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Metaphorical Analysis of Teacher Trainers' Conceptualization of Constructivist Education

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ABSTRACT

This study aims to ascertain how teacher trainers conceptualize constructivist education through metaphors. Education based on constructivist approach has been implemented in Turkey for ten years. Thus, the expressed metaphors were ascertained, the themes were extracted, analyzed and, then, compared according to departments in the Faculty of Education and programs in the Department of Educational Sciences. In this study, phenomenological design, one of qualitative research design, was used. 323 teacher trainers at 71 Faculties of Education volunteered to take part in the study. 13 themes were extracted from metaphors. It was observed that teacher trainers considers constructivist education generally as providing an opportunity to learn by doing and living, constructing new knowledge from prior knowledge, and guiding students to discover and learn how to learn. Any noteworthy differences have not been observed between departments and programs. Whatever the teacher trainers' department or program is, when the themes were compared, it was noticed that they perceive Piaget's cognitive constructivism as its basis. Moreover, it was observed that participants did not display any erroneous understanding regarding the key concepts at hand with regard to constructivist approach. As a final remark, the metaphors and themes pointed out that cognitive constructivism was emphasized by the teacher trainers.

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Keywords:
Constructivism, constructivist education, metaphor, phenomenological research

Introduction

Constructivist approach has origins that date back to the age of Socrates with its foundations laid down by the first educationalist, Vico. In order to ensure that constructivist approach renders effective results, numerous elements need to be taken into consideration. These include; clear definition of the problem to be addressed, teacher's role, and a focus on the prior knowledge of learner, an awakening of students' intrinsic motivation, and having students to discover by hints (Demirel, 2008; Glasersfeld, 2004; Sonmez, 2008). According to constructivist educational worldview, learning is a process. Within this process, learning comes to mean the fusion of the new and the old by means of a method, which ensures effective retention of subject material. To render the learning process meaningful, a large responsibility lies on the shoulders of teacher (Demirel, 2008). Within this process, teacher acts as a 'guide' or 'facilitator' aiding students in the acquisition of cognitive skills or abilities. In constructivist approach, constructivist teacher directs a process that is designed not merely to allow learning or even teaching and not simply to bring about the direct absorption of knowledge but rather the 'real' learning of it. In constructivist approach, teacher manages a process that aims learning not teaching and designs lesson for discovering knowledge not acquiring it. Therefore, he or she supports active (Orlich, Harder, Callahan, Trevisan & Brown, 2012).

In recent years, the constructivist approach has been implemented within the context of the education systems in a great number of developed nations and has yielded successful results (Akpinar, 2010). When

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observing studies conducted both at home and abroad, teaching systems based on constructivist educational approach have been found to exert a positive influence on the academic success and behavior of students when contrasted with traditional methods (Koc, 2002; Ozkan, 2001). In this regard, it was anticipated that the implementation of constructivist approach would make a positive contribution to the Turkish educational system. Nevertheless, a large number of studies on constructivist approach pointed out that in the implementation of the approach, educations system has faced with significant problems and the intended results have not been reached (e.g., Adiguzel, 2009). Furthermore, a number of criticisms have emerged toward constructivist approach (Brooks & Brooks, 2001; Fer & Cirik, 2007). These criticisms include perceived over tolerance of the approach (towards subjective opinions), its excessive flexibility, its biased understanding of subject matter, and problems experienced pertaining to issues such as time, personnel and the cost of initiating such a reform. Educationalists have moreover constantly debated key issues arising from the application of the approach such as the perception and definition of knowledge, the objective existence of knowledge, the role of the mind in processing that knowledge and the effect of the environment on the learning process.

Education based on constructivist model has been implemented in Turkey over the course of the past ten years. In particular, the new education programs, which were introduced in 2006, were vigorously contested on account of the introduction of the approach into schools without sufficient piloting, analysis (of targets or goals), and training of stakeholders in terms of theory and practice (Aydin, 2006; Under, 2010). In constructivist education, particularly, teachers have encountered a number of striking problems in the implementation of this approach. In fact, the key factor in devising a solution to this problem should be education faculties. Teacher trainers at Faculties of Education, as active participants in this process, need to address this problem adequately. What these participants think about constructivist approach would affect what they reflect.

In this study, the views of teacher trainers at Turkey's educational faculties were analyzed by means of metaphors. To this end, it is necessary to discuss what is meant by a metaphor. In Turkish, the word metaphor is often expressed using the word or term 'mecaz'. According to Quale (2002), a metaphor is the expression of a 'descriptive analogy'. This can be contrasted with Lakoff and Johnson (2005) who described the metaphor as a process of discovery. In this study, the points of view of participants with regard to constructivist approach were observed and underlying reasons were assessed.

Both at a national and international level, many methodological studies in relation to certain educational concepts have appeared in literature in recently. Some of these concepts are as follows: "Education (Gunay, Aydin & Damgaci, 2015), "Learning" (Saban, Kocbeker-Eid & Saban, 2014; Uiba, Kikas & Tropp, 2011), "Teacher" (Culha-Ozbas, 2012), "The Student" (Saban, 2010), "The Educational Program" (Gultekin, 2013), "Knowledge" (Saban, 2008) and "The Internet" (Sahin & Baturay, 2013). When the current studies were examined, it was noticed that there is a lack of studies on the concept of constructivist education. Nevertheless, teacher trainers have not involved in studies conducted so far on educational concepts. Therefore, it is anticipated that an important contribution will be made to educational sciences through the examination of the metaphorical perceptions of teacher trainers with regard to constructivist approach currently applied in our educational system.

Teacher trainers' perceptions and attitudes toward constructivist education reflect their teaching and so teacher candidates; thus, searching this situation carries great importance. In this regard, the purpose of this study was to ascertain how teacher trainers conceptualize constructivist education through metaphors. To this end, it was attempted to find answers to the following questions:

1. What are the metaphors of teacher trainers working in the Faculty of Education regarding to constructivist education?
2. Under which themes, can these metaphors be categorized according to their shared characteristics?
   2.1. What kinds of similarities and differences in the extracted themes can be observed between the Department of Educational Sciences and the other departments?
   2.2. What kinds of similarities and differences in the extracted themes can be observed between the programs under the Department of Educational Sciences?

Method

In this study, phenomenological design, one of qualitative research design, was used and the phenomenon of the study was determined as "constructivist education". The phenomenological design is a design that attempts to understand how individuals attach meaning to experiences connected to facts and how they share these meanings with others. (Merriam, 2013; Patton, 2002)

Participants

Within the scope of this study, in the determination of the sample purposeful sampling was employed. With the assumption that the e-mail addresses or postal addresses of certain participants were likely to change or prove impossible to reach, purposeful sampling was employed. In order to collect data, teacher trainers employed at all of Turkey's Faculties of Education were contacted via e-mail and provided with information about the study. In this regard, 323 teacher trainers at 71 Faculties of Education volunteered to take part in the study. The sample group consisted of 152 male (47%) and 171 (53%) female participants. The largest group that participated in the research was those who had been employed for between 0 and 5 years with 23 % and assistant professors with 33%. As concerns the departments that participated in the study, the largest number of participants originated from the Educational Sciences department (33%).

Table 1. Characteristics of participants

		f	%
Experience in years	0-5 years	75	23
	6-10 years	50	15
	11-15 years	62	19
	16-20 years	52	16
	21-25 years	33	10
	26-30 years	27	8
	31-35 years	12	4
	36 + years	12	4
Title	Research Assistant	84	26
	Instructor	39	13
	Dr. Research Assistant	12	4
	Assistant Professor	106	33
	Associate Professor	55	17
	Full Professor	27	8
Level of Education	Vocational Higher Education	3	1
	Associate Degree	2	1
	Bachelor's Degree	20	6
	Master's Degree	75	23
	Doctorate	223	69
Department	Educational Sciences	108	33
	Foreign Languages	45	14
	Primary Education	56	17
	Computer and Educational Technology	23	7
	Secondary Science and Mathematics	36	11
	Secondary Social Sciences	18	6
	Special Education	6	2
	Turkish Education	9	3
	Physical Education and Sports	7	2
	Fine Arts	13	4
	Religious and Moral Education	2	1
	Total	323	100

Data Collection

In order to elicit the metaphors that participants held in mind with regard to the concept of constructivist education, all were asked to complete the following statement "constructivist education is/ similar to....., because……." and submit details relating to their gender, age, area of study, title, and level of

education attained. By including the concept of 'because' in the study, participants were requested to explain underlying 'reasons' for their own metaphors. A metaphor form was sent to the participants' official e-mail addresses by researchers. Furthermore, during the preparation stage of the metaphor form, the opinions of five experts in the field and two assessment and evaluation specialists were sought. The views of these specialists were evaluated and 100% agreement had been reached.

Data Analysis

The data of the study were analyzed using a content analysis. The process of the content analysis was organized as follows: (i) coding data (ii) forming categories (iii) organizing data according to codes and categories (iv) presenting and interpreting findings (Yildirim & Simsek, 2013). The study at hand was analyzed in five stages:

Tabulation of the data. The metaphors provided by the participants were codified in alphabetic order by the first researcher. The metaphors were classified according to their reasons of preference and a clear metaphor that represented best the opinion of the participant was chosen as the 'example' metaphor. An example of the table used in the codifying process in relation to these questions can be seen in Table 2.

Table 2. Codification table for the opinions of participants.

No	Gender	Age	Department	Experience	Title	Level of Education	Constructivist Education resembles a……?.....	Because….?....
323	F	41-45	Educational Sciences	16-20	Assoc. Prof. Dr.	Doctorate	Making lace	It is difficult, it requires long-term endeavor tirelessly

There are two basic aims in the codification and compilation process conducted by taking the format in Table 2 into consideration: (i) to ensure that metaphors are effectively grouped under a specific category (ii) and to validate the data analysis process and interpretation within the study.

Development of codes and themes. In this stage, setting out from the metaphors obtained, these metaphors were collected under thirteen main themes with regard to common characteristics concerning the features of constructivist education. The metaphors were arranged in alphabetical order according to priority and were examined in terms of their common features present in the metaphorical concepts created by the participants. A particular code was assigned to the metaphors (e.g., construction, utopia etc). Metaphors and underlying reasons were examined from the perspective of the characteristics of constructivist education and then transformed into themes. Finally, by placing these metaphors and explanations under all of themes, the development process of themes was completed

Validity and reliability. In qualitative studies, the detailed reporting of data collected and an explanation of how the researcher has arrived at his conclusions are the most important criterion (Glesne, 2013; Merrian, 2013). For reliability, the consensus of three people must be reached at each stage of the research, namely: the choice of design, creation of questions, and collection and analysis of data and interpretation of the results. In order to establish whether the metaphors had been placed correctly under each theme heading, the views of five experts in the field were elicited. A list of codes, themes with responses was sent to five teacher trainers currently employed at the Departments of Educational Sciences at Yildiz Technical University and Marmara University. They were requested to compare and match the themes and metaphors in the study. As a result of the comparison of these matching, a consensus was reached in terms of reliability.

Findings

In this section, the themes that arose from the metaphors generated by the participants were introduced and quotations taken from responses were given. Concerning quotations, codes indicating the participant's row number, gender and title were used in order to ensure anonymity of the participants and written in the brackets at the end of each quotation. For example, a teacher trainer may be codified as such: (32, M, P) According to the codification system the letters 'M' and 'F' were used to specify the gender of the

participants. Furthermore, the academic titles of the participants are also codified. According to this codification system: the following letters are used as codes: "A" for research assistant, "I" for instructor, "D" for holders of a doctoral title, AP for assistant professor, DP for associate professor and P for professor.

Metaphors Regarding to Constructivist Education

The participants produced 111 metaphors regarding constructivist education (Table 3). The metaphors that ranked in the top ten were as follows in order of frequency: construction, student-centered education, jigsaw puzzle, game, cognitive process, lego, factory, utopia, theatre, and lifestyle.

