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The Predictive Power of Turkish Teachers' Reflective Thinking Skills Perceptions in their Problem Solving Skills Perceptions

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ABSTRACT

The Turkish education program has a great importance in terms of increasing the quality of education and training process and determining and developing the cognitive skills of students. The explanation of the relationship between the high-level thinking skills of Turkish teachers responsible for teaching the program and the Turkish education program reveals the necessity of the study. Accordingly, this research was created in order to determine the relationship between reflective thinking skills perceptions and problem solving skills perceptions that should be present in Turkish teaching. The sample of the study consists of 106 Turkish teachers who are working in eight districts of Kars Province. In this study, the Reflective Thinking Tendency Scale (YANDE) and Problem Solving Inventory (PSI) were used. The data were analyzed using descriptive and inferential statistical methods. According to the findings, the relationships between total and sub-dimensions of Turkish teachers' reflective thinking skills perceptions and their problem-solving skills perceptions were moderate. According to the findings; continuous and purposeful thinking, open-mindedness, questioner and effective teaching, teaching responsibility and scientificity, predictive and sincerity and professional perspective sub-dimensions of reflective thinking scale do not significantly predict any sub-dimension of problem solving. However, it is observed that the 'researcher sub-dimension of the reflective thinking' scale significantly predicts problem solving total scores, hasty approach scores, thinking approach scores and avoidant approach scores. The relationship between total and sub-dimensions of reflective thinking skills perceptions of Turkish teachers and total and sub-dimensions of problem solving skills perceptions was found to be at a moderate level. These thinking skills should be considered when planning activities in undergraduate and professional education to develop reflective thinking skills perceptions and problem solving skills perceptions of Turkish teachers.

Key words: Problem Solving Skills Perceptions, Reflective Thinking Skills Perceptions, Turkish Language Teaching Program

INTRODUCTION

'Thinking is the disciplined form of observation, experience, intuition, reasoning and the conceptualization of knowledge obtained by other channels as well as application, analysis and evaluation" which is the main point of education' (Özden, 2005, p.139). Thinking skill is a skill field that can be taught besides being a talent. In environments where educational processes are carried out, using the reflective thinking method, teachers should also be able to teach thinking critically, showing their productiveness, acting in a solution-oriented manner, as well as progress in teaching point (Uyanık, 2017).

Language is important in teaching these thinking processes. Demir (2009) explains the relationship between language and thought as follows: 'The inner self of the individual consists of the thought system. Anyone who dreams, thinks and can conceive, puts the results of all these in his words and behaviors that are outside of his self. The thoughts realized in the mind are transformed into verbal expressions through language (p.5).' When this relationship between thought and language, which is evaluated as a means of transmission of feelings and thoughts about the internal life of the individual, is examined carefully, we see that language is the most important tool in teaching thinking processes in educational environments.

Within the framework of the Turkish curriculum, the desired development of the individual in the areas of language skills is possible by providing functionality to high-level mental processes such as understanding, questioning, creativity, thinking, analyzing, interpreting, associating and evaluating. In this way, the term literacy appears to be an effective way to bring functionality to language education. Literacy is defined as a metacognition activity in which the individual determines his/her interest and goal in reading and

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writing. The person who gains such a literacy skill identifies the problems related to reading and writing by himself, corrects his mistakes if any, makes the necessary arrangements and checks the process himself again (Collins, 1994). Along with reading and writing activities, briefly, literacy is a term related to the individual's perception, understanding and understanding of life and objects and events within this life and giving a meaning to all relations in his social life (Aşıcı, 2009). When teaching a language, the qualification of the instructor is very important in order to provide functionality to the higher level mental processes. Therefore, it is important for the teachers who are teaching the language to develop a good communication with their students, to prepare a lesson environment that reflects their thoughts to the other side and also for the prospective teachers who will teach Turkish language to be involved in the language teaching process having acquired the said skills in order for the students to be trained at the desired level (Şahin, 2011).

In the reflective thinking, which is important in the education and training processes, the student or prospective teacher or teacher enters into a conscious and active process by concentrating on problem solving. In the process of learning and teaching, teachers emphasize that when they observe their students and communicate with families during this process, they notice the problems more quickly and act in a solution-oriented manner. Soylu and Soylu (2006) evaluate the scientificness of problem solving as a method and emphasize the necessity of using critical and reflective thinking skills perceptions in order to solve a problem.

In terms of problem solving skills perceptions, having this skill field is what makes a person different in society. Such a skill is very important in the conditions we are in and takes the first place as a skill which is aimed to be gained to the students while determining the objectives in education and training systems. To be in accord with the requirements of our age, a method that focuses on problem solving should be determined as the teaching method (Kılıç & Samancı, 2005).

In this context, it is important for Turkish teachers who are responsible for the use of the Turkish Teaching Program to explain the relationship between high-level thinking skills and the curriculum. This study was carried out to reveal and determine the contribution of teachers to students' cognitive and intellectual skills using Turkish Language Teaching Program (2019).

Turkish teachers, both as role models and through basic skills of Turkish lesson (listening, speaking, writing, reading) and literacy, will be able to teach individuals the 'ability of solving the problems' against the problems they will encounter in daily life. Therefore, at every stage of the education process, educational situations which give students opportunity to learn by experiencing first hand should be organized for problem solving (Erdem, 2006). Teachers who use the reflective thinking method are effective guides in the education and training process. Therefore, teachers with this skill guide their students in obtaining the information they want to get and prepare environments where students can express their thoughts freely (Ersözlü, 2008). In this way, the mind becomes involved in a conscious and active process by focusing on problem-solving skills and the problem itself in the process of reflective thinking. In the light of these findings, it is necessary to examine the predictive power of reflective thinking perceptions on Turkish teachers' problem solving skills.

LITERATURE REVIEW

Turkish Language Teaching Program

Language skills and mental skills related to reading, writing, listening / watching and speaking in the education process will enable students to use them lifelong, to improve themselves personally and socially. In addition, the Turkish Lesson Curriculum (2019), which is structured with integrity, covers these skills and is seen as a prerequisite to acquiring skills in all fields.

With the Turkish Language Teaching Program, which is organized according to the general aims and main principles in the education specified in the Basic Law of National Education No: 1739, the students are expected;

- To take the skills of listening or following, reading and writing, speaking areas to the next level,
- To use Turkish correctly and carefully, being aware of the rules of language,
- To reach the pleasure and sensitivity of using the language by increasing vocabulary, based on what they read and listen to; to increase their mental competence,
- To increase the interest in reading and writing and to gain habits in this direction,
- To ensure that they can comprehensibly communicate their ideas and suggestions along with their feelings and thoughts about a subject in a linguistic and written manner,
- To develop research, questioning, analyzing and structuring skills in order to reach information,
- To develop skills regarding access to information from printed and multi-media materials, classification of information in a certain order, research, utilization of information and generating new knowledge,
- To comprehend and critically evaluate the information read,
- To ensure that they attach importance to national, cultural, historical, spiritual and social values and develop national awareness,
- To raise awareness and care about aesthetic and artistic values realized at national and international level (MEB, Turkish Language Teaching Program, 2018).

According to these principles and based on the constructivist approach, the MEB Turkish Language Teaching Program and Guide are prepared with an understanding that focuses on the students and the practices. In the student-centered constructivist system, it is aimed for students to develop their mental skills and to combine the knowledge.

Literacy

Literacy, the situation starting with vocalization and interpretation of writing symbols, by using this skill effectively,

to understand the facts, events and objects in more detail and express their essence by adding their self to his understanding. Literacy, which is a way of interaction, is a way of understanding, interpreting, sharing and transferring the knowledge, skills and social rules in the society to the next generations (Altun, 2005).

UNESCO (1987), approaching the concept of literacy at three levels, defines it as the first part is basic literacy; the second part is functional (literacy); the third part is multi-functional literacy:

- The first part includes basic reading and writing skills such as vocalizing words and understanding sentences.
- To The second part includes using the knowledge and abilities of the individual about reading, writing and arithmetic in the personal, social and cultural area.
- The third part aims at enhancing one's capacity to the maximum, it involves not only self-reading and writing but also efforts to make the society progress.

A multi-functional literate individual has features such as self-realization, deep values, understanding complex problems, developing creativity and having a comprehensive world view (Güneş, 1997).

Accordingly, it is observed that the first and second levels are associated with literacy Turkish curriculum, while the third level literacy is related to the reflective thinking and problem-solving skills perceptions of the study.

Literacy is an educational term that expresses many mental skills, communication skills and attitudes that it presents by using language, beyond reading and writing (Aşıcı, 2009).

Reflective Thinking Skills Perceptions

The word reflection means communication and it further means 'Making connections between a subjective life and the outside world; for example, the individual's thinking of the qualities, emotions or attitudes he/she conjectures in an object, person or social cluster as if they really exist there (TDK, 2011). It is the ability of an individual to think of the consequences of situations or events and to exhibit attitudes and behaviors accordingly.

When we consider the concept of reflective thinking, which consists of the word reflection, we see that the concept of reflective thinking was first introduced by Dewey in 1909 (Ergüven, 2011). Dewey (1910) suggests that reflective thinking is an active, persistent and careful consideration of a belief or supposed form of knowledge, of the grounds that support that knowledge and the further conclusions to which that knowledge leads.

Rodgers (2002) divides a planned reflection into six stages in line with Dewey (1910):

1. An experience,
2. Spontaneous interpretation of this experience,
3. Nomenclature of problems or questions arising from this experience,
4. Producing possible explanations about the problem or questions,
5. Translating explanations into hypotheses,
6. Testing or checking selected hypotheses (p.856).

Schön (1983) expresses the need for reflective thinking in the areas of professional practice. Thanks to his observations, reflective thinking is seen as an important tool in the acquisition of professional knowledge. Schön (1983) evaluates reflective thinking under two headings: reflection-in-action and reflection-on-action. According to him, while reflective thinking in action is related to reflective teacher education and reflective teaching and it is similar to Dewey's concept of reflection, reflective thinking on action occurs in framing unexpected problem situations.

In line with this information, it is seen that there are many definitions on reflective thinking. Reflective thinking is not separate from other thinking abilities. It also develops thinking skills such as creative thinking, critical thinking, problem solving and metacognitive thinking (Ersözlü & Kazu, 2008).

Reflective thinking is the process in which an individual acquires, shares and interacts with his/her own experiences during the active process of life. Reflective thinking allows the individual to use his/her knowledge in new situations and to learn from past experiences. For this reason, it is very important to determine the extent to which programs develop reflective thinking skills perceptions.

The role of reflective thinking in education is also undeniable. Reflective thinking teachers and students in education processes are the most important elements of this phenomenon. They interact with each other.

Yıldırım (2013), who considers reflective thinking from the perspective of teachers and students, states that: In the reflective thinking process, the teacher is the guide who monitors and directs the students' work instead of being the only information source in the school. While the book is normally the only source of information for students, with this system, the students are trained to use all the resources and educational technology in the educational environment effectively. Together with this, the student will evolve from being an information carrier between the teacher and the book to the level of being a researcher.

Reflective thinking enables students to develop their organizational and working skills, to put forward their goals and action plans, to evaluate themselves and their needs, to illuminate the deficiencies in their knowledge, to develop creative thinking and self-confidence; to evaluate, explain and inspect attitudes, feelings and thoughts; to solve problems and to produce new ideas.

Problem Solving Skills Perceptions

According to Dewey (1933), the problem is defined as everything that confuses the human mind, challenges it, and obscures faith (cited in Yeşilova, 2013). Jonassen (1989) defines the problem as a state of obscurity that occurs due to a situation in which the individual is trying to meet a requirement or fulfill a purpose. Arlin (1989), however, states that a problem is considered to be a real problem only when someone feels a need to find a solution to eliminate the negativities and incompatibilities (cited in Şendağ, 2008).

When the definitions and properties related to the concept of problem are examined, the properties of a problem situation can be summarized as follows.

1. There is a difference between the existing situation and the situation that should be,

2. Perception of this difference,
3. The perceived difference causes tension in the person,
4. The person's attempts to eliminate the tension,
5. Preventing the person's efforts to eliminate tension (Öğülmüş, 2001).

Problem concept then brings the concept of problem solving skills perceptions. Many definitions have been made on problem solving or problem solving skills perceptions. Some of them are defined as follows: According to Sonmaz (2002, as cited in Yeşilova, 2013), problem solving skills perceptions consist of three dimensions: emotional, social and cognitive. While the perception of the problem by the individual, the determination of the real problem, revealing many solutions and the application of one of these for the solution constitute the 'cognitive dimension', 'emotional dimension' is when the individual tries to make sense of his/her own emotions as well as others' and develop appropriate behaviors for this in order for the problem-solving process to be healthier and the collection of written sources, opinions or experiences about similar problems for the solution of the problem constitutes the 'social dimension'. In this context, in order to reach a certain goal, it is necessary to acquire some skills for solving problems. In this respect, it is an effective method for the development of individual skills. Büyüköztürk (2016) explains the problem-solving process as follows: The first thing individuals need to do to find a solution to a problem they encounter is to identify the problematic situation. Accordingly, assumptions are made about how the problem can be solved. Then, the necessary information is collected to provide a solution and the solutions are put into practice based on them. The experience, data and information obtained as a result of all treatments are evaluated and generalizations are made for similar problems that may be encountered in the following periods.

When we look at the problem solving process in terms of educational environment, any question or problem encountered is the beginning of the problem solving process. Under the supervision of teachers, students ask the most accurate and current questions about the problem or question. Then generalizations are made based on the data obtained. The students are encouraged to reason and ask the necessary questions during the solution stages. While problem solving process constitutes a process of rational thinking from a scientific point of view, it is directly related to terms and concepts such as reflective thinking, critical thinking, scientific method, questioning, decision-making and so on (Aksoy, 2003).

The Relationship between Turkish Language Teaching Program, Reflective Thinking Skills Perceptions and Problem Solving Skills Perceptions

The development of one's language skills in the Turkish curriculum is closely related to the functioning of high-level mental processes in all skill areas. The role of the instructor in the acquisition of higher-level mental processes during language teaching is of great importance. In this context, it is especially important for Turkish teachers to develop an environment in which they can develop empathy and reflective thinking with the students and for candidates being educated for this specific field to take part in the language teaching process having acquired all these skills for the competence of students whom they will educate (Şahin, 2011). According to Jay and Johnson (2002), the reason why reflective thinking is seen as important for prospective teachers is to teach teacher candidates 'thinking like teachers' in different ways in pre-service education studies and to facilitate the reflections of these skills by them (as cited in Köksal & Demirel, 2008).

Within the framework of the Support to Basic Education Project by the Ministry of National Education, reflective thinking is identified as one of the general competence areas for teachers to achieve certain gains (MEB, 2005, p: 8-9). In this way, teachers are required to create a competence area related to reflective thinking processes in order to give many competences to students who have a certain foundation in the education and training process as well as to keep these people in-house (Karahan & Atalay, 2016).

It emphasizes the characteristics of teachers who use reflective thinking method within the context of Turkish curriculum and it is expected that teachers will evaluate the students in the process by drawing attention to their roles in the process, note down the practices applied in this process and review these recorded information continuously (MEB, 2003). According to Van Mannen (1992), teachers with reflective thinking skills reconstruct situations related to learning-teaching process and re-examine the feedback about their own practices (as cited in Alp & Taşkın, 2012). According to Dewey, reflective-thinking teachers need to proceed with a scientific understanding of the subject in order to become more professional. A teacher, who has the opportunity to reflect his experiences, can easily evaluate students' behaviors. The teacher who uses reflective thinking technically does not focus solely on solutions and does not repeat the actions in the same way (1933 as cited in Tok, 2008). According to Selley (1999 as cited in Şahan, 2002), the teacher who uses constructivist teaching method should be open to ideas, modern, self-renewing, evaluating individual differences and being effective in the field as well as providing learning experiences instead of transferring knowledge and a model learning with the students. In this way, they carry out studies to solve the problems arising from the practices carried out in the learning-teaching processes or some deficiencies in the education system (Ünver, 2003).

Kızılkaya and Aşkar (2009) state that problem solving ability is one of the important skills that should be acquired by all individuals. Therefore, they mention that reflective thinking occurs when a problem is felt and states that the ability to reflect is best observed during problem solving processes. However, they mention that reflective thinking is similar to problem-solving process in terms of input-process-output, but what makes reflecting thinking different is that it is not required for reflective thinking to have a problem in the input part. In other words, while there is a problem situation or experience in reflective thinking, there is only one problem situation in problem solving.

Literacy is also used as expressing his individual wishes, feelings and thoughts in a complete and accurate manner by speaking and writing, understanding the discourses and

writings of people other than himself with their listening and reading skills and while doing all these, using their knowledge and abilities in social and cultural fields.

It is considered that individuals who are especially equipped with such literacy skills will have creative and deep values while developing their own knowledge, feelings and thoughts. However, it is believed that it will contribute to the solution and progress of the problems of the society in which the literate people live, as well as self-development (Güneş, 1997). Leu, Kinzer, Coiro and Cammack (2004, as cited in Yamaç, 2018) argue that literacy is a way to identify important problems, access information that works quickly, critically evaluate information, synthesize many sources of information to find the best solution and communicate effectively, literacy overall Turkish curriculum reflects the relationship between reflective thinking skills perceptions and problem-solving skills perceptions.

Considering the contribution of Turkish teachers, who are the practitioners of the Turkish Curriculum which provide intellectual language education, to the development of communication and thinking skills, teachers should first know and develop their own metacognition levels. For this reason, the individual who has the skills of self-regulation, critical thinking, asking questions, analyzing and evaluating, taking responsibility, literacy and having responsibility for the formation of metacognition will have reflective thinking and problem solving skills perceptions.

Purpose of the Study

The main purpose of this study is to investigate the relationship between Turkish teachers' reflective thinking skills perceptions and problem solving skills perceptions. For this purpose, answers for the following questions were sought:

1. Is there a significant relationship between total and sub-dimensions of Turkish teachers' reflective thinking skills perceptions (continuous and purposeful thinking, open-mindedness, questioning and effective teaching, teaching responsibility and being scientific; being a researcher, being foresighted and sincere; attitude towards the profession) and total and sub-dimensions of problem-solving skills perceptions (hasty approach, thinking approach, avoidant approach, evaluative approach, self-confident approach, planned approach)?
2. Do total and sub-dimensions of Turkish teachers' reflective thinking skills perceptions significantly predict their total and sub-dimensions of problem solving skills perceptions?
3. Which of the total and sub-dimensions of reflective thinking skills perceptions of Turkish teachers significantly predict the total and sub-dimensions of their problem solving skills perceptions?

METHODOLOGY

In this part of the study, information about the research method is given. The research methodology includes information on research model, population and sample, data collection tool and data analysis.

Research Model

This study is a procedural research in the relational screening model. The relational screening model is the general screening model that examines the presence and degree of co-variation between two or more variables. These relationships can be determined with the help of statistical methods such as correlation, t-test, variance analysis and multiple regressions. It is done in two ways: correlation and comparison (Karasar, 2004). In this study, the relationship between reflective thinking skills perceptions and problem solving skills perceptions of Turkish teachers giving education in Kars was examined. Reaching judgments about the universe and examining multiple variables together is the primary purpose of 'procedural statistics'. Accordingly, comparisons and relationships between variables are included in the scope of procedural statistics (Borg and Gall, 1989). In this study, Turkish teachers' problem solving skills perceptions were considered as dependent variables and reflective thinking skills perceptions were determined as predictive variables.

Population and Sample

This research was conducted in 2017-2018. The population of the study is Turkish teachers working in the central and central districts of Kars Province (Akyaka, Arpaçay, Digor, Kagizman, Sarikamis, Selim, and Susuz). The sample consists of 106 Turkish teachers determined by cluster sampling method which is not based from the universe to probability. Of these, 54 (50.9%) were female and 52 (49.1%) were male.

Data Collection Tools

The data were obtained by using the 'Problem Solving Inventory' (PSI) to determine teachers' perceptions of problem solving skills and 'Reflective Thinking Tendency Scale' (YANDE) to measure reflective thinking skill perceptions.

The Reflective Thinking Scale (YANDE) was developed by Çetin Semerci in 2007 to determine the reflective thinking of teachers. It is a five-point Likert-type scale. The rating of the scale is 'I totally agree (5), I mostly agree (4), I partially agree (3), I mostly disagree (2), I totally disagree (1)'. The Cronbach's Alpha coefficient of the scale is 0.90. In the analysis results for the scale, item total correlations ranged between 0.308 and 0.607, test-retest correlation was 0.742 ($p < 0.01$) and the correlation coefficient between the split-half scores was 0.77 ($p < 0.01$). According to the results of factor analysis, KMO value of YANDE scale was 0.909, Bartlett test value was 6811.46 ($p < 0.05$). The mean score of the teacher candidates was 171.50 and the standard deviation was 20.15. The scale consisted of 35 items, 20 of which were negative and 15 were positive. Negative items of scale are 1, 4, 6, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 20, 22, 26, 28, 31, 34 and positive items are 2, 3, 5 , 7, 19, 21, 23, 24, 25, 27, 29, 30, 32, 33, 35. 35 items with 7 factors were included in the scale. 35 items are divided into seven themes: continuous and purposeful thinking (1-7), open-mindedness (8-13), questioning and effective teaching (14-18), responsibility of teaching and scientificness (19-23), being a

researcher (24-29), being foresighted and sincere (30, 32, 33, 35), attitude towards the profession (31&34) (p.1360).

In the reliability analysis for this study; Cronbach's Alpha internal consistency coefficient for the whole scale was 0.87. Cronbach's alpha values in the subscales of the scale were; 0.60 for the continuous and purposeful thinking subscale, 0.68 for the open-mindedness subscale, 0.62 for the questioning and effective teaching subscale, 0.49 for the responsibility of teaching and scientificness subscale, 0.66 for being a researcher subscale, 0.72 for being foresighted and sincere subscale and 0.30 for the attitude towards the profession subscale.

The Problem Solving Inventory (PSI) was developed by Heppner and Petersen in 1982 and translated into Turkish by Şahin, Şahin and Heppner (1993). It is a six-point Likert type scale. The Cronbach's Alpha coefficient of the PSI scale was 0.88. During the scoring of the scale consisting of 35 items, items 9, 22 and 29 were excluded from the scoring, while items 5, 6, 7, 8, 10, 12, 16, 18, 19, 20, 23, 24, 27, 28, 31, 32, 33 and 35 were reversely coded. The Turkish version of the scale was applied to university students and the reliability coefficient of the whole scale was found to be $\alpha = .88$. The split-half reliability coefficient of the scale obtained by separating odd and even numbered items is $r = 0.81$. In the 65 reliability studies of the scale, the criterion-related validity method was applied and the correlation coefficient between the Beck depression inventory and STAI-T was .45. In the construct validity of the scale, it was stated that Beck Depression Inventory and STSI-T scores were significantly differentiated from the extreme groups. As a result of discriminant analysis, it is shown that the scale was able to correctly classify dysphoric and non-dysphoric groups by 94% and 55%; anxiety and non-anxiety groups, on the other hand, by 90% and 80%. 35 items are divided into 6 themes: Hasty Approach (13, 14, 15, 17, 21, 25, 26, 30, 32), Thinking Approach (18, 20, 31, 33, 35), Avoidant Approach (1, 2, 3, 4), Evaluative Approach (6, 7, 8), Self-confident Approach (5, 11, 23, 24, 27, 28, 34), Planned Approach (10, 12, 16, 19) (cited in Tok & Sevinç, 2010, p.72).

In the reliability analysis for this study; Cronbach's Alpha internal consistency coefficient for the whole scale was 0.89. Cronbach's alpha values in the subscales of the scale were; 65.5 for hasty approach subscale, 0.81 for thinking approach subscale, 0.78 for avoidant approach subscale, 0.84 for evaluative approach subscale, 0.39 for self-confident approach subscale and 0.81 for planned approach subscale.

Data Analysis

Data were analyzed for each sub-purpose of the study. Before analyzing the data, the missing and incorrect codes were reviewed. In this way, it was checked whether the data fulfilled the general conditions of parametric tests. Since the data provided the right conditions of parametric tests in the total and sub-scales of the problem solving inventory and the reflective thinking scale, the data showed normal distribution and the variances were homogeneous.

In order to examine the assumptions of the regression analysis in accordance with the first sub-purpose, outlier analysis was performed and large values of Mahalanobis distance value were excluded from the analysis. In the last stage, multicollinearity, variance swelling (VIF) and tolerance values were examined among the variables, and tolerance approaching to zero, VIF greater than 5, accompanied by two variances greater than 0.50 and condition index greater than 30 were not found. Multiple linear regression analysis was used to predict dependent variables in the study. While the dependent variable of the study is the scores obtained from the Problem Solving Inventory, the independent variables are the scores obtained from the sub-scales and the total of the Reflective Thinking Scale.

It is aimed to determine the extent to which the problem-solving skills perceptions are predicted by the scores obtained from the sub-scales of the Reflective Thinking Scale; attitude towards the profession, being a researcher, being foresighted and sincere, responsibility of teaching and scientificness, questioning and effective teaching, open-mindedness and continuous and purposeful thinking subscales. In this context, multiple linear regression analysis was performed. In this analysis, the order of entry of independent variables into equation is determined within the framework of statistical criteria. Independent variables are determined according to what is added in terms of their entry order in the equation (Tabachnick & Fidell, 2001). The significance level of .05 was taken as a criterion in the interpretation of the meaning state in the findings.

FINDINGS

In line with the first sub-purpose, the relationship between the total and sub-dimensions of Turkish teachers' reflective thinking skills perceptions (continuous and purposeful thinking, open-mindedness, questioning and effective teaching, responsibility of teaching and scientificness, being a researcher, being foresighted and sincere, attitude towards the profession) and the total and sub-dimensions of problem-solving skills perceptions (hasty approach, thinking approach, avoidant approach, evaluative approach, self-confident approach, planned approach) was examined. In addition, the second sub-purpose: 'Do the total and sub-dimensions of Turkish teachers' reflective thinking skills perceptions predict the total and sub-dimensions of their problem solving skills perceptions?'; the third sub-objective is 'Which of the total and sub-dimensions of Turkish teachers' reflective thinking skills perceptions predict their total and sub-dimensions of their problem solving skill perceptions?'. Arithmetic mean, standard deviation and correlation results of the variables are given in Table 1.

When the Table 1 is examined, the arithmetic mean of the dependent variables is between 37.0 and 14.7 and the standard deviations vary between 20.0 and 3.14. Dependent variables are measured using a six-point scale. In this respect, it is seen that arithmetic means are at medium level. Standard deviations of the independent (predictor) variables were 12.14 to 1.43; their arithmetic means vary between 29.8 and 1.57. The mean of the independent variables measured using the five-point scale was similarly high.

It is seen that most of the predictor variables in Table 1 have a moderate significant relationship with dependent

Table 1. Arithmetic mean, standard deviation and correlation results of total and sub-scales of reflective thinking scale and total and sub-scales of problem solving inventory

	$\bar{X}$	Ss	1	2	3	4	5	6	7	8
1	1.57	20.0	1	.746**	.777**	.701**	.654**	.725**	.742**	.360**
2	37.0	6.35		1	.343**	.596**	.223*	.296**	.257**	.110
3	24.9	4.19			1	.314**	.658**	.723**	.718**	.378**
4	19.6	4.09				1	.221*	.299**	.341**	.127
5	14.7	3.14					1	.579**	.732**	.343**
6	26.0	3.44						1	.660**	.373**
7	19.5	3.66							1	.386**
8	29.8	3.67								1
9	28.4	2.21								
10	23.8	1.51								
11	22.4	2.51								
12	26.3	3.25								
13	17.2	2.566								
14	9.08	1.432								
15	1.572	12.146								

	$\bar{X}$	Ss	9	10	11	12	13	14	15
1	1.57	20.0	.296**	.265**	.395**	.545**	.451**	.380**	.564**
2	37.0	6.35	.062	.058	.108	.309**	.289**	.156	.236*
3	24.9	4.19	.359**	.326**	.385**	.495**	.391**	.373**	.559**
4	19.6	4.09	.130	.068	.204*	.299**	.233*	.146	.260**
5	14.7	3.14	.245*	.289**	.377**	.440**	.302**	.361**	.487**
6	26.0	3.44	.351**	.345**	.417**	.480**	.410**	.373**	.566**
7	19.5	3.66	.318**	.276**	.471**	.480**	.375**	.398**	.561**
8	29.8	3.67	.318**	.330**	.402**	.480**	.363**	.226*	.718**
9	28.4	2.21	1	.519**	.310**	.240*	.316**	.356**	.581**
10	23.8	1.51		1	.267**	.389**	.242*	.319**	.568**
11	22.4	2.51			1	.666**	.539**	.401**	.758**
12	26.3	3.25				1	.618**	.436**	.826**
13	17.2	2.566					1	.497**	.745**
14	9.08	1.432						1	.596**
15	1.572	12.146							1

** P<.01 *P<.05

1. PSI Total, 2. Hasty Approach, 3. Thinking Approach, 4. Avoidant Approach, 5. Evaluative Approach, 6. Self-confident Approach, 7. Planned Approach, 8. Continuous and Purposeful Thinking, 9. Questioning and Effective Teaching, 10. Open-mindedness, 11. Responsibility of Teaching and Scientificness, 12. Being a Researcher, 13. Being Foresighted and Sincere, 14. Attitude towards the Profession, 15. Reflective Thinking Total

variables. Most of the predictor variables were not correlated to the extent that they could cause multicollinearity problems, but they were moderately significant. However, there is no significant relationship between the hasty approach, a sub-dimension of the dependent variable and the predictor variables; continuous and purposeful thinking, open-mindedness, questioning and effective teaching, responsibility of teaching and scientificness and attitude towards the profession.

As shown in Table 2, all the predictor variables collectively account for 35% of the variance in the total score of the Problem Solving Inventory (R=.594; R^2=.353; *Corrected* R^2=.307; $F_{(7,105)}$= 7.635; p<.05). According to the standardized regression coefficients (β), the relative importance order of the predictor variables on the total score of problem solving; being a researcher (.394), open-mindedness (.129), attitude towards the profession (.117), being foresighted and sincere (.105), continuous and purposeful thinking (.093), responsibility of teaching and scientificness (-.038), questioning and effective teaching is (-.039). When the T-test results related to the significance of regression coefficients were examined, the total score of the being researcher sub-dimension of the reflective thinking scale significantly predicted the total scores of problem-solving, while the other dimensions did not predict significantly (p <.05).

As can be seen in Table 3, all predictor variables collectively explain 14% of the variance in the Hasty Approach score of the Problem Solving Inventory (R=.378; R^2=.143; *Corrected* R^2=.082; $F_{(7,105)}$= 2.338; p<.05). According to standardized regression coefficients (β), the relative importance order of the predictor variables on the hasty approach dimension of problem solving; being a researcher (.374), being foresighted and sincere (.199), open-mindedness (.031), attitude towards the profession (.007), continuous and purposeful thinking (-.037), questioning and effective teaching (-.082), responsibility of teaching and scientificness (-.224) is. When the t-test results related to the significance of regression coefficients were examined, the 'being a researcher' sub-dimension of the Reflective Thinking Scale significantly predicted the Hasty Approach scores of problem solving, while it did not significantly predict the other dimensions (p <.05).

As can be seen in Table 4, all the predictor variables collectively explain 33% of the variance in the Thinking Approach score of the Problem Solving Inventory (R=.575;

Table 2. Results of multiple regression analysis of the total score of problem solving inventory and predictor variables

Variable	B	St Error B	β	T	P	Paired R	Partial R
Invariant	35.723	28.073		1.273	.206		
Continuous and purposeful thinking	.505	.526	.093	.960	.339	.360	.097
Open-mindedness	1.170	.927	.129	1.261	.210	.296	.126
Questioning and effective teaching	-.516	1.354	-.039	-.381	.704	.265	-.038
Teaching responsibility and being scientific	-.304	.911	-.038	-.333	.740	.395	-.034
Being a researcher	2.425	.804	.394	3.017	.003	.545	.292
Being foresighted and sincere	.816	.880	.105	.928	.356	.451	.093
Attitude towards the profession	1.638	1.386	.117	1.182	.240	.380	.119
R=.594; R^2=.353; Corrected R^2=.307; $F_{(7.105)}$= 7.635; p=.000							

Table 3. Results of multiple regression analysis of the hasty approach score in problem solving inventory and predictor variables

Variable	B	St Error B	β	T	P	Paired r	Partial R
Invariant	29.299	10.245		2.860	.005		
Continuous and purposeful thinking	-.064	.192	-.037	-.332	.741	.110	-.033
Open-mindedness	.088	.338	.031	.260	.795	.062	.026
Questioning and effective teaching	-.344	.494	-.082	-.696	.488	.058	-.070
Teaching responsibility and being scientific	-.567	.333	-.224	-1.706	.091	.108	-.170
Being a researcher	.729	.293	.374	2.486	.015	.309	.244
Being foresighted and sincere	.493	.321	.199	1.537	.128	.289	.153
Attitude towards the profession	.033	.506	.007	.065	.948	.156	.007
R=.378; R^2=.143; Corrected R^2=.082; $F_{(7.105)}$=2.338; p=.030							

Table 4. Results of multiple regression analysis of the thinking approach score in problem solving inventory and predictor variables

Variable	B	St Error B	β	T	P	Paired r	Partial R
Invariant	-5.821	5.979		-.974	.333		
Continuous and purposeful thinking	.142	.112	.124	1.267	.208	.378	.127
Open-mindedness	.337	.198	.177	1.704	.092	.359	.170
Questioning and effective teaching	.071	.288	.025	.245	.807	.326	.025
Teaching responsibility and being scientific	.002	.194	.001	.009	.993	.385	.001
Being a researcher	.399	.171	.310	2.331	.022	.495	.229
Being foresighted and sincere	.049	.187	.030	.261	.795	.391	.026
Attitude towards the profession	.361	.295	.123	1.225	.224	.373	.123
R=.575; R^2=.331; Corrected R^2=.283; $F_{(7.105)}$=6.912; p=.000							

R^2=.331; *Corrected* R^2=.283; $F_{(7,105)}$= 2.338; p<.05). According to standardized regression coefficients (β), the relative order of significance of the predictor variables on the thinking approach dimension of problem solving; being a researcher (.310), open-mindedness (.177), continuous and purposeful thinking (.124), attitude towards the profession (.123), being foresighted and sincere (.030), questioning and effective teaching (.025), responsibility of teaching and scientificness (.001). When the t-test results related to the significance of regression coefficients were examined, the 'being a researcher' sub-dimension of the Reflective Thinking Scale significantly predicted the 'thinking approach' scores of the problem solving, while it did not significantly predict the other dimensions (p <.05).

As can be seen in Table 5, all predictor variables do not significantly explain the Avoidant Approach score of the Problem Solving Inventory collectively (*R*=.323; R^2=.104; *Corrected* R^2=.040; $F_{(7,105)}$= 1.633; p>.05). According to standardized regression coefficients (β), the relative order of significance of predictor variables on the avoidant approach dimension of problem solving; being a researcher (.315), open-mindedness (.113), being foresighted and sincere (.061), attitude towards the profession (-.010), responsibility of teaching and scientificness (-.029), continuous and purposeful thinking (-.034) and questioning and effective teaching (-.105). When the results of the t-test regarding the significance of regression coefficients were examined, the 'being a researcher' sub-dimension of reflective thinking significantly predicted the 'avoidant approach' scores of problem-solving, while it did not significantly predict the other dimensions (p <.05).

As can be seen in Table 6, all predictor variables collectively explain 26% of the variance in the Evaluator Approach score of the Problem Solving Inventory (*R*=.512; R^2=.262; *Corrected* R^2=.210; $F_{(7,105)}$= 4.980; p<.05). According to standardized regression coefficients (β), the relative order of significance of predictor variables on the avoidant approach dimension of problem solving; being a researcher (.231), attitude towards the profession (.188), continuous and purposeful thinking (.141), responsibility of teaching and scientificness (.099), questioning and effective teaching (.064), open-mindedness (.035), being foresighted and sincere (-.066). When t-test results related to the significance of regression coefficients were examined, any dimension of reflective thinking did not significantly predict the 'evaluative approach' scores of problem solving (p> .05).

As can be seen in Table 7, all the predictor variables collectively explain 32% of the variance in Self-confident Approach score of the Problem Solving Inventory (*R*=.571; R^2=.326; *Corrected* R^2=.278; $F_{(7,105)}$= 6.767; p<.05). According to standardized regression coefficients (β), the relative order of significance of predictor variables on the

Table 5. Results of multiple regression analysis of the avoidant approach score in problem solving inventory and predictor variables

Variable	B	St Error B	β	T	P	Paired r	Partial R
Invariant	10.810	6.741		1.604	.112		
Continuous and purposeful thinking	-.038	.126	-.034	-.301	.764	.127	-.030
Open-mindedness	.208	.223	.113	.935	.352	.130	.094
Questioning and effective teaching	-.285	.325	-.105	-.876	.383	.068	-.088
Teaching responsibility and being scientific	-.046	.219	-.029	-.212	.833	.204	-.021
Being a researcher	.396	.193	.315	2.050	.043	.299	.203
Being foresighted and sincere	.097	.211	.061	.460	.646	.233	.046
Attitude towards the profession	-.027	.333	-.010	-.082	.935	.146	-.008
R=.323; R^2=.104; Corrected R^2=.040; $F_{(7.105)}$= 1.633; p=.135							

Table 6. Results of multiple regression analysis of the evaluative approach score in problem solving inventory and predictor variables

Variable	B	St Error B	β	T	P	Paired r	Partial R
Invariant	-4.470	4.704		-.950	.344		
Continuous and purposeful thinking	.121	.088	.141	1.369	.174	.343	.137
Open-mindedness	.050	.155	.035	.321	.749	.245	.032
Questioning and effective teaching	.132	.227	.064	.582	.562	.289	.059
Teaching responsibility and being scientific	.124	.153	.099	.810	.420	.377	.082
Being a researcher	.223	.135	.231	1.658	.100	.440	.165
Being foresighted and sincere	-.081	.147	-.066	-.548	.585	.302	-.055
Attitude towards the profession	.413	.232	.188	1.779	.078	.361	.177
R=.512; R^2=.262; Corrected R^2=.210; $F_{(7.105)}$=4.980; p=.000							

Table 7. Results of multiple regression analysis of the self-confident approach score in problem solving inventory and predictor variables

Variable	B	St Error B	β	T	P	Paired r	Partial R
Invariant	.018	4.922		.004	.997		
Continuous and purposeful thinking	.109	.092	.117	1.186	.239	.373	.119
Open-mindedness	.205	.163	.132	1.262	.210	.351	.126
Questioning and effective teaching	.183	.237	.081	.771	.442	.345	.078
Teaching responsibility and being scientific	.112	.160	.082	.699	.486	.417	.070
Being a researcher	.223	.141	.211	1.581	.117	.480	.158
Being foresighted and sincere	.104	.154	.077	.672	.503	.410	.068
Attitude towards the profession	.265	.243	.110	1.093	.277	.373	.110
R=.571; R^2=.326; Corrected R^2=.278; $F_{(7.105)}$= 6.767; p=.000							

Table 8. Results of multiple regression analysis of the planned approach score in problem solving inventory and predictor variables

Variable	B	St Error B	B	T	P	Paired R	Partial R
Invariant	-5.169	5.195		-.995	.322		
Continuous and purposeful thinking	.152	.097	.152	1.557	.123	.386	.155
Open-mindedness	.188	.172	.114	1.097	.275	.318	.110
Questioning and effective teaching	-.026	.251	-.011	-.103	.918	.276	-.010
Teaching responsibility and being scientific	.277	.169	.190	1.643	.104	.471	.164
Being a researcher	.218	.149	.194	1.469	.145	.480	.147
Being foresighted and sincere	-.036	.163	-.025	-.219	.827	.375	-.022
Attitude towards the profession	.453	.256	.177	1.768	.080	.398	.176
R=.580; R^2=.336; Corrected R^2=.289; $F_{(7.105)}$= 7.086; p=.000							

avoidant approach dimension of problem solving; being a researcher (.211), open-mindedness (.132), continuous and purposeful thinking (.117), attitude towards the profession (.110), responsibility of teaching and scientificness (.082), questioning and effective teaching (.081), being foresighted and sincere (.077). When t-test results related to the significance of regression coefficients were examined, any dimension of reflective thinking did not significantly predict the self-confident approach scores of problem solving (p> .05).

As can be seen in Table 8, all the predictor variables collectively explain 33% of the variance in the Planned Approach score of the Problem Solving Inventory (*R*=.580*; R^2*=.336*; Corrected R^2*=.289 $F_{(7,105)}$= 7.086 p<.05). According to standardized regression coefficients (β), the relative order of significance of predictor variables on the avoidant approach dimension of problem solving; being a researcher (.194), responsibility of teaching and scientificness (.190), attitude towards the profession (.177), continuous and purposeful thinking (.152), open-mindedness (.114), questioning and effective teaching (-.011) and being foresighted and sincere (-.025). When t-test results related to the significance of regression coefficients were examined, any dimension of the reflective thinking scale did not significantly predict the planned approach scores of problem solving (p> .05).

DISCUSSION AND CONCLUSION

When we evaluate the relationship between total and sub-dimensions of Turkish teachers' reflective thinking skill perceptions and their problem-solving skills perceptions, it is seen that there is a medium level relationship.

Bas (2013) examined the relationship between elementary school students' reflective thinking skills perception for problem solving and academic achievements of science and technology lessons. In his study questioning, reasoning and evaluation sub-dimensions of reflective thinking skill perceptions scale of students towards problem solving predict the academic success of science and technology lesson. Şen (2011) concluded that there is a significant relationship between elementary school students' perceptions of reflective thinking skills based on problem solving and their academic achievement in Mathematics courses. In the study of Bas and Kıvılcım (2003), it was concluded that it significantly predicted reflective thinking skills perceptions of high school students towards problem solving and their academic achievements in mathematics and geometry. As stated in the literature section of the study, it can be said that reflective thinking can only be observed in the problem solving process (Kızılkaya & Aşkar, 2009) by relying on fact that reflective thinking emerges only when a certain problem is perceived (Shermis, 1992). Accordingly, in reflective thinking, the mind enters a conscious and active process, focusing

on problem-solving skills perceptions. When a similar event occurs, he tries to find new solutions for problems and events by reflective thinking in the solutions he finds.

When the other findings of the study are examined, the 'being a researcher' sub-dimension of the reflective thinking scale predicts the total problem solving scores significantly. In the process of reflective thinking, the learner has the metacognition skills such as being able to determine their own learning goals, being responsible for their own learning, seeing and correcting their own mistakes (Ünver, 2003). As Semerci (2007) states, the individual who is a researcher is a problem solver, a learner who has a research spirit, can make objective evaluations and is interested in the good aspects of teaching art. Dewey (1910) developed the problem-solving method in line with the principles put forward in the theory of reflective thinking and stated that reflective thinking means problem solving when used in education. In addition, Yılmaz's (2017) study on "Determining the Reflective Thinking Trends of 8th Grade Turkish Teachers and Students" found that Turkish teachers' general tendency towards reflective thinking was positive. These results support the results of our study.

