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# DETERMINATION OF PRE-SERVICE PRIMARY SCHOOL TEACHERS' COGNITIVE STRUCTURES OF COMMUNICATION, COOPERATION AND DECISION-MAKING SKILLS VIA A WORD ASSOCIATION TEST

*Research Article*

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**Abstract**

The purpose of the current study is to determine pre-service primary school teachers' cognitive structure regarding communication, cooperation and decision-making skills, which are among the basic life skills addressed in the Life Sciences curriculum. The study employed qualitative research method. The study group of was composed of 111 pre-service primary school teachers taking the course "Life Sciences Teaching" at the Department of Primary School Teacher Training in a state university located in the Marmara region of Turkey. A word association test prepared to test the skills addressed in the current study was used as the data collection tool. This word association test focused on three of the basic life skills; communication, cooperation and decision-making skills. By examining the words written by the pre-service primary school teachers related to these three skills in a detailed manner, a frequency table showing how many times the concepts were repeated was prepared and on the basis of the cut-off points, concept maps were developed. As a result of the analysis, it was found that the pre-service primary school teachers produced a total of 154 concepts in relation to the three skills. When the concepts most frequently produced by the pre-service primary school teachers were examined, it was found that "human" was the concept most frequently produced for the communication skill, "group" was the concept most frequently produced for the cooperation skill and "reaching a conclusion" was the concept most frequently produced for the decision-making skill.

*Keywords:* Communication, cooperation, decision-making, word association test, cognitive structure

## 1. Introduction

Educational-instructional activities aim to impart scientific and technological developments to students and to enable them to keep pace with these developments. The main purpose of education is to ensure that children know themselves as an individual and develop interpersonal relationships and to train them as a good citizen aware of his/her responsibilities (Binbaşıoğlu, 2003; Öztürk, 2006). In this connection, the first course in the elementary school education programs, where the student can both know himself/herself and improve his/her interpersonal relationships and skills, is the Life Sciences course. The Life Sciences course is defined by Baymur (1947) as a course of observations and experiences of life rather than a course which can be learned by reading from books; defined by Binbaşıoğlu (2003) as the first course teaching children how to positively adapt to their environment, by Çilenti (1988) as a course allowing students to get to know themselves and their environments, to adapt to their environment and to provide a basis for the development of

problem solving and creative thinking skills, by Sönmez (2005) as a process based on proving with natural and social realities and knowledge related to life and used in life. Accordingly, the Life Sciences course aims to teach individuals how to cope with the problems they may encounter in daily life, to prepare them for life and to enhance their level of readiness for life by enabling them to infer conclusions from the sample incidences within life (Akınoğlu, 2002). When the objectives of the Life Sciences course are examined, it is seen that it aims to provide the basic life skills that enable the individual to survive.

When the Life Sciences curriculum is examined, it is seen that it addresses a total of twenty three basic life skills; communication, cooperation, decision-making, self-regulation, self-protection, problem solving, entrepreneurship, social participation, developing career awareness, time management, research, observation, perception of space, perception of change and continuity, personal care, self-knowledge, getting to know national and cultural values, protection of nature, use of resources, protection of health, balanced nutrition, following rules, and using information and communication technologies. Cognitive structure and metacognition plays an important role in the inculcation of these skills. Özenç Uçak and Olşen Güzeldere (2006) describe cognitive structure as the framework that organizes the elements that make up knowledge in meaningful learning. Metacognition covers not only the thoughts about the individual's own cognition, but also the thoughts he/she has about all his/her mental actions and enables the individual to review his mental actions against any event and to prepare himself/herself if necessary (Blakey and Spence, 1990; Gama, 2000; Livingston, 1997; Smith and Kosslyn, 2007) because metacognition includes cognitive activities such as understanding, perception, attention, communication, verbal persuasion, reading, social cognition, self-knowledge, problem solving and control (Flavell, 1985). These cognitive activities are of great importance for individuals to master scientific and technological innovations in this century and to apply them in their life processes.