Table 3. The list of 111 metaphors regarding constructivist education

Metaphor	*f*	%	Metaphor	*f*	%	Metaphor	*f*	%
construction	46	14,24	bird	2	0.62	furniture	1	0.31
student-centered education	17	5.26	cook and eat it yourself	2	0.62	a dramatic film with fourteen words	1	0.31
jigsaw puzzle	15	4.64	table	2	0.62	origami	1	0.31
game	13	4.02	a luxury car	2	0.62	sculptor	1	0.31
cognitive process	12	3.72	seed	2	0.62	play-do	1	0.31
lego	11	3.41	light	1	0.31	omelette with tomatoes	1	0.31
factory	10	3.10	clamp	1	0.31	spider	1	0.31
utopia	10	3.10	season	1	0.31	spider's web	1	0.31
theatre	9	2.79	ant	1	0.31	paradox	1	0,31
life	9	2.79	rich soup	1	0.31	pastry	1	0,31
journey	7	2.17	internet	1	0.31	picnic	1	0,31
sea	7	2.17	stability	1	0.31	pilot flame	1	0.31
harmonious music	7	2.17	detective novel	1	0,31	a hamster wheel	1	0.31
puzzle	6	1.86	saving a life	1	0.31	compass	1	0.31
democracy	5	1.55	balloon	1	0.31	ship	1	0.31
chess	4	1.24	mould	1	0.31	rainbow	1	0.31
garden	4	1,24	canyon	1	0.31	Growing a rose from a bush	1	0.31
a guide	4	1.24	riding a bicycle	1	0.31	daily newspaper	1	0.31
cooking	3	0.93	sun	1	0.31	teaching how to fish	1	0.31
tree	3	0.93	key	1	0.31	plough the sands	1	0.31
baby	3	0.93	anchor	1	0.31	inspiration	1	0,31
chaos	3	0.93	mirror	1	0.31	torrential rain	1	0.31
person	3	0,93	flower	1	0.31	family	1	0.31
making lace	3	0.93	mountain	1	0.31	oak tree in a forest	1	0.31
absurdity	3	0.93	power station	1	0.31	lion	1	0.31
art	3	0.93	moon	1	0.31	school of experience	1	0.31
soil	3	0.93	diamond	1	0.31	shoe	1	0.31
staircase	3	0.93	dynamic time	1	0.31	sugar stirred in tea	1	0.31
snack joint	2	0.62	nature	1	0.31	independence	1	0,31
workshop	2	0.62	birth	1	0.31	pasta/spaghetti	1	0.31
gardening	2	0,62	bricklayer	1	0.31	sponge	1	0.31
bank	2	0.62	world	1	0.31	supermarket	1	0.31
scout camp	2	0.62	sieve	1	0.31	train	1	0.31
drawing a picture	2	0.62	cake	1	0.31	summer camp	1	0.31
laboratory	2	0.62	bridge	1	0.31	learning to swim	1	0.31
engineer	2	0.62	sand dunes	1	0.31	fruit	1	0.31
museum	2	0.62	carpenter	1	0.31	masterpiece of Mimar Sinan (Ottoman Architect)	1	0.31

Themes Extracted from the Metaphors

By taking literature on constructivist approach into account, the metaphors and codes were analyzed and the following thirteen main themes were extracted (Figure 1). Among these themes, the participants considered constructivist education most commonly as "an education which provides the opportunity to learn by discovering and doing". Secondly, metaphors related to the theme "an education that constitutes a

whole by constructing new knowledge from prior knowledge" were expressed. The least produced metaphors were related the theme that considers constructivism as "an education that is composed of a number of interconnected complicated networks of information" and "an education that employs different/alternative methods and techniques and tools of evaluation and assessment."

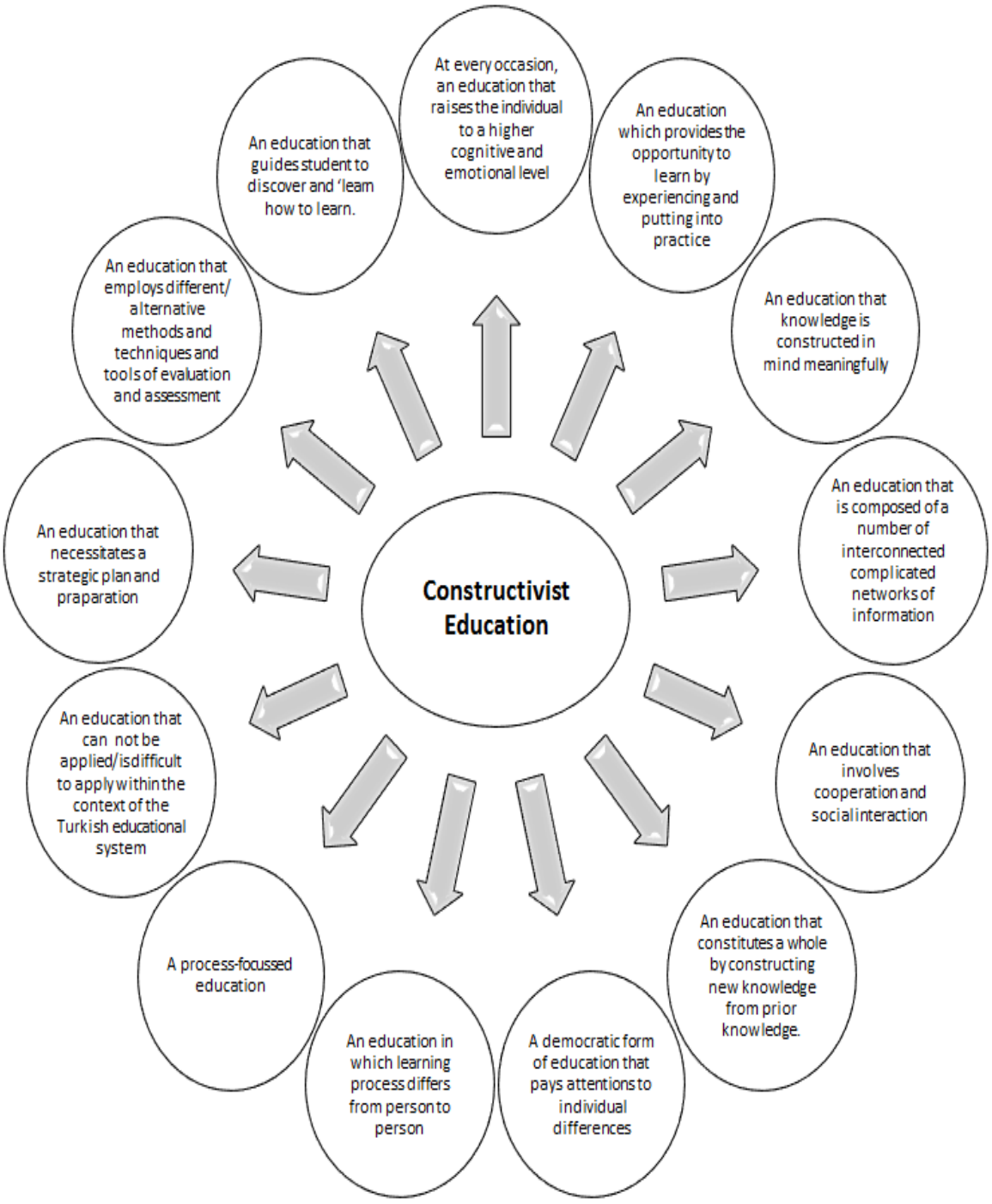


Figure 1. Thirteen themes extracted regarding to constructivist education

Theme 1: An education provides an opportunity for students to learn by doing and experiencing. This theme encompassed 37 of the metaphors that were generated by the 69 teacher trainers. The participants perceived that constructivist education provided learning in which student learned by doing and experiencing and created his or her own worlds through the experiences he or she conducted. Some of the participants' thoughts on this theme are presented below:

Table 4. Distribution of metaphors according to themes

Themes	*f* %	Constructivist education metaphors	*f* %
An education that provides an opportunity to learn by doing and living	69 21,36%	Harmonious music 1, workshop 3, baby 2, riding a bicycle 1, puzzle 3, lifejacket 1, democracy 1, school of experience 1, sea 2, deep canyon 1, nature 1, wall artist 1, threading a needle 1, construction 7, cook and eat it yourself 1, bird 2, laboratory 1, lego 1, carpenter 1, fruit 1, engineer 1, museum 1, game 4, play-do 1, student-centered education 6, art 1, supermarket 1, theatre 2, soil 2, a journey 3, learning to swim 1, a cognitive process 1	37 18,32%
An education that constitutes a whole by constructing new knowledge from prior knowledge	53 16,41%	tree 2, moon 1, puzzle 1, going to the mountain 1, democracy 1, sieve 1, factory 1, sun 1, daily newspaper 1, lace making 1, inspiration 1, person 3, construction 22, chaos 1, bridge 1, lego 1	23 11,39%
An education that guides student to discover and learn how to learn	41 12,69%	inclination 1, mirror 1, independence 1, garden 1, fishing 1, understanding of teaching 1, banking 1, puzzle 1, cultivating a rose from a bush, anchor 1, flower 1, sea 1, birth 1, ship 1, sculptor 1, light 1,construction 1, scout camp 1, sand dune 1, laboratory 1, lego 1, luxury car 1, origami 1, game 1, student-centered education 4, pilot flame 1, compass 1, sponge 1, theatre 1, jigsaw puzzle 4, guide 4, journey 1, cognitive process 1	32 15,84%
A democratic form of education that pays attention to individual differences	36 11,15%	harmonious music 5, family 1, shoes 1, garden 2, gardening 2, oak tree in a pine forest 1, democracy 3, sea 1, factory 1, rainbow 1, construction 3, mixed soup 1, cup cake 1, lego 3, museum 1, game 3, large cake 1, picnic 1, chess 2, theatre 1, puzzle 2	21 10,40%
An education that cannot be applied/is difficult to apply within the context of the Turkish educational system	24 7,43%	To tread water 1, to make lace 1, construction 1, mold 1, luxury car, table 1, clamp 1, film with just fourteen words 1, game 1, nonsense 3, utopia 10, life 1, journey 1	13 6,44%
An education that knowledge is constructed in mind meaningfully	18 5,57%	bank 1, baby 1, puzzle 1, factory 3, construction 3, lego 2, student-centered education 2, jigsaw puzzle 1, cognitive process 4	9 4,46%
An education that necessitates a strategic plan and praparation	17 5,26%	balloon 1, sugar stirred in tea 1, factory 1, construction 4, lego 1, egg and tomato omelette 1, furniture 1, engineer 1, student-centered education 1, spider 1, spider's web 1, torrential rain 1, chess 1, theatre 1	14 6,93%
At every occasion, an education that raises the individual to a higher cognitive and emotional level	16 4,95%	sea 1, factory 2, construction 1, lego 1, staircase 1, student-centered education 1, art 1, chess 1, theatre 1, seed 1, cognitive process 1	11 5,45%
An education that involves cooperation and social interaction	16 %4,95	harmonious music 1, garden 1, sea 1, factory 1, hamster wheel 1, construction 1, ant 1, bring your own food and cook it 1, table 1, game 1, theatre 2, jigsaw 1	12 5,94%
An education in which learning process differs from person to person	16 4,95%	snack joint 2, sea 1, diamond 1, construction 1, season 1, masterpiece of Mimar Sinan (Ottoman architect), paradox 1, art 1, earth 1, puzzle 2, cooking food 1, journey 1	14 6,93%
A process-focussed education	11 3,41%	tree 1, key 1, dynamic time 1, world, power station 1, factory 1, construction 1, internet 1, stability 1, jigsaw puzzle, journey 1	11 5,45%
An education that is composed of a number of interconnected complicated networks of information	4 1,24%	chaos 2, student-centered education 1, puzzle 1	3 1,49%
An education that employs different/alternative methods and techniques and tools of evaluation and assessment	2 0,62%	student-centered education 1, theatre 1	2 0,99%

"It is important in constructivist learning to form relationships with one's own existence, experience and real life." [231, F, AP]
"It is necessary to strive 'in life'. Constructivist education necessitates student to apply real effort so as to obtain knowledge." [271, M, A]
"Such an understanding of education focuses on experience and sharing and necessitates doing and sharing." [218, M, P)

Theme 2: An education that constitutes a whole by constructing new knowledge from prior knowledge. This theme encompassed 23 metaphors generated by 53 teacher trainers. The participants described how relationships are formed between prior and new knowledge and indicated that prior or initial knowledge constitutes the starting point of any learning. The thoughts of some of the participants are given below:

"We cannot have one piece (of knowledge) without another relating piece being present. By attaching one piece of information to the one that goes before the existence of knowledge takes shape and the first stage comes into being from which the successive stage can take root and through this process a totality of knowledge is created." [309, M, I]
"Without the foundations (of a building) being firm, it is impossible to add upper new floors or layers" [20, F, A]
On a firm foundation, new knowledge can be supplied continuously."[158, F, AP]

Theme 3: An education that guides student to discover and 'learn how to learn'. This theme encompassed 32 metaphors generated by 41 teacher trainers. The participants held the view that students were guided to discover new knowledge through asking questions and to learn to learn by realizing how they learn. Through such a system it was clearly ascertained that student-centered education was actively applied and students became the main starting point in their learning. Some of the participants' views on this theme were as follows:

"If the correct actions are conducted in the correct order, the paper can assume an incredible shape and size. When knowledge can be applied by student, the correct tendencies or directions in his or her learning can be generated." [148, F, OP]
"(Constructivist education) does not provide ready information, but rather teaches how to access and reach knowledge, it conceptualizes (in students' minds) how that knowledge can be applied, teaches how to question, and conveys the importance of individual responsibility (to student)." [29, F, A]
"Every student is a construction worker, every teacher is an engineer...Workers constructing buildings" [279, F,I]

Theme 4: A democratic form of education that pays attentions to individual differences. This theme encompassed 21 metaphors generated by 36 teacher educators. In constructivist education, the fact that every student possesses different qualities and characteristics was stressed and this diversity was seen to contribute richness to the educational process. Furthermore, it was asserted that education taking individual differences without any discrimination or segregation should be ensured and this belief should form the central philosophy of the educational understanding. Some of the participants' viewpoints on these matters can be seen below:

"All individual values are carefully protected and processed (as part of the learning process)."[71, F, P]
"To enable the creation of a cake, different ingredients need to be brought together." [166, F, A]
"Gardening, because (the gardener) first should become acquainted with knowledge about the properties specific to every seed and flower and then prepare the necessary conditions (for growth) so as to provide the opportunity for every seed to become a shoot or a tree." [193, M, AP]

Theme 5: An educational approach that cannot be applied/is difficult to apply within the context of the Turkish educational system. This theme covered 13 of the metaphors engendered by 24 of the teacher trainers. According to the participants, constructivist education had been introduced in Turkey without a (sufficient) piloting process. The participants likened constructivist education to a ship being launched without a clear destination and without clear agreement as to its port of destination. The opinions of some of the participants are expressed below:

"It is far divorced from the teaching mentality of educators at every level of the Turkish educational system." [30, F, A)
"Only the affluent can embark on such a learning process, it is difficult to set such a process in motion in developing countries." [8, F, OP]
"The objectives of the approach that have been defended at a philosophical level have not been seen to have brought tangible benefits to students themselves." [85, F, A]
"(Constructivism) has not been sufficiently comprehended nor explained...it has been unsuccessful" [289, F, OP]

Theme 6: An education that knowledge is constructed in mind meaningfully. This theme encompassed nine methaphors generated by 18 teacher educators. They articulated the viewpoint that knowledge is fully realized through a cognitive process of construction. It was expressed that the knowledge that is presented as input is then processed and transformed into different forms (by the brain).

"It is a normal capability of the mind to interpret information. The educational approach (that you advocate) merely ensures a more qualitative application of this principle" [75, M, AP)
"It is a process that advances the (acquisition of) knowledge in the individual brain. [4, M, P]
"The gaps in attainment (observed through the application of the approach) become larger, smaller but they do not erode easily" [15, F, OP]
"The new methodology has been applied but has rendered results qualitatively quite different (from those anticipated)" [173, F, AP]

Theme 7: A form of education that necessitates a strategic plan and preparation. This theme encompassed 14 metaphors invented by 17 teacher trainers. According to the participants, before initiating reforms, a 'script' or plan of action and a thorough stage of preparation have to be conducted. The key to creating a durable foundation to an educational policy lies in a strategic plan and a well setout preparatory period. The views of some participants are cited below.

"When a new building is to be constructed, first plans are drawn up with clear specifications. Only according to these plans the necessary components or elements of the building construction are put in place." (264, M, I]
"The teacher must in advance, at least within his or her own mind (through preparation and planning) make such preparations so that there is clear conviction as to the learning outcomes that student will derive from the learning process." [118, F, AP]
"For this reason, every step taken in the educational process must be approach in a systematic and planned manner." [182, F, AP]

Theme 8: At every occasion, an education that raises the individual to a higher cognitive and emotional level. This theme covered 11 of the metaphors created by 16 teacher trainers. The participants expressed the opinion that through the development of higher-level cognitive skills, students became endowed with high level characteristics and competencies such as analysis, synthesis and creativity. Here are the views of some of the participants in this regard:

"Ensures the development of (cognitive skills such as) comprehension, assimilation and internalization" [120, M, AP]
"(Constuctivist education represents the development of) high level skills and competencies founded on the acquisition of essential information" [249, M, OP]
"At every stage and on every day (of the learning process) something is manufactured and there exists a spirit of creativity." [211, M, OP]

Theme 9: An education that involves cooperation and social interaction. This theme includes twelve metaphors generated by 16 teacher educators. The participants felt that in constructivist approach, cooperation between teacher and student and an emphasis on social interaction and collective learning were observed and valued. Within this spirit of cooperation, the responsibilities and tasks of all involved were clearly specified. The opinions of certain participants with regard to this theme are quoted below:

"All involved in the learning process, including the teacher must all 'get on board' so as to 'turn the wheel together'." [225, M, AP]

"While attaining success alone is often difficult, within a spirit of cooperation this success becomes much easier." [254, M, AP]

"With the action and contribution of all elements within the whole, a valuable final and total result is attained." [126, M, AP]

Theme 10: An education in which learning process differs from person to person. This theme covered 14 metaphors produced by 16 teacher educators. Every student possesses his or her own learning style. The process of learning reveals differences from individual to individual. The participants put forward the view that knowledge can assume real meaning when it is presented and delivered in a form particular to the needs and expectations of individual students. The opinions of certain participants are given below:

"Through the provision of knowledge to the individual person, things that are special and original to the individual may be created." [223, M, A]

"Everyone has a different understanding of knowledge." [176, M, P]

"(Knowledge) differs from person to person just as one's taste in art." [12, F, OP]

"Everyone can create (a meal) using a different method and bring out a different taste." [159, M, AP]

Theme 11: A process-focused education. This theme included 11 metaphors created by 11 teacher educators. Participants argued that learning required continuity and that knowledge was constructed during teaching-learning process. The views of some of the participants can be quoted below:

"It ensures that the learner enters a continually-changing cycle through the formation of a connection between process and product." [61, M, D)

"This reflects the learning and instruction process and new viewpoints with regard to the nature of knowledge within constructivist educational philosophy." [283, F, A]

"Educational is a continual process." [80, M, AP]

"Knowledge cannot be attained through a single individual and is experienced during the process in which knowledge is constructed." [54, F, OP]

Theme 12: An education that is composed of a number of interconnected complicated networks of information. This theme elicited 3 metaphors created by 4 teacher educators. Participants expressed constructivist education as an approach in which factors such as who, what, why and for what reason cannot described completely. The framework of the approach is not completely 'set in stone' and the relationship between the constituent elements remains not completely defined. The views of some of the participants can be read below.

"The framework of the thing to be learnt is not completely defined...in order to conduct these tasks, the subject must possess a number of quite highly-developed skills and abilities." [128, M, AP]

"It does not describe what, why and for what reason things are conducted. Those who share the learning experience are not spared from this perceived chaos." [67, M, OP]

Theme 13: An education that employs different/alternative methods and techniques and tools of evaluation and assessment. This theme encompassed two metaphors generated by 2 teacher educators. It was indicated that within constructivist education process, various methods and techniques are employed. In addition to traditional tools of evaluation and assessment, the necessity of using alternative and multiple measurement and evaluation methods was also emphasized. The views on certain participants in this regard were as followed:

"In a theatrical performance the necessary knowledge and abilities are not only conveyed by the enactment process itself but also by the methods used to relay that message to the audience." [266, M, A]

"Due to the fact that constructivist educational process encompasses numerous active learning methods, it is able to address all individuals." [272, M, A]

Comparison of Themes between the Department of Educational Sciences and the Other Departments

In this section, the themes that were generated from the metaphorical perceptions of participants of the Department of Educational Sciences and participants from other departments were compared. There was an attempt to highlight the similarities and differences in viewpoints of teacher educators in the Department of

Educational Sciences who teach pedagogical courses and their counterparts from the other departments who generally teach subject courses.

Table 5. Comparison of themes generated by teacher trainers in the department of educational sciences and other departments

	Educational Sciences		Other Departments	
	f	%	*f*	%
An education that constitutes a whole by constructing new knowledge from prior knowledge	24	22.2	29	13.5
An education that guides student to discover and learn how to learn	8	7.4	33	15.3
An education that provides student with an opportunity to learn by doing and experiencing	26	24.1	43	20.0
An education that knowledge is constructed in mind meaningfully	3	2.8	15	7.0
A democratic form of education that pays attentions to individual differences	17	15.7	19	8.8
On every occasion, an education that raises the individual to a higher cognitive and emotional level	3	2.8	13	6.0
An education that involves social cooperation and social interaction	3	2.8	13	6.0
An education that is composed of a number of interconnected complicated networks of information	3	2.8	1	.5
An education in which the learning process is different from person to person	6	5.6	10	4.7
A process-focussed education	2	1.9	9	4.2
An education that cannot be applied/is difficult to apply within the context of the Turkish educational system	7	6.5	17	7.9
A form of education that necessitates a strategic plan and preparation	4	3.7	13	6.0
An education that employs different/alternative methods and techniques and tools of evaluation and assessment	2	1.9		
Total	108	100.0	215	100.0

According to these findings, the top five-ranked themes for both the Educational Sciences Department and the other departments were identical. In both groups, "*It is an education that provides an opportunity for students to learn by doing and experiencing"* was ranked first and "*An education that cannot be applied/is difficult to apply within the context of the Turkish educational system*" was ranked fifth. For the other three themes, it was observed that the rankings and associated themes differed. In the other departments, the themes "*An education that guides students to discover and how to learn*" and "*An education that constitutes a whole by constructing new knowledge from prior knowledge"* were ranked second and third place respectively.

Comparison of Themes according to the Programs in the Department of Educational Sciences

The differences of themes according to the programs of teacher trainers in the Department of Educational Science were also examined. The main programs in the Department of Educational Sciences under discussion are: Curriculum and Instruction (CI), Educational Administration (EA), Psychological Counseling and Guidance (PCG), Measurement and Evaluation in Education (ME) and other smaller programs. Although the number of participants from the CI department was larger than those from the other programs, it was observed that the perceptions were similar.

Approximately 25% of the participants from the programs of CI and EA described constructivist education as one that "*constitutes a whole by constructing new knowledge from prior knowledge*." Another theme that emerged with a similar level of agreement was "*An education that provides an opportunity to learn by doing and living*". The themes that occupied the top two rankings for the CI and EA programs, occupied second and third position among the themes ranked by those in the PCG program. It is notable that in the PCG program, the theme *"A democratic form of education that pays attentions to individual differences*" emerged in the first position. Furthermore, although the number of participants from the ME program was limited in relation to those in the other programs, the theme coming into prominence was "*An education that provides an opportunity to learn by doing and living*".

Table 6: Comparison of the themes according to the programs of teacher trainers in the department of educational sciences.

	CI		PCG		EA		ME		Others	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
An education that constitutes a whole by constructing new knowledge from prior knowledge	13	25.5	4	15.4	6	28.6	1	12.5		
An education that guides student to discover and learn how to learn	5	9.8	2	7.7	1	4.8				
An education that provides student with an opportunity to learn by doing and experiencing	12	23.5	4	15.4	6	28.6	4	50.0		
An education that knowledge is constructed in mind meaningfully	1	2.0			2	9.5				
A democratic form of education that pays attentions to individual differences	8	15.7	6	23.1	1	4.8	2	25.0		
On every occasion, an education that raises the individual to a higher cognitive and emotional level			1	3.8	1	4.8	1	12.5		
An education that involves cooperation and social interaction	1	2.0	1	3.8	1	4.8				
An education that is composed of a number of interconnected complicated networks of information	1	2.0	1	3.8					1	50.0
An education in which the learning process is different from person to person	3	5.9	2	7.7	1	4.8				
A process-focused education	1	2.0							1	50.0
An education that cannot be applied/is difficult to apply within the context of the Turkish educational system	5	9.8	2	7.7						
A form of education that necessitates a strategic plan and preparation			3	11.5	1	4.8				
An education that employs different/alternative methods and techniques and tools of evaluation and assessment	1	2.0			1	4.8				
Total	51	100	26	100.0	21	100	8	100	2	100

Discussion and Suggestions

In this study, in order to symbolize the participants' perceptions towards constructivist education, the metaphors that they used were grouped under thirteen theme headings. Under the theme "*An education that provides an opportunity to learn by doing and living*", one of the themes emerged from a number of metaphors, the participants expressed that constructivist education ensures students learn by doing and construct their own worlds with their experiences. By providing students with sufficient opportunities and creating learning environments in which they can learn by doing and put their ideas into practice, they may be clear of traditional instruction practices. In studies conducted by Candar and Sahin (2013) and Akpinar and Ergin (2005), it is underlined that by participating in lessons in which students carried out activities, enjoyed experiences, and learned by doing and experiencing, they would not be overloaded with information; instead they would gain responsibility of their learning and be able to create products or pieces of work that they could then display or demonstrate to other.

Those participants who expressed sentiments in line with the theme heading, "*An education that constitutes a whole by constructing new knowledge from prior knowledge*" agreed that prior knowledge of students are determined and taken into account at the center of the learning process and meaning was realized when a connection between prior knowledge and new knowledge was established. That is to say, if one wishes to acquire all knowledge on a particular subject, one must pay attention to the learning experiences that have occurred previously. It is stated that an opportunity to fuse new and prior knowledge, to apply new knowledge and to determine strategies for subsequent topics should be ensured (Dundar, 2015; Ozden,

Onder, & Kabapinar, 2015). During the knowledge formation period, one needs to pay attention to prior knowledge and reform it in the context of new experiences. According to participants who offered views in line with the statement that constructivist education is *"an education that guides students to discover and learn how to learn,"* they purported that in such environment, teachers guide students to discover by asking questions and to realize and learn how to learn. It was also argued that discovery emerges when students question their own thoughts as to what knowledge is and how it takes shape. Similarly, Aktepe, Tahiroglu and Acer (2015) states that in constructivist approach, the opportunity to learn by way of discovery should be given to students, choices should be offered and various instructional approaches should be developed. However, in a study carried out by Akdeniz and Akbulut (2010), it was identified that materials and tools that encourage student to discover knowledge were not used widely or sufficiently, deepening activities were not developed so as to shed lights on areas in which subject knowledge was deemed inadequate and relation of topics to everyday real-life experiences was not established sufficiently.

Those participants who created metaphors in line with the theme *"a democratic form of education that pays attentions to individual differences"* emphasized that the main goal of educational systems was to raise individuals who were aware of universal social values, far from prejudice, respectful to different cultures, freedom, justice and liberty and who had a desire to live at peace with nature and humanity. They also articulated the need to bring learners together in order to support interaction between learners and to create a solid infrastructure for the community to move towards a common goal. The participants considered that constructivist education united different cultures and regarded these different groups as a valuable resource, helped to reduce prejudices, ensured equality of opportunities in education and facilitated learning. This constituted a great enhancement to the learning and teaching environment. These results are consistent with the related studies by Gunay and Aydin (2015), Gunay, Aydin and Damgaci (2015) and Bennett (2001), who expressed that among the aims of constructivist education, there are items stating the reduction of prejudice and positive contribution to the content of educational programs.

Those who believed in that constructivism in Turkish Education System would not be able to make any progress because of several problems such as insufficient infrastructure, traditionalist teachers at every level of the education system and poor understanding of constructivism. In research conducted by Taskin-Can (2011), it was observed that teacher candidates persisted with teacher-centered perceptions of educations and as one of reasons; they pointed out the traditional approaches to which they had been exposed during their education. Moreover, Gul, Dilci and Arseven (2009), in their study, found that students looked at constructivism positively but have deficiencies in its implementation, and they suggested that successful implementation of this approach should be supported and consistency of courses with this approach should be ensured. With regard to the theme heading "*An education that knowledge is constructed in mind meaningfully*", the finding that construction of knowledge takes place in one's mind is parallel to the results found in the study by Demir (2010).

With regard to the theme heading, that constructivism was a *"A form of education that necessitates a strategic plan and preparation"*, Yıldırım and Donmez (2008) argue that students and teachers must undertake a number of preparatory activities, review lesson and work books prior to lesson, scan teacher manuals and prepare instructional materials so as to make learning more beneficial and effective. Moreover, it is expected that with this goal in mind, teachers acquire necessary information, act in a more conscious and sensitive manner and adopt new processes and roles. For those whose views coincided with the theme heading that the approach was *"At every occasion, an education that raises the individual to a higher cognitive and emotional level,"* in constructivist education, students acquire high level cognitive abilities such as analysis, synthesis and creativity and high-level affective abilities such as the ability to make judgments. Furthermore, the participants indicated that within this process, they assisted students to reconstruct knowledge. They also emphasized that they helped students in learning through activities that were close to real-life situations, and contributed to the development of critical thinking skills.

With regard to the theme heading that constructivism was "*An education that involves cooperation and social interaction,"* the participants emphasized the students should be guided to study collaboratively by participating in group activities and interaction between teacher and student should be established. Likewise, Erdem and Demirel (2002) highlighted that in order to ensure learning that is authentic, communication between student and teacher needs to be directed in a positive manner. Under the theme

heading of "*an education in which learning process differs from person to person*" the way in which the connection between concepts already established in the mind and newly learned concepts may differ from person to person. The way in which new knowledge is incorporated into student's present conceptual framework, may depend on both students cognitive framework as well as the nature of the knowledge conveyed. For this reason, each individual can interpret the same knowledge and experiences differently. However, in their study, Bozdogan and Altuncekic (2007), it was expressed that learning process differing from person to person may make class management problematic.

