Analysing the Level and Relation between the Reasoning Ways, the Social Problem Solving, the Rational and Intuitive Decision Making Skills of in-Service and Pre-Service Teachers

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Abstract

This research is to determine the level of reasoning, social problem solving, rational and intuitive decision making skills of teachers and pre-service teachers. And at the same time, it is to reveal how the relationship between these skills is. The research was carried out in quantitative method and correlational survey model. The sample of the research consists of 529 teachers, 415 women and 114 men that using convenience sampling method, working in public and private schools in different cities of Turkey. And 391 teacher candidates, 303 female and 88 male, who are students of education faculties in different cities of Turkey, were reached. Thus, a total of 920 participants were included in the sample.

The Reasoning Ways Scale, the Revised Social Problem Solving Inventory Short Form, and the Rational and Intuitive Decision-Making Styles Scale were used as data collection tools in the study. In the analysis of the data, descriptive statistics, t-test, Mann-Whitney U, ANOVA, Kruskal-Wallis, Bonferroni and Spearman Correlation were used.

The results of the study showed that teachers and pre-service teachers use reasoning ways at a "good" level. It was understood that "Verbal" and "Analogical" sub-dimensions of reasoning ways were preferred by both groups at a very good level. It has been understood that teachers and pre-service teachers use their "rational decision making" skill at a very good level and both groups use their "intuitive decision making" skill at a moderate level. Social Problem Solving Skills of teachers and pre-service teachers were found to be at a "good" level.

As a result of the correlation analysis, a positive correlation was found with the positive and interrelated variables and sub-dimensions. Negative relationships were also found in the negative sub-dimensions. The results obtained regarding all the variables and sub-dimensions of the study supported each other.

Keywords: Pre-Service Teacher, In- Service Teacher, Reasoning Ways, Social Problem Solving, Intuitive Decision Making

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Öğretmen ve Öğretmen Adaylarının Akıl Yürütme Yolları, Sosyal Sorun Çözme, Akılcı ve Sezgisel Karar Verme Becerileri Düzeyi ve Aralarındaki İlişki

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Öz

Bu araştırma, eğitim sisteminde görev yapmakta olan öğretmenlerin ve öğretmen adaylarının; akıl yürütme yolları, sosyal sorun çözme, akılcı ve sezgisel karar verme beceri düzeylerini belirlemek ve bu beceriler arasındaki ilişkinin nasıl olduğunu ortaya koymak amacıyla gerçekleştirilmiştir. Araştırma, nicel betimsel yöntem ve ilişkisel tarama modelinde gerçekleştirilmiştir. Araştırmanın örneklemi, pandemi nedeni ile kolayda örnekleme yöntemi ile belirlenmiş ve Türkiye'nin farklı illerinde devlet ve özel okullarda görev yapmakta olan 415 kadın, 114 erkek olmak üzere toplam, 529 öğretmene ulaşılmıştır. Aynı zamanda, Türkiye'nin farklı şehirlerinde bulunan eğitim fakültelerinde öğrenim görmekte olan 303 kadın, 88 erkek olmak üzere 391 öğretmen adayına ulaşılmıştır. Böylece araştırmanın örneklemi toplam, 920 katılımcıdan oluşmuştur.

Araştırmanın verileri; Akıl Yürütme Yolları Ölçeği, Gözden Geçirilmiş Sosyal Sorun Çözme Envanteri Kısa Formu ve Akılcı ve Sezgisel Karar Verme Stilleri Ölçeği aracılığı ile elde edilmiştir. Bu veriler, tanımlayıcı istatistikler, t-testi, Mann-Whitney U analizi, ANOVA, Kruskal-Wallis ve gruplar arası farkın kaynağı için Bonferroni ile analiz edilmiştir. Değişkenler arasındaki ilişki ise Spearman Korelasyon analizi ile anlaşılmaya çalışılmıştır.

Araştırmanın sonuçları, öğretmen ve öğretmen adaylarının, akıl yürütme yollarını "iyi" düzeyde kullandıklarını göstermiştir. Akıl yürütme yollarından "Sözel" ve "Analojik" alt boyutu her iki grubun çok iyi düzeyde tercih edildiği anlaşılmıştır. Akılcı ve Sezgisel Karar Verme Ölçeğinin, "akılcı karar verme" becerisini öğretmen ve öğretmen adaylarının çok iyi düzeyde, "sezgisel karar verme" becerisi"ni de yine her iki grubun orta düzeyde kullandığı anlaşılmıştır. Yine araştırmanın diğer bir değişkeni olan Sosyal Sorun Çözme Becerilerinde, öğretmen ve öğretmen adaylarının "iyi" düzeyde oldukları görülmüştür. Araştırmanın değişkenleri arasındaki korelasyon analizi sonucunda, olumlu ve birbiri ile ilişkili değişkenler ve alt boyutlar ile pozitif yönlü bir ilişki var iken olumsuzlarda da negatif yönlü ilişkiler tespit edilmiştir. Araştırma sürecinde ele alınan tüm değişkenler ve alt boyutlarına ilişkin elde edilen sonuçlar, birbirini destekler nitelikte olmuştur.

Anahtar Kelimeler: Öğretmen, Öğretmen Adayı, Akıl Yürütme Yolları, Sosyal Sorun Çözme, Sezgisel Karar Verme

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Introduction

Having successful reasoning, social problem solving and decision-making skills form the basis of the development in social, academic fields and other areas. Today's education process, OECD's Learning Compass 2030 framework, aims to provide emotional competencies by developing programs related to a broad social and emotional skill set within the scope of social-affective learning outcomes, such as self-awareness (for example, the ability to recognize one's emotions), social awareness (for example, the ability to take the perspective of others), self-management (for example, one's emotions), the ability to organize, relationship skills (for example, the ability to form rewarding relationships), and the ability to make responsible decisions (for example, the ability to make constructive choices) (Taylor et al., 2017; Goodman et al., 2015; Hyson, 2004; Sharp, 2001). In this context, in the decision-making process; individuals are expected to identify problems, analyze situations, solve, evaluate, reflect the problems, and take ethical responsibility (casel.org, 2021). Therefore, at the mentioned stages, every individual, regardless of the age range, it is absolutely necessary to use the reasoning process because reasoning is an important cognitive and affective variable that enables recognition, reasoning by categorizing, and being survival by making decisions. In this process, individuals need to use "reasoning" ways in order to make constructive choices in the process of ethical standards, safety concerns, personal behavior and social interactions based on social norms, but reasoning used proactively can support decisions that are easily justified but not necessarily better (Mercier ve Sperber, 2011). For this reason, it is thought that the reasoning ways, decision making and social problem solving skills of teachers and pre-service teachers with high influence on society should be understood. Because, as Akınoğlu and Bakır (2003) stated, in order to have individuals who can produce science, technology and art in a society, individuals, who has the ability of questioning, criticizing, analyzing and solving problems, are needed in developing and changing societies. Reasoning is a special form of thinking that involves inferring from initial premises and is closely related to justification, decision making, and problem solving (Holyoak and Morrison, 2005). Considering the changing question types in the education system, especially in the university and high school entrance exams, the importance of reasoning, rational and intuitive decision making is emphasized more by asking students more questions that they can solve using their reasoning skills, which are called new generation questions. As the results of researches, it is understood that reasoning is a skill that can be developed (Chen & She, 2015; Gillies, 2011). Students' reasoning skills are affected by their teachers' competencies and qualifications in those skills (Brown ve Campione, 1994; Gillies, 2019). Teachers who have high level of reasoning skills can offer their students more effective learning environments based on questioning (Benford & Lawson, 2001). An effective education is directly related with the qualifications of teachers. In the learning and teaching processes (MEB, 2010) included in the teacher qualifications determined by the Ministry of National Education with receiving the opinions from academicians, teachers and education experts, the teaching strategies that teachers and pre-service teachers will use in order to develop their students' learning, problem solving and thinking skills with the proficiency of asking effective questions, are expected to use instructional strategies (Özcan, 2011). These strategies, used by pre- service and in-service teachers, directly affect the reasoning, social problem-solving and decision-making skills of their students, for

whom they are role models. Reasoning skills enable individuals to solve social and scientific problems that they may encounter throughout their lives and they also prepare them to be good citizens (Nickerson, 1986). Social problem solving is defined as all kinds of difficulties that occur in real life and prevent the realization of the individual's goals and wishes, and it is expressed as the process of understanding, evaluating and effectively coping with many different, stressful life cases (D'Zurilla & Nezu, 2010). It is possible to see some psychological and behavioral reactions in children and young people's behaviour during the pandemic process. In this period, when adults are also affected, it may be beneficial to keep children's well-being strong and to support their self-recovery (MEB, 2020). It is aimed to regain students' basic sense of trust, which has been shattered by the pandemic process, and to improve their problem-solving skills (Jongsma, Peterson, McInnis, & Bruce, 2014; WHO, 2020). Thus, adapting to changing educational processes and being ready to take on different responsibilities is also significantly related to teachers' professional competencies (König, Jäger-Biela, & Glutsch, 2020). It is aimed to ensure that teachers approach social problems with a solution-oriented approach, along with the ways of reasoning and decision-making skills they will use in the social problem-solving process. Again, the necessity of effective communication is emphasized in the communication competence, which is within the scope of the attitudes and values in the teacher qualifications determined by the Ministry of National Education (MEB, 2017). It can be thought that the development of effective problem-solving skills and communication skills will have an important effect on coping with problems encountered in interpersonal relationships and establishing positive communication with other people in the social environment (Koç, Terzi, & Gül, 2015). In this context, the study was conducted to investigate the reasoning ways, social problem solving, rational and intuitive decision-making skills of in- service and pre- service teachers, who will guide the education of the new generation and thus are the architects of our future, and to also examine their characteristics from the perspective of gender, branch, and professional seniority. The aim of the study is to determine the reasoning ways, social problem solving, rational and intuitive decision-making skill levels of in-service and pre- service teachers and to reveal how the relationship between these skills is.

Method

The research was conducted to quantitative descriptive method and correlational survey model**.**

The sample of the research consists of 529 teachers, 415 women and 114 men, working in public and private schools in different cities of Turkey. And 391 teacher candidates, 303 female and 88 male, who are students of education faculties in different cities of Turkey and studying in different departments were reached. Thus, a total of 920 participants were included in the sample.

Data collection tools were The Reasoning Ways Scale, the Revised Social Problem Solving Inventory Short Form, and the Rational and Intuitive Decision-Making Styles Scale.

The Ways of Reasoning Scale: Developed by Yalın Uçar, Bağatarhan, Yakıt, Kızılaslan, and Erol (2021). The instrument, which is a five-point Likert-type instrument, consists of 21 items. The tool consists of seven sub-dimensions: "Deductive", "Iductive", "Analogical", "Intuitive", "Algebraic", "Historical" and "Verbal". The Cronbach Alpha reliability co-

efficient of the measurement tool was calculated as. 74. All sub-dimensions of the measurement tool are reliable and show normal distribution: verbal, 0.85; historical, 0.81; algebraic, 0.78; heuristic, 0.77; analogical, 0.72; the inductive sub-dimension was 0.67 and the deductive sub-dimension was 0.61.

Revised Social Problem Solving Inventory Short Form (SPSI-R-Short): Developed by D'Zurilla, Nezu and Maydeu-Olivares (2002) and adapted into Turkish by Eskin and Aycan (2009). The five-point Likert-type instrument consisted of 25 items and five sub-dimensions: "Positive Problem Orientation" "Negative Problem Orientation", "Rational Problem-Solving Style"; "İmpulsive-Careless Problem-Solving Style" and "Avoidant Problem-Solving Style". The internal consistency co-efficients of the sub-dimensions of the measurement tool range from 0.62 to 0.92. The test-retest results showed that the reliability coefficients were between 0.60 and 0.84.

Rational and Intuitive Decision-Making Styles Scale: Developed by Hamilton et al. (2016) and it was adapted into Turkish by İme, Kalı Soyer and Keskinoğlu (2020). The five-point Likert-type instrument consists of 10 items and has two sub-dimensions: "Rational Decision Making" and "İntuitive Decision Making". It has Cronbach Alpha's .80. In the analysis of the data, descriptive statistics, t-test, Mann-Whitney U, ANOVA, Kruskal-Wallis, Bonferroni and Spearman Correlation were used. For the distribution of research data, it was tested with Kolmogorov-Smirnov and Shapiro-Wilk. Independent sample t-test was used for normally distributed measurements. Mann-Whitney-U was used for non-normally distributed measurements. In the comparison of scores of more than two groups, analysis of variance (ANOVA) was used for normal distribution, and Kruskal-Wallis analysis was used for those who did not show normal distribution.

Findings

Below, the statistical findings of the data obtained from the Reasoning Ways, Social Problem Solving, and Rational and Intuitive Decision-Making Styles Scale are shown respectively. Within the scope of the findings, the level of participation obtained for each variable and the degrees of the relationship between these variables are included.

Participation Levels of Teachers and Pre-Service Teachers for Reasoning Ways

Table 1. Reasoning Ways of Teachers and Pre-Service Teachers

Scale	N	Min.	Medyan	Max.	$\bar{x}$	SS	TCLFA
Scale of Reasoning Ways (Teacher)	529	40,00	73,00	100,00	73,21	9,72	3,66
Scale of Reasoning Ways (Pre Service Teacher)	391	23,00	73,00	105,00	72,76	10,23	3,46
Deductive (Teacher)	529	3,00	12,00	15,00	11,33	3,16	3,77
Deductive (Pre Service Teacher)	391	3,00	11,00	15,00	10,22	3,33	3,40
Inductive (Teacher)	529	3,00	8,00	15,00	7,99	3,14	2,66
Inductive (Pre Service Teacher)	391	3,00	6,00	15,00	6,69	2,90	2,23
Analogical (Teacher)	529	3,00	13,00	15,00	12,21	2,61	4,07
Analogical(Pre Service Teacher)	391	3,00	13,00	15,00	12,07	2,65	4,02
Intuitive (Teacher)	529	3,00	10,00	15,00	9,63	2,74	3,21
Intuitive (Pre Service Teacher)	391	3,00	10,00	15,00	9,52	2,88	3,17

Verbal (Teacher)	529	3,00	14,00	15,00	13,29	2,13	4,43
Verbal (Pre Service Teacher)	391	3,00	14,00	15,00	13,11	2,28	4,37
Historical (Teacher)	529	3,00	12,00	15,00	11,46	2,80	3,82
Historical (Pre Service Teacher)	391	3,00	12,00	15,00	11,24	2,84	3,74
Algebraic (Teacher)	529	3,00	11,00	15,00	11,18	2,65	3,72
Algebraic (Pre Service Teacher)	391	3,00	10,00	15,00	9,93	3,04	3,3

TCLFA: The Corresponding Level for the Average

Table 1, indicates that the highest score on Ways of Reasoning of 529 teachers participating in the study was 100.00; the lowest score is 40.00 and the mean is $\bar{x}$ (73.21). It can also be seen in this table that teachers mostly use "Verbal" reasoning with an average of $\bar{x}$ (13.29) and use "Inductive" reasoning way $\bar{x}$ (7.99) the least. On the other hand, the lowest total score on Reasoning Ways of 391 preservice teachers participating in the study was 23.00 and the highest total score was 105.00. The mean score of the pre-service teachers' Ways of Reasoning is $\bar{x}$ (72.76). It is seen that they use the "Verbal" reasoning way at most with an average of $\bar{x}$ (13.11) and they use the "Inductive" way of reasoning the least with $\bar{x}$ (6.69).

Participation Levels of Teachers and Preservice Teachers Regarding Social Problem Solving Skills

Table 2. Social Problem Solving Skills of Teachers and Preservice Teachers

Scale	N	Min.	Medyan	Max.	$\bar{x}$	SS	TCLFA
Social Problem Solving Scale-(Teacher)	529	6,20	14,20	19,60	13,89	2,85	3,46
Social Problem Solving Scale-(Pre Service Teacher)	391	6,40	13,60	19,40	13,48	2,79	3,39
Positive Problem Orientation (Teacher)	529	1,00	3,20	4,00	3,20	0,62	4,20
Positive Problem Orientation (Pre Service Teacher)	391	0,20	3,20	4,00	3,08	0,70	4,08
Npor (Teacher)	529	0,00	2,20	4,00	2,13	0,99	1,88
Npor (Pre Service Teacher)	391	0,00	2,20	4,00	2,06	0,94	1,77
Rpsr (Teacher)	529	1,00	3,40	4,00	3,21	0,65	4,21
Rpsr (Pre Service Teacher)	391	0,00	3,00	4,00	3,06	0,70	4,06
Icsr (Teacher)	529	0,00	2,60	4,00	2,56	0,83	2,60
Icsr (Pre Service Teacher)	391	0,00	2,80	4,00	2,62	0,78	2,70
Avoidant Problem Solving Style (Teacher)	529	0,00	3,00	4,00	2,78	0,91	2,96
Avoidant Problem Solving Style (Pre Service Teacher)	391	0,00	2,80	4,00	2,65	0,90	2,75

TCLFA: The Corresponding Level for the Average

Table 2, indicates that the lowest total score of the teachers participating in the study from the Revised Social Problem Solving Inventory Short Form was 6.20, while the highest total score was 19.60. According to Table 2, teachers mostly used "Rational

problem solving" (Rpsr, $\bar{x}$, 3.21) style; they used a negative problem orientation at the minimum level (Npor, $\bar{x}$, 2.13). Besides, it can be seen that the lowest total score obtained from the Revised Social Problem Solving Inventory of the pre-service teachers participating in the research was 5.40 and the highest total score was 18.40. In the same table, it can be seen that pre-service teachers mostly use "Positive problem orientation" (Positive problem orientation, $\bar{x}$, 3.08), while they use "Negative problem orientation" (Npor, $\bar{x}$, 2.06) the least.

Participation Levels of Teachers and Preservice Teachers for Rational and Intuitive Decision Making Skills

Table 3. Rational and Intuitive Decision Making Skills of Teachers and Preservice Teachers

Scale	N	Min.	Medyan	Max.	$\bar{x}$	SS	TCLFA
Rational Decision Making Styles Sub-Dimension (Teacher)	529	5,00	22,00	25,00	21,68	3,50	4,33
Rational Decision Making Styles Sub-Dimension (Pre Service Teacher)	391	5,00	21,00	25,00	20,86	3,91	4,17
Intuitive Decision-Making Styles Sub-Dimension (Teacher)	529	5,00	15,00	25,00	15,38	4,69	3,08
Intuitive Decision-Making Styles Sub-Dimension (Pre Service Teacher)	391	5,00	15,00	25,00	15,22	4,70	3,04

TCLFA: The Corresponding Level for the Average

In Table 3, it can be seen that the total mean score of the "Rational" sub-dimension of the Rational and Intuitive Decision-Making Styles Scale is $\bar{x}$ (21,68). The mean of the "intuitive" sub-dimension is $\bar{x}$ (15.38). According to the finding in Table 3, While the teachers use the "Rational" decision-making skill at the highest level, they use the "Intuitive" decision-making skill at the least level (Table 3).

According to Table 3, the total mean score of the 'rational' sub-dimension of the pre-service teachers participating in the research on the Rational and Intuitive Decision-Making Styles Scale is $\bar{x}$ (20.86), while the mean score of the 'intuitive' sub-dimension is $\bar{x}$ (15.22). It can be seen that pre-service teachers use the "Rational" decision-making skill the most, while they use the "Intuitive" decision-making skill the least (Table 3).

Correlation Levels between the Variables

The findings obtained regarding the degrees of the correlation between the Reasoning Ways, Social Problem Solving, Rational and Intuitive Decision-Making Styles Scale and the sub-dimensions of these measurement tools according to the Spearman Correlation analysis of the teachers and pre-service teachers are described below.

The Correlation Between Teachers' Reasoning Ways, Social Problem Solving, Rational and Intuitive Decision Making Styles

Table 4. The Correlation Between Teachers' Reasoning Ways, Social Problem Solving, Rational and Intuitive Decision Making Styles

Scale		Positive problem orientation	Negative problem orientation	Rational problem solving style	Impulsive-careless problem-solving style	Avoidant problem-solving style	spsitot	Rational	Intuitive
Deductive	r	,096*	-0,002	,144*	-0,020	0,001	0,038	0,068	0,081
	p	0,028	0,960	0,001	0,650	0,976	0,385	0,116	0,062
Inductive	r	0,065	-0,015	,144*	-0,048	-0,005	0,026	,100*	,112*
	p	0,138	0,737	0,001	0,267	0,903	0,555	0,021	0,010
Analogical	r	,226*	-,090*	,204*	-0,027	0,037	0,048	,161*	,176*
	p	0,000	0,039	0,000	0,536	0,397	0,274	0,000	0,000
Intuitive	r	0,020	-,235*	0,026	-,307*	-,258*	-,251*	0,005	,656*
	p	0,641	0,000	0,546	0,000	0,000	0,000	0,913	0,000
Verbal	r	,344*	,121*	,322*	0,083	,094*	,221*	,275*	0,042
	p	0,000	0,005	0,000	0,056	0,031	0,000	0,000	0,340
Historical	r	,338*	,142*	,376*	0,052	0,073	,221*	,372*	0,000
	p	0,000	0,001	0,000	0,233	0,092	0,000	0,000	0,998
Algebraic	r	,340*	,094*	,349*	0,065	0,031	,192*	,340*	,122*
	p	0,000	0,031	0,000	0,137	0,482	0,000	0,000	0,005
Reasoning Total Score	r	,349*	0,002	,393*	-0,055	-0,016	,124*	,333*	,325*
	p	0,000	0,969	0,000	0,211	0,718	0,004	0,000	0,000

p<0,05

Spearman Correlation analysis was performed to statistically measure the correlation between Teachers' Reasoning Ways and sub-dimensions, Social Problem Solving Scale, Rational and Intuitive Decision-Making Styles Scale and its sub-dimensions.

Table 4 shows that there is a significant positive and weak correlation between the "Deductive" sub-dimension of Reasoning Ways and the "positive problem orientation" (r=0.096, p=0.028) and "rational problem-solving style" (r=0.144, p=0.001) sub-dimensions of the Social Problem Solving Scale. It was observed that there is a statistically significant, positive and weak correlation between "Inductive" sub-dimension of Reasoning Ways and "Rational" (r=0.100, p=0.021) and "Intuitive" (r=0.112, p=0.010) sub-dimensions of Rational and Intuitive Decision-Making Styles Scale. It was also observed that there is a statistically significant, positive and weak correlation between the "Analogical" sub-dimension of Reasoning Ways and the "Positive problem orientation" of the Social Problem Solving Scale (r=0.221, p=0.003); "negative problem orientation" (r=-0.086, p=0.049) and "Positive problem orientation" (r=0.226, p=0.000); "negative problem orientation" (r=-0.090, p=0.039); the "rational problem solving style" (r=0.204, p=0.000) sub-dimension.

There is also statistically significant, positive, weak correlation between "Analogical"

sub-dimension of Reasoning Ways and "Rational" (r=0.161, p=0.000) and "Intuitive" (r=0.176, p=0.000) sub-dimensions of Rational and Intuitive Decision-Making Styles Scale. It can be concluded from Table 4, that there is a statistically significant, negative and weak correlation between the "Intuitive" sub-dimension of Reasoning Ways and the "negative problem orientation" (r=-0.253, p=0.000) and "impulsive-careless problem-solving style" (r=-0.307, p=0.000) and "avoidant" problem solving style" (r=-0.258, p=0.000) sub-dimensions of the Social Problem Solving Scale. There is a statistically significant, negative and weak correlation (r=-0.251, p=0.000) between the "Intuitive" sub-dimension of Reasoning Ways and the Social Problem Solving Scale (Table 4). Besides, there is a statistically significant, positive and moderate correlation (r=0.656, p=0.000) between the "Intuitive" sub-dimension of Reasoning Ways and the "Intuitive" sub-dimension of Rational and Intuitive Decision-Making Styles Scale (Table 4). There is also a statistically significant, positive and moderate correlation between the "Verbal" sub-dimension of Reasoning Ways and the "Positive problem orientation" (r=0.344, p=0.000); "rational problem-solving style" (r=0.322, p=0.000) sub-dimensions of Social Problem Solving Scale (Table 4). Besides, it can be seen that there is a statistically significant, positive and weak correlation between "Verbal" sub-dimension of Reasoning Ways and "Negative problem orientation" (r=0.121, p=0.000) and "Avoid problem-solving style" (r=0.094, p=0.000) sub-dimensions of the Social Problem Solving Scale (Table 4). There is also a statistically significant, positive and weak correlation (r=0.221, p=0.000) between "Verbal" sub-dimension of the Reasoning Ways and the Social Problem Solving Scale (Table 4). There is a statistically significant, positive and weak correlation (r=0.275, p=0.000) between the "Verbal" sub-dimension of Reasoning Ways and the "Rational" sub-dimension of Rational and Verbal Decision-Making Scale (Table 4).

It was also observed that there is a statistically significant, positive and moderate (r=0.338, p=0.000) correlation between the "Historical" sub-dimension of Reasoning Ways and "Positive problem orientation" of Social Problem Solving Scale's sub-dimension. According Table 4, shows that there is a statistically significant, positive and weak correlation (r=0.142, p=0.001) between the "Historical" sub-dimension of Reasoning Ways and "Negative problem orientation" sub-dimension of Social Problem Solving Scale (Table 4). There is also a statistically significant, positive and moderate correlation (r=0.376, p=0.000) between the "Historical" sub-dimension of Reasoning Ways and the "rational problem solving style" sub-dimension of Social Problem Solving Scale (Table 4). It can be seen in Table 6 that there is a statistically significant, positive and weak correlation (r=0.221, p=0.000) between the "Historical" sub-dimension of Reasoning Ways and Social Problem Solving Scale (Table 4). Table 4, also shows that there is a moderately significant, positive correlation between the "Algebraic" sub-dimension of Reasoning Ways and the "Positive problem orientation" (r=0.340, p=0.000) and "Negative problem orientation" (r=0.094, p=0.031) sub-dimensions of Social Problem Solving Scale. There is also a statistically significant, positive and moderate correlation (r=0.349, p=0.000) between the "Algebraic" sub-dimension of Reasoning Ways and the "rational problem solving style" sub-dimension of Social Problem Solving Scale (Table 4).

There is a statistically significant, positive and weak correlation (r=0.192, p=0.000) between the "Algebraic" sub-dimension of Reasoning Ways and the Social Problem

Solving Scale (Table 4). Table 4 also indicates that there is a statistically significant, positive and moderate correlation (r=0.340, p=0.000) between the "Algebraic" sub-dimension of Reasoning Ways and the "Rational" sub-dimension of Rational and Intuitive Decision-Making Styles Scale (Table 4). It can also be seen that there is a statistically significant, positive and weak correlation (r=0.122, p=0.005) between the "Algebraic" sub-dimension of Reasoning Ways and the "Intuitive" sub-dimension of Rational and Intuitive Decision-Making Styles Scale's (Table 4). Besides, there is a statistically significant positive and moderate correlation between Reasoning Ways and "positive problem orientation" (r=0.349, p=0.000) and "rational problem solving style" (r=0.393, p=0.000) sub-dimensions of the Social Problem Solving Scale (Table 4). ..Table 4, shows that there is a statistically significant, positive and weak correlation (r=0.124, p=0.004) between Reasoning Ways and Social Problem Solving Scale. It can also be observed that there is a statistically significant positive and moderate correlation between Reasoning Ways and "Rational" (r=0.333, p=0.000) and "Intuitive" (r=0.325, p=0.000) sub-dimensions of Rational and Intuitive Decision-Making Styles Scale (Table 4). In Table 4, statistically significant, positive and moderate correlation (r=0.372, p=0.000) was also observed between the historical sub-dimension of Reasoning Ways and the "Rational" sub-dimension of Rational and Intuitive Decision-Making Styles Scale (Table 4).

The Correlation among Pre-Service Teachers' Reasoning Ways, Social Problem Solving, Rational and Intuitive Decision-Making Styles.

Table 5. The Correlation among Pre-service Teachers' Reasoning Ways, Social Problem Solving, and Rational and Intuitive Decision-Making Styles Scale and its Sub-Dimensions

Scale		Positive problem orientation	Negative problem orientation	Rational problem solving style	Impulsive-careless problem-solving style	Avoidant problem-solving style	Spsitot	Rational	Intuitive
Deductive	r	0,026	-,102*	0,022	-0,072	-,129*	-0,079	0,001	0,076
	p	0,613	0,044	0,668	0,157	0,011	0,117	0,991	0,133
Inductive	r	-0,081	-,181*	-0,088	-,185*	-,148*	-,192*	-,112*	,139*
	p	0,109	0,000	0,083	0,000	0,003	0,000	0,027	0,006
Analogical	r	,299*	-0,019	,213*	0,008	0,051	,133*	,149*	,139*
	p	0,000	0,710	0,000	0,878	0,314	0,008	0,003	0,006
Intuitive	r	0,084	-,197*	-0,038	-,330*	-,204*	-,201*	-,107*	,646*
	p	0,099	0,000	0,457	0,000	0,000	0,000	0,035	0,000
Verbal	r	,415*	,113*	,406*	,161*	,166*	,335*	,359*	-0,001
	p	0,000	0,025	0,000	0,001	0,001	0,000	0,000	0,985
Historical	r	,383*	,160*	,452*	0,097	0,091	,312*	,401*	-0,080
	p	0,000	0,001	0,000	0,055	0,072	0,000	0,000	0,113
Algebraic	r	,326*	0,095	,310*	-0,028	0,007	,179*	,251*	-0,026
	p	0,000	0,062	0,000	0,588	0,889	0,000	0,000	0,606
Reasoning	r	,363*	-0,040	,314*	-,106*	-0,057	,103*	,220*	,248*
	p	0,000	0,432	0,000	0,037	0,259	0,042	0,000	0,000

*p<0,05

In Table 5, it can be observed that there is a statistically significant, negative and weak correlation among pre-service teachers' Reasoning Ways and the "negative problem orientation" (r=-0.102, p=0.044), "avoidant problem-solving style" (r=-0.129, p=0.011) and "negative problem orientation" (r=-0.181, p=0.000) sub-dimensions of Social Problem Solving Scale. Besides, there is a statistically significant, negative and weak correlation (r=-0.192, p=0.000) between the "Inductive" sub-dimension of Reasoning Ways and the Social Problem Solving Scale. There is also a statistically significant negative and weak correlation between "Inductive" sub-dimension of Reasoning Ways and the "Impulsive-careless problem-solving style" (r=-0.185, p=0.000) and "Avoid problem-solving style" (r=-0.148, p=0.000) sub-dimensions of Social Problem Solving Scale (Table 5). It can be seen in Table 5 that there is a statistically significant, negative and weak correlation between the "Inductive" sub-dimension of Reasoning Ways and the "Rational" sub-dimension of the Rational and Intuitive Decision-Making Styles Scale (r=-0.112, p=0.027) (Table 5). There is also a statistically significant, positive and weak correlation (r=0.139, p=0.006) between the "Inductive" sub-dimension of Reasoning Ways and the "Intuitive" sub-dimension the Rational and Intuitive Decision-Making Styles Scale (Table 5).

Table 5, shows that there is a statistically significant, positive and weak correlation (r=0.133, p=0.008) between the "Analogical" sub-dimension of Reasoning Ways and Social Problem Solving Scale. Moreover, there is a statistically significant, positive and weak correlation between the "Analogical" sub-dimension of Reasoning Ways and the "Positive problem orientation" (r=0.299, p=0.000) and "rational problem-solving style" (r=0.213, p=0.000) sub-dimensions of the Social Problem Solving Scale (Table 5). It can also be observed in Table 5 that there is a statistically significant, positive and weak correlation (r=0.149, p=0.003) between the "Analogical" sub-dimension of Reasoning Ways and the "Rational" and "Intuitive" (r=0.139, p=0.006) sub-dimensions of the Rational and Intuitive Decision-Making Styles Scale (Table 5).

Table 5, also shows that there is a statistically significant, negative and weak correlation (r=-0.197, p=0.000) between Intuitive sub-dimension of Reasoning Ways and the "Negative problem orientation" sub-dimension of Social Problem Solving Scale (Table 5). In Table 5, it can also be observed that there is a statistically moderate, significant and negative correlation between the Intuitive sub-dimension of Reasoning Ways and the "Impulsive-careless problem-solving style" (r=-0.330, p=0.000) and "Avoid problem-solving style" (r=-0.204, p=0.000) sub-dimensions of Social Problem Solving Scale (Table 5). There is also a statistically significant, negative and weak correlation (r=-0.201, p=0.000) between Intuitive sub-dimension of Reasoning Ways and Social Problem Solving Scale. There is also a statistically significant, positive and weak correlation between the "Intuitive" sub-dimension of Reasoning Ways and the "Rational" (r=0.149, p=0.000) and "Intuitive" (r=0.646, p=0.000) sub-dimensions of the Rational and Intuitive Decision-Making Styles Scale. (Table 5). In Table 5, it can be observed that there is a statistically significant, positive and moderate correlation between the "Intuitive" sub-dimension of Reasoning Ways and the sub-dimensions of Rational and Intuitive Decision-Making Styles Scale. There is a statistically significant, positive and moderate correlation among the "Verbal" sub-dimension of Reasoning Ways and the "Positive

problem orientation" (r=0.415, p=0.000) and "Negative problem orientation" (r=0.113, p=0.025) and "rational problem-solving style" (r=0.406, p=0.000) sub-dimensions of Social Problem Solving Scale (Table 5).

Table 5, also shows that there is a statistically significant, positive and weak correlation (r=0.161, p=0.001) between the "Verbal" sub-dimension of Reasoning Ways and the "Impulsive-careless problem-solving style" sub-dimension of Social Problem Solving Scale's (Table 5). Besides, there is a statistically significant, positive and weak correlation (r=0.166, p=0.001) between the "Verbal" sub-dimension of Reasoning Ways and the "Avoidant problem-solving style" sub-dimension of Social Problem Solving Scale (Table 5). It can be seen in Table 5 that there is a statistically significant, positive and moderate correlation (r=0.335, p=0.000) between the "Verbal" sub-dimension of Reasoning Ways and Social Problem Solving Scale (Table 5).

There is a statistically significant, positive and moderate correlation (r=0.359, p=0.000) between the "Verbal" sub-dimension of Reasoning Ways and the "Rational" sub-dimension of Rational and Intuitive Decision-Making Styles Scale (Table 5). There is a statistically significant, positive, moderate correlation between the "Historical" sub-dimension of Reasoning Ways and the "Positive problem orientation" (r=0.383, p=0.000) and "Rational problem-solving style" (r=0.452, p=0.000) sub-dimensions of Social Problem Solving Scale (Table 5). In addition, there is a statistically significant, positive and weak correlation (r=0.160, p=0.001) between the "Historical" sub-dimension of Reasoning Ways and the negative problem orientation sub-dimension of the Social Problem Solving Scale (Table 5).

There is also a statistically significant, positive and moderate correlation (r=0.312, p=0.000) between the "Historical" sub-dimension of Reasoning Ways and the Social Problem Solving Scale (Table 5). Besides, there is a statistically significant, positive and moderate correlation (r=0.401, p=0.000) between the Historical sub-dimension of Reasoning Ways and the "Rational" sub-dimension of Rational and Intuitive Decision-Making Styles Scale (Table 5). There is a statistically significant, positive and moderate correlation (r=0.310, p=0.000) between the "Algebraic" sub-dimension of Reasoning Ways and the "Positive problem orientation" (r=0.326, p=0.000) and "Rational problem-solving style" (r=0.310, p=0.000) sub-dimensions of Social Problem Solving Scale (Table 5). There is a statistically significant, positive and weak correlation (r=0.179, p=0.000) between the "Algebraic" sub-dimension of Reasoning Ways and the Social Problem Solving Scale (Table 5). It can be observed that there is a statistically significant, positive and weak correlation (r=0.251, p=0.001) between "Algebraic" sub-dimension of Reasoning Ways and the "Rational" sub-dimension of Rational and Intuitive Decision-Making Styles Scale (Table 5). It can be concluded that there is also a statistically significant, positive and moderate correlation between the Reasoning Ways and the "positive problem orientation" (r=0.363, p=0.000) and "rational problem solving style" (r=0.314, p=0.000) sub-dimensions of Social Problem Solving Scale (Table 5). A statistically significant, negative and weak correlation (r=-0.106, p=0.037) between Reasoning Ways and the Social Problem Solving Scale sub-dimension was also observed in Table 5. Table 5 also shows that there is a statistically significant, positive and weak

correlation (r=0.103, p=0.042) between Reasoning Ways and Social Problem Solving Scale. Besides, there is a statistically significant, positive and weak correlation between Reasoning Ways and the "Rational" (r=0.220, p=0.000) and "Intuitive" (r=0.248, p=0.000) sub-dimensions of the Rational and Intuitive Decision-Making Styles Scale.

Conclusion

It is clear that teachers and pre-service teachers in this study use reasoning at a "good" level. It was understood that the participants in both groups used "Verbal" and "Analogical" reasoning at a very good level. While it is seen that the teachers use the "Deductive" reasoning way at a moderate level, it is seen that the pre-service teachers use this reasoning way at a level below the moderate level. While it was seen that teachers and pre-service teachers used the "Historical" reasoning way at the same level, it was concluded that the teachers were at a good level by using the "Algebraic" reasoning way at a higher level than the pre-service teachers. This shows that teachers use problem-solving or decision-making processes by making inferences based on numerical data more than younger pre-service teachers.

It was concluded that both participant groups used "Intuitive" reasoning at a moderate level and "Inductive" reasoning at a minimum level. In fact, pre-service teachers' "Inductive" reasoning is almost below the moderate level. In summary, the order of frequency level of reasoning ways used by teachers is as follows: verbal, analogical, deductive, historical, algebraic, intuitive, and finally inductive reasoning. It was understood that the reasoning methods pre-service teachers used are verbal, analogical, historical, deductive, algebraic, intuitive and, lastly, inductive.

Thus, it is understood that both teachers and pre-service teachers use similar reasoning ways. It is quite surprising that the reasoning methods used by teachers who are experienced in the teaching profession and those who are still studying and have no experience in the profession are almost identical. While it is expected that the ways of reasoning that should be learned, changed or developed during the four-year vocational education should differ as a result of the professional experience gained with age, on the contrary, it can be concluded that the pre-service teachers graduated with what they brought in their repertoire and their professional experience did not contribute to this repertoire.

In this case, reasoning paths are a built-in feature that is shaped by language, belief systems and worldview, and that there are reasoning preferences that are internalized by each of us according to the interpersonal interaction that arises simply from being in that culture (Vygotsky, 1978, as cited in Osborn and Kind, 2017) would not be wrong to say. In fact, the ways of reasoning should not be a structure that evolves within the culture as expressed here.

The ways of reasoning should be brought in a wide range with a completely professional approach, in formal learning environments, with a teachable and improvable approach. Otherwise, the same or similar reasoning will result in similar ways of solving problems or making decisions. These similarities will alienate

individuals, therefore society, from creativity. For this reason, it is necessary to develop reasoning ways with a structured understanding within the framework of an independent course or spiral programming that will teach different reasoning ways to teacher candidates.

"Verbal" reasoning is also the ability to logically understand concepts and problems expressed in words. Behaviors of speaking fluently, accessing vocabulary, expressing oneself in a meaningful way, using reasoning skills to help understand the environment are the elements of verbal reasoning. "Analogy" is the explanation of a previously unknown and unfamiliar phenomenon with previously known and similar phenomena. The previously known state is the source, and the previously unknown state is the target. In order to reach the goal, associations are made based on the existing resources (Saygılı, 2008). Analogy is expressed as our mind's generalization of similar events and objects based on events and objects in our minds. "Analogical" reasoning is to reveal invisible similarities from visible similarities (Topçu, 2008). The results obtained need to be verified by studies in order to gain certainty (Kulen, 1972). The word "analogy" is included as 'similarity-likeness' in the Dictionary of the Turkish Language Association, and is defined as obtaining a conclusion or information by comparing pre-existing information with new information among similar objects (Amiripour & Bijan- Zadeh, 2012).

Intuition is quick as it involves immediate insight in the absence of reasoning, provides a sense of confidence, and can reflect processing large amounts of information. And when intuition is based on relevant experiential learning, it likely provides accurate judgments, requires less effort than cognitive reasoning pathways, and does not compete for central working memory resources (Evans, 2010). Therefore, the structure of intuition and the intuition process can also lead to contradictory assumptions and various misunderstandings. In particular, the distinction between process and outcome, the role of consciousness and affect, focus on decision making or problem solving, and intuition in technical and creative environments can lead to different uses (Sinclair, 2010). For this reason, it is thought that the data results obtained through the interview will be satisfactory in order to obtain explanatory information about the moderate participation rate obtained for the "intuitive" reasoning sub-dimension in this study. It was understood that the "rational decision making" skill, which is another variable of the research, among the rational and intuitive decision-making skills, was at a very good level in both groups, and the "intuitive decision making skill" was at a moderate level. This result showed parallelism with the result obtained from the other variable of the research, "Ways of Reasoning". Because of the "intuitive reasoning" method, which is one of the sub-dimensions of the tool in question, was also preferred at a medium level.

According to rationalism, which argues that the source of knowledge is the mind and that true knowledge can only be obtained with reason and thought, they argue that the exact and correct knowledge sought will be found in the reason as a result of a a metaphysical inquiry with mathematics and geometry (Scruton, 2015). This result, which is the proof of the criticism made above regarding the behaviors towards

memorization at the cognitive level of the education-teaching process, is a current of thought based on the epistemology. Because it is an opinion that argues that the accuracy of knowledge is based on thought and mind and that the right source of information is the reason.

According to the results of this research, it was understood that the social problem solving skills of teachers and teacher candidates were at a good level. The positive reflection of the multiplier effect of this result on the grown generations is remarkable. Because it is thought that students with high problem-solving skills will also have problem-solving skills (Ceylan, Bıçakçı, Aral, and Gürsoy 2012). Considering the result that there is a positive, moderate relationship between the social problem-solving skills of university students and their psychological well-being (Dikmen, 2019), it can be concluded that this result is quite significant.

It was understood that both participant groups used the "rational" problem-solving style, which is one of the sub-dimensions of the same measurement tool, at a very good level. Again, it is seen that this result is in parallel with the results obtained regarding the other variables of the study. In addition to rational problem solving, the "positive problem" tendency preferred by both groups at a high level, it is understood that the participants of the research solved the problems with a positive approach.

It has been understood that teachers and pre-service teachers use "Avoid problem solving style", "negative" and "impulsive-careless problem solving" styles at low and close to medium levels. Thus, it can be concluded that teachers and pre-service teachers do not avoid problems and solve problems with a positive or constructive approach. This is desirable behavior for our teachers, who are both role models and teach students problem-solving methods in formal learning environments.

While a statistically significant positive and moderate relationship was observed between the Reasoning Ways of the Teachers and the Rational and Intuitive Decision-Making Scale, rational and intuitive sub-dimensions, this relationship was weak in the positive direction in the prospective teachers. This situation, supported the results obtained from the deductive and intuitive ways of reasoning, which were used at the lowest levels of reasoning above. At the same time, it is seen that as the reasoning skills of the teachers increase, the social problem solving scale, "positive problem orientation" and "rational problem solving" preferences also increase. This result showed that as the reasoning skills of the participants increased, the problem-solving skills of the teachers also increased the frequency of using a positive perspective and a rational method.

One of the striking results of the study was that as the algebraic reasoning skills of the participants increased, their rational problem-solving styles increased. While it is possible to create a concept, to establish relationships between the concepts created, with the principles of reason, this is a result that shows that the reasoning process (Durhan, 2021) is used in establishing relations between proposition and propositions. In addition, recognizing concepts, interpreting sentences, and generalizing and picturing expressions in algebraic terms by making abstractions and relations between

variables require valid and sequential reasoning. Therefore, the result obtained shows that an algebraic reasoning is included in the process.

Again, the correlation analysis between the variables showed that as the "intuitive" reasoning skills of the teachers increased, their intuitive decision-making skills also increased. Thus, it shows that the participants of the research made their decisions by using the way of reasoning that is compatible with each other. This result shows the result that a rational method is used.

The teacher participants of the research, the social problem solving scale was "Positive problem orientation", "Negative problem orientation", "rational problem-solving style", "Impulsive-careless problem-solving style" and "Avoid problem-solving style", a positive correlation was obtained between the sub-dimensions and the "Rational" sub-dimension of the Rational and Intuitive Decision-Making Styles Scale. At the same time, a negative relationship was found between the social problem solving scale, "Negative problem orientation", "Impulsive-careless problem-solving style", "Avoid problem-solving style" sub-dimensions and the "Intuitive" sub-dimensions of the Rational and Intuitive Decision-Making Styles Scale. Thus, it was seen that these relational results obtained showed the expected relations in harmony with each other.

In the prospective teachers, while a positive relationship was obtained between Reasoning Ways and the Social Problem Solving Scale's "positive problem orientation" and "rational problem solving styles", a negative relationship was obtained between Reasoning Ways and "impulsive-careless problem solving style".

As a result of the correlation analysis between the variables of the study, a negative relationship was observed between the "Rational problem solving style" and the "Intuitive" sub-dimension variables of the Rational and Intuitive Decision-Making Styles Scale. It is seen that as the rational problem solving styles of the pre-service teachers increase, their intuitive decision-making skills decrease. This result supported the low-level intuitive rational decision-making and high-level rational decision-making results.

Although the reasoning paths scale used in the study consisted of seven sub-dimensions, it was seen that both participant groups focused on the same sub-dimensions. This showed that the variety of reasoning remained limited. However, the importance of developing reasoning skills is emphasized (Marchis, 2013) and according to Umay (2003), in environments where there is cultural diversity, reasoning skills are enriched and become permanent, while in more closed cultures, less diversity in reasoning is expected. Of course, it also shows that there is a need for quantitative and qualitative studies that will reveal this limitation. However, it is also revealed that reasoning is a teachable and developable skill in studies (Chen & She, 2015; Gillies, 2011). For this reason, it is possible to create a multiplier effect from pre-school to higher education by including individual courses such as "reasoning ways and decision-making skills" in the teacher training process.

According to the results obtained from the findings of the research, it can be said that the diversity of reasoning ways, social problem solving and rational and intuitive decision-making skills of teachers and teacher candidates should be developed.

In a final description, all the results obtained regarding the correlations with the levels of this study, positive and negative observations made the findings of this study consistent within itself in a logical framework.

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