Changes occur in curriculums in line with changing and developing conditions as a result of scientific and technological innovations (Ulusoy, 2008). With the advance of 21st century, greater importance has been attached to skill development than knowledge transfer and skills in education have come to the fore with the innovation-oriented efforts in the 21st century. However, although there is no clear definition of exactly what these skills are, 21st century skills have been identified by many institutions and organizations (Dede, 2010). Some of these institutions and organizations are Partnership for 21st Century Skill ([P21], 2013), the World Economic Forum (DEF, 2015) and the Organization for Economic Cooperation and Development (OECD, 2005). For example, the P21 project, which is implemented by many states in the USA, gathers 21st century skills under three headings called learning and innovation skills, information, media and technology skills and life and career skills (Kylonen, 2012; Partnership for 21st Century Skills, 2013). Under these three main skills are there communication, collaboration, social skills, creative thinking, critical thinking, problem solving, information and communication technologies literacy, media literacy, leadership, flexibility and adaptability, self-management, productivity and accountability skills. Wagner (2008) named 21st century skills as survival skills and stated that these seven skills called cooperation between systems and individuals and leadership, effective oral and written communication, critical thinking and problem solving, accessing and analyzing information, entrepreneurship and taking initiative, agile intelligence and adaptation, curiosity and imagination are of vital importance and that they were created by adhering to the principle of "No Child Left Behind (NCLB)". This stated principle advocates that each child should be active and successful in processes such as learning and citizenship, be able to effectively apply what they have acquired, and that there should be no children who do not acquire the skills determined in this process (Wright, Wright and Heath, 2006). In the 21st century

student profile prepared by the Ministry of National Education (2011), 21st century skills are collected under four main themes called ways of thinking (creativity and innovative thinking and being open to them, critical thinking, problem solving and decision making, using learning strategies / learning to learn and cognitive skills-self-evaluation), ways of working (ways of communication / proper use of Turkish and being able to use a foreign language at a basic level, team work), tools of working (information literacy, information communication technologies literacy) and world citizenship (local and universal citizenship consciousness, consciousness and skills of life and career, awareness of social responsibility covering cultural awareness and competences). In addition, in a study conducted by Ekici, Abide, Canpolat and Öztürk (2017) to list the 21st century skills defined by organizations and institutions, a total of 63 skills from 19 different sources were detected and they also found that the five most frequently repeated skills in these sources are; problem solving, communication, cooperation, creativity / innovation and critical thinking. As a result, although all the classifications made by different institutions and organizations such as OECD (2005), Ministry of National Education (2011), DEF (2015), Partnership for 21st Century Skill (2013) are different from each other, some skills they have included are common in the classifications made. For example, communication and collaboration skills are two of the most common skills in these classifications. Moreover, learning and innovation skills (communication, collaboration, critical thinking and creativity) are seen as the key to lifelong learning and creative thinking (Trilling and Fadel, 2009). Decision-making skill is also included themes called ways of thinking prepared by the Ministry of National Education (2011). In this connection, communication, cooperation and decision-making skills, which are among the 21st century skills, are also included in the elementary school Life Sciences curriculum. For this reason, communication, cooperation and decision-making skills will contribute to the development of lifelong learning in individuals and to the emergence of appropriate outcomes at the end of the training process.

Conveyance of emotions, thoughts and information to others in any conceivable way is called communication (TDK, 2019). The main function of communication is to share emotions, thoughts and skills among individuals (Yalın, 2003). Communication arises from a need and an effort to achieve mutual goals (Johnson, 1990). Due to their social structure, humans need to communicate with other individuals. According to Cüceloğlu (2003), communication is a multichannel process that starts with individuals becoming aware of each other. Individuals communicate from the moment they are born, but many factors such as listening, speaking, and environment can affect communication and problems may arise. Although the individual starts to communicate from the moment he/she is born, the problems that occur in communication cause the emotions and thoughts to be not correctly defined and conveyed (Özerbaş, Bulut and Usta, 2007) and where communication is unhealthy, individuals cannot meet their needs and develop healthy relationships (Cüceloğlu, 2004).