Those whose thoughts were grouped under the theme heading "*A process-focused education'* expressed the view that student's active construction of knowledge throughout the learning process was more effective. In order to create the desired behaviors on the part of students, the constituent parts of the approach must be carried out carefully, extended over time, and followed in a systematic fashion. Those who agreed with the statement that constructivism was *'An education that is composed of a number of interconnected complicated networks of information'*, expressed the perception that constructivist education is an approach that is not completely defined. According to these participants, the framework of the approach is not clear and the relationship between the constituent parts is uncertain. Cetin (2012) stresses that in order to describe complicated, interwoven problems arise in different areas of study, it is necessary to acquire critical thinking skills. Finally, under the theme heading '*An education that employs different/alternative methods and techniques and tools of evaluation and assessment'* it was established that in constructivist education students' thinking processes are enhanced by way of alternative methods and techniques and, at the end of the process, an opportunity to evaluate the products and work created is provided. This is in keeping with the findings of Calık's (2007) study.

Furthermore, by embarking from the metaphors and explanations provided by the participants, a comparison was carried out according to the departments of the participants concerned. First, there was an attempt to establish the differences and similarities between the Department of Educational Sciences and the other departments and then between the programs at the Department of Educational Sciences. The most important practitioner in the field of constructivist education is teacher himself or herself. For this reason, it is very important that teacher is well-trained in constructivist methodology and thinking. Actually, not only teacher candidates but also and primarily teacher trainers are expected to possess the adequate competencies that constitute the most essential element of constructivist education. From that perspective, it is important to determine the negative metaphors generated in the study by the teacher trainers regarding constructivist education and take concrete steps to tackle deficiencies. This is extremely essential in ensuring a positive contribution to teacher training programs.

The different paradigms that direct teacher education have led to numerous conflicts in approaches regarding teacher training and one of these competing areas is between subject knowledge versus pedagogical knowledge. The arguments as to whether teacher training should consist mainly subject field courses and knowledge or pedagogical courses and knowledge should be prioritized has been continuing (Yildirim, 2011). As part of this study, the themes that emerged from the metaphorical perceptions of both participants in the Department of Educational Sciences who teach pedagogical courses and those in the other departments who teach subject courses were compared. Both of these groups of teacher trainers play an important role in current teacher training and the results indicated that there is not any significant difference in their perceptions. Both groups of teacher trainers perceived constructivist education as a form of education centered on learning by doing and experiencing and stressed the importance of the teaching-learning process of the constructivist approach. The other themes coming into prominence were constructing knowledge on prior knowledge, guidance role of teachers, individual differences in instruction and democratic education. On the other hand, the general similarities between the programs in the Department of Educational Sciences were also noticed when these were compared. Those from the CI and EA programs stressed the importance of establishing relationships between new and prior knowledge and learning by doing and experiencing. That is, they emphasized the construction of knowledge and teaching-learning process of constructivist education. Nevertheless, those from PCG program focused on the educational environment of constructivist education since they often expressed democratic education based on individual differences. As for participants from the ME program, they also stressed learning by doing and experiencing and so underlined the learning-teaching process of this approach.

Whatever the teacher trainers' department or program is, when the themes were compared, it was noticed that they perceive Piaget's cognitive constructivism as its basis. Although there were few participants that stressed the social dimension in their responses, the number at the Department of Educational Sciences were even fewer in number. One of the reasons for referring cognitive constructivism mostly might be the criticisms toward social constructivism. Because in social constructivism, social interaction is very important and knowledge is formed through social interaction with other people. However, the claim that everything learned is because of interaction with the social environment may be regarded as an exaggerated one (Schunk, 2011). While the effect of social interaction on the construction of knowledge is accepted, the way that social constructivism is unable to explain how one constructs knowledge individually has been criticized (Baviskar, Hartle & Whitney, 2009). An interesting finding is that the teacher trainers consider constructivism is difficult to apply either in the Turkish educational system or in general. The corresponding theme was placed at the fifth. As a matter of fact, a number of factors that prevent the successful application of constructivist approach can be explained. Constructivist applications are often time-consuming (Mirzaoglu, 2010). There is a limited time and lack of clarity as to whether learning objectives have been addressed (Klein cited in Simsek, 2004). Educational programs and learning designs attempting to address the interests of students make the design and planning of lesson instruction difficult (Brooks & Brooks,2001). The large number of activities and high self-confidence might cause unintended learning or the inadequacy of teacher when faced with a confusion of knowledge to be learned might cause a negative effect on learning (Grasel, Prenzel & Mandel cited in Simsek, 2004). Finally, factors such as lack of teachers equipped with competencies for implementing constructivism, disadvantageous physical environment and conditions of the school hinders the successful implementation of this approach difficult.

At this point, it is pleasure to reveal that whatever their department or program is, participants did not display any erroneous understanding regarding the key concepts at hand with regard to constructivist approach. Even though they might point out an aspect of this approach, all perceive it correctly. This result raises the expectation that teacher-trainers can reflect their perceptions into practice and will be able to equip teacher candidates with adequate theoretical knowledge and practical skills regarding constructivism.

For this reason, to better understand the thoughts of participants with regard to the issue of constructive education, new studies will need to be conducted. Furthermore, it may prove useful to elicit the perceptions of students at any stage of schooling with regard to constructivist education. Finally, the themes of "*An education that cannot be applied/is difficult to apply within the context of the Turkish educational system"* and "*An education that is composed of a number of interconnected complicated networks of information*" that arose within the framework of this research may be subjects deemed worthy of more extensive study. The existence of misconceptions regarding constructivism among teacher trainers can be further studied because these misconceptions may highlight serious problems or deficiencies with regard to the implementation of constructivism. Fortunately, in this study, misconceptions were not encountered, this pointed out the adequacy of teacher trainers' theoretical knowledge. Next, practical knowledge and skills can be investigated and results can be compared.

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