The 'Being a Researcher' sub-dimension of the Reflective Thinking Scale significantly predicted the 'Hasty Approach' scores of problem solving ($p < .05$). The hasty approach involves whether an individual acts in the first thought that comes to mind in order to solve a problem when faced with it without reasoning it and takes into account many of the ways to deal with the problem (Erdoğmuş, 2004, Schön (1987) defined reflection in two ways: projection-in-action and reflection-on-action. According to Schön (1987), reflection-in-action is a process that focuses on solving the problems that arise during the realisation of the action and includes the reorganization of the action (cited in Baki, Güç and Özmen, 2012). In this case, the reflective thinking teacher can present different solutions to a problem situation he/she is faced with instantly.

The 'Being a Researcher' sub-dimension of the Reflective Thinking Scale significantly predicted the 'Thinking Approach' scores of problem solving. The thinking approach measures whether an individual takes into account all kinds of information, reviews and tries to understand the situation when faced with a problem (Erdoğmuş, 2004). In short, it measures whether or not to question the problem. As Shermis (1992) says, it can be said that reflective thinking can only be observed in the process of problem solving based on the emergence of reflective thinking only when a certain problem is perceived. When a skill is measured, the actions that reveal that skill need to be examined. In this context, it is seen that one of the actions revealing reflective thinking skills perceptions is questioning (Dewey, 1933, cited in Kızılkaya and Aşkar, 2009). In its simplest definition, questioning can be defined as the process of seeking answers to questions that are produced by the person himself or directed to him by an outsider (Kızılkaya and Aşkar, 2009). In this respect, the reflective thinking teacher presents a thinking approach to the possible solutions of the problem situations he faces.

The 'Being a Researcher' sub-dimension of the Reflective Thinking Scale significantly predicted the 'Avoidant Approach' scores of problem solving. The avoidant approach measures whether an individual experiencing a problem has a solution for this problem, whether or not he hesitates over dealing with the problem in case of failure of the method he applies, whether he thinks what works and what does not work after solving the problem (Erdoğmuş, 2004). In fact, according to Schön (1987)'s reflection-on-action, it is to evaluate every aspect of the action after it is performed, to look back and to think about it in an intentional and systematic way (cited in Kızılkaya and Aşkar, 2009). According to Kızılkaya and Aşkar, one of the actions performed in the process of reflective thinking is the evaluation process in which the person turns back and looks at the action he has taken, and determines the wrongs and the rights by making analyses. In addition, as Mezirow (1991) says, reflective thinking involves examining and analyzing past experiences and creating new ones (cited in Baki, Güç and Özmen, 2012). In this direction, the reflective thinking teacher thinks about the positive and negative aspects of the situations encountered after the solution of the problem situation and can take measures against the problems that may occur in the next problem situation.

Any dimension of the Reflective Thinking Scale does not significantly predict the 'Evaluating Approach' scores of problem solving. This approach measures whether an individual examines his emotions in order to understand what he feels in a problem solution and whether he compares the result he gets after trying a particular method with the one he expects to (Erdoğmuş, 2004). In Kızılkaya and Aşkar's (2009) study, the actions taken in the reflective thinking process of the scale were formed around three main dimensions: questioning, reasoning and evaluation. According to the study, the concept of evaluation is defined as 'the individual looking back to his actions again and determining the wrong and right ones by doing analysis '. This scale was applied by Baki, Güç and Özmen (2012) on Mathematics teachers in their study titled 'Investigation of Reflective thinking skill perceptions of Elementary Mathematics Teacher Candidates for Problem Solving'. When the averages of the ideas observed in the study are taken into consideration, it is concluded that the dimension with the least reflective thinking is the evaluation. Both the scale prepared by Kızılkaya and Aşkar (2009) and the Problem Solving Inventory prepared by Heppner and Petersen (1982) show that the concept of evaluation presents common ideas. Therefore, it is seen that, when teachers read problems, they are lacking in establishing relationships between them and the previously solved ones considering their similarities and differences and thus it is important to carry out studies aimed at developing these skills.

Any dimension of the Reflective Thinking Scale does not significantly predict the 'Self-confident Approach' scores of problem solving. The individual measures whether or not he sees himself as competent in problem solving and striving for problem solving (Erdoğmuş, 2004). This result is not expected, because the main purpose of the undergraduate

programs that train teachers is to have reflective teachers who are self-confident, have problem-solving abilities and exemplary attitudes and behaviors.

Any dimension of the Reflective Thinking Scale does not significantly predict the 'Planned Approach' scores of problem solving. This result is not expected. It measures whether an individual has solved a problem in a planned way by evaluating the data at hand and whether or not he has only focused on that problem (Erdoğmuş, 2004). In this respect, it can be said that reflective thinking Turkish teachers cannot evaluate the data at hand and cannot reach a solution in a planned way.

Any dimension of the Reflective Thinking Scale does not significantly predict the 'Evaluative Approach, Self-confident Approach and Planned Approach' dimensions of problem solving. These three dimensions are related to the self-efficacy perception of the individual. In this respect, when we examine the studies related to the self-efficacy perception of Turkish teachers, according to the findings of the study conducted by Coşkun, Gelen and Öztürk (2009) in order to determine the self-efficacy perceptions of Turkish teacher candidates about the dimensions of planning, implementation and evaluation, we can see that Turkish teacher candidates do not find themselves sufficient in terms of their self-efficacy levels. The planning dimension that Coşkun, Gelen and Öztürk (2009) discussed in their study coincides with the planned approach in this study and the evaluation dimension in their study with the evaluative approach in this study. The self-confident approach, on the other hand, forms a part of the self-efficacy perception, in general terms. Therefore, the results of the study conducted by Coşkun, Gelen and Öztürk (2009) support the findings of our study. In addition, the fact that there is a significant and positive relationship between attitudes towards teaching profession and reflective thinking tendency is significant data to be used to enhance teacher competencies.

In the light of this information, it is concluded that reflective thinking skills perceptions predict the problem solving skills perceptions of Turkish teachers participating in the study, however, it also suggests that the education that Turkish teachers have received and the experiences they have gained in their own lives and professional lives are insufficient in terms of improving their self-efficacy perceptions and that they are to contribute to their own personal development themselves.

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