There are different opinions about whether communication skills are inherent, intuitive, or can be learned and taught (Korkut, 2004). However, it is stated in the literature that many of the communication techniques can be learned and taught (Buckman, 2001; Corey, 2001; Driscoll, 1988; Egan, 1994). Babies start communicating with their environment from the moment they are born and their environment expands with the school. West and Mild (1994) stated that communication is a process that should continue between home and school for the development of communication skills in students. In the school environment, one of the basic elements of the student in this process is the teacher and the teacher must have communication skills in order for this process to be completed successfully (Çetinkaya, 2011). It was stated by Çiftçi and Taşkaya (2010) that communication skill is one of the features that teachers should have. In order for teaching to be successful, the communication

process and skills between teachers and students are expected to be good, so the teacher needs to develop communication skills (Alper, 2007). The existing research indicates that there is a positive relationship between the teacher's communication skills and student success (Davies and Iqbal, 1997). It was stated that a teacher with low communication skills would have low professional competence as well as personal competences (Yılmaz, 2011). In a classroom where communication processes are good, it can be said that the teacher and students have good relations with each other. In addition, Dunbar, Brooks and Kubicka-Miller (2006) stated that the ability to communicate is of great importance and that communication skills are taught not only by the communication department, but also in various educational institutions.

Cooperation ability is the ability to evaluate individual contributions made by each member of the team to demonstrate the ability to work effectively and respectfully with different groups, to be willing to make concessions when necessary to achieve the common goal, and to take responsibility for collaboration (Trilling and Fadel, 2009; Yalçın, 2018). Homan (2004) describes cooperation as a group-based work using effective communication and critical thinking. Greer (2012) explains cooperation as a process that facilitates learning by observing, sharing and discussing practices. Cooperation skill, which is among the learning and innovation skills defined as 21st century skills, is one of the skills that need to be developed in school (National Research Council, 2012). Kökdemir (2003) argued that the dominance of critical thinking in the education process could foster cooperation skill as well as reasoning skill in the individual. Senemoğlu (2009) also states that cooperation has benefits such as learning to discuss with others, looking at events from different perspectives, empathizing, problem solving and developing higher order skills. From the elementary school, which is considered to be the beginning of the teaching life, primary school teachers and the Life Sciences course included in the curriculum have an important role in the inculcation of cooperation skill. For example, research has revealed that schools where there is cooperation between teachers are more successful (Goddard, Goddard and Tschannen Moran, 2007).

Decision making is a process that includes skills such as problem solving and through which the individual chooses among the alternatives according to the desired purpose (Wehmeyer, 2007). In this process, the individual selects appropriate and important criteria in line with his/her purpose, defines the alternatives and decides by evaluating them (Beyth-Marom, Fischhoff, Quadrel and Furby, 1991; Chabeli, 2006; Goldsmith, 1996). Understanding what the individual builds his/her decision on when making a decision is an important issue for the development of decision making skill. Making decision always begins with choosing between deciding or not (Betancur, 2016 cited in Melgar, Flores, Arévalo and Antón, 2019). Children need to learn what decisions to make and when, and they need to understand the fact that different decisions are required by different situations (Kaya, 2014) because sometimes decisions can be made based on very simple criteria, sometimes very complex and various criteria need to be considered. Sometimes, right and wrong are very clearly separated, but decisions cannot be so clear. Some decisions may have to be made with partial knowledge, or decisions can also be made based on one's own interests, personal passions, emotions and excitement (Russell, Waters and Turner, 2017). For this reason, it is of great importance to impart the decision-making skill to the child of elementary school age.

In the current study, a word association test was used to elicit the relationships between the concepts found in the pre-service primary school teachers' cognitive structures related to communication, cooperation and decision-making skills also addressed in the primary school Life Sciences curriculum. Word association test is a helpful technique to reveal individuals' conceptual structures and conceptual changes related to any subject (Hovardas and Korfiatis,

2006). There is also a conceptual metaphor theory, which is cognitively similar to word association tests but has some differences. Amin, Jeppsson & Haglund (2015) stated that conceptual metaphor is a theory in which abstract concepts in our mental schemas can be concretized by following a metaphorical way. When the studies using word association tests are examined, it is seen that these tests are widely used in the field of science (Ayaz, Karakaş and Sarıkaya, 2016; Bahar, Johnstone and Sutcliffe, 1999; Bahar and Özatlı, 2003; Balbağ, 2018; Ercan, