003), science and classroom teachers prefer the most concept map technique in concept teaching.

Two of the most important reasons why teacher candidates benefit from the concept map method are that it makes the subjects more understandable and effectively performs learning. Some of the other reasons are that it contributes to the embodiment and understanding of the subject as a whole with the concept map. Concepts form the roots of cognitive activities, and learning cannot take place without understanding the relationships of concepts with each other (Aydın, 2005). In this regard, the concept map method helps us to understand the relationships that concepts form with each other. When some studies were examined, it was concluded that the most important factor to infer about the preliminary knowledge of the students and to increase success and permanence was the concept map (Çolakoğlu, 2006; Gündüz, 2014; Memişoğlu & Tarhan, 2016). These results coincide with the opinions of the teacher candidates about the impact of the concept map.

One of the units where teacher candidates have the most problems in the concept teaching process is units with abstract concepts. Of these, it was inferenced that there were problems with biology and history at the 7th and 8th grade levels. The reasons for this situation include having wide content in terms of concept, mostly abstract concepts, not according to student level and inadequate sampling. The qualities of concepts have a great impact on learning processes. Considering the level of abstraction, its detailedness and other characteristics, the concepts grouped constitute a variety of students' learning situations and levels. Stream, plain in Social Information; In science, there is a problem at the lowest level in the learning of concrete concepts such as sun, earth and moon, while the concepts that have problems at the highest level are globalism, culture, society in social sciences; In science, cell divisions, energy transformations, etc. are concepts. Methods such as defining, exemplification and relationship building in the teaching of such concepts have great benefits (Dündar, 2008).

In line with the difficulty of teacher candidates, it has been revealed that the misconceptions of the students are mostly in biology, history and citizenship courses in the 8th grade science curriculum. From these concepts, the constitution, sovereignty and society take the first place in the teaching of Social Sciences. In addition, it was determined that students had misinformation about concepts such as cell divisions and the properties of matter and electrical energy. In parallel, most studies examined revealed the presence of students with conceptual misconceptions in such concept categories. Parallel, meridian, scale in the study conducted by Bitlisli (2014); Kılıçoğlu (2011) emphasized the concepts of scale, map and location. Population and population density in the research carried out by Çakmak (2006); As a result of the research carried out by Tural (2011), age, chronology, equality, rights, law, science, state, culture; In the research carried out by Akdağ (2010), the existence of conceptual misconceptions of students in

parallel, meridian, sketch, map, location titles was obtained. In the study carried out by Akınoğlu & Arslan (2007), it was determined that the students had difficulty learning the chronology, place-place names, forms of state administration and concepts used in ancient Turkish in the history course. In the study carried out by Bal & Gök (2011), 5. It turned out that the concepts of "Republic, reign, leadership" of the students were not learned by the students at the required level. The results of the research carried out by Aycan (2010) also stated that the concepts in T.C. Revolution History and Ataturkism course were not adequately understood, so the misconceptions of concept occurred. It is seen that the results of the studies examined are in line with the results of this research. The teacher candidates stated that the reason they had problems with these topics was because the abstract subjects were too much, the subjects were not according to the student level and they could not produce various examples.

Teacher candidates stated that the concepts are not suitable according to student levels among the obstructive factors in concept teaching. Studies that show parallels with the thoughts of the participants are included in the literature. Ulusoy & Erkuş (2015) 4. In the research carried out with the students of the class, it was determined that the students had misconceptions about the concepts of history associated with daily life within the scope of the Social Studies course and concepts with similar meanings such as "chronology, war, homeland, tradition, victory, front, liberation war and occupation". As a result of the work carried out by Ciritçi (2012), 6th and 7th. It is stated that some of the concepts related to teaching purposes are not included in the content of The Class Social Studies Course and Student Books, and the concepts included are not in line with the steps of introduction, development and consolidation.

As a result, it was inferred from the teacher candidates that those who used the presentation and invention path stages did not really succeed in concept teaching. Teacher candidates who preferred the presentation path used only definitions and explanations and various examples in the sampling stages aimed at explaining the concept, characterizing the concept, understanding and not. No conclusions have been reached about giving examples that are not covered by the concept. Participants who adopted the invention path used tips in the concept teaching application to direct the students to the targeted concept. The stages of this path consist of giving the most suitable example for the concept, using different examples that indicate the concept, discovering similar features about the concept by taking into account the examples within the scope of the concept, generalizing, using examples that are not covered by the concept and discovering the qualities that distinguish the concept from others by taking these examples into consideration. In addition, no one of the teacher candidates has made any statements about comparison, listing, grouping, classification and interpretation of other ways of teaching concepts.

In courses with a lot of understanding, such as Social Studies and Science, educators should be given extensive and important information about concept teaching using various methods such as in-service training. When giving this information, a lot of attention should be paid to the steps of concept teaching. In the same way, educators should be encouraged to use other methods such as invention path instead of traditional methods used by in-service training. Considering the research results examined on concept teaching, educators should be encouraged to use more techniques such as concept map, concept network, semantic analysis table, etc., which add students to the process and make important contributions to the realization of permanent learning. Although the concept map of these techniques is used relatively much, studies should be carried out to make the remaining techniques, materials and methods more known in education and to benefit from them.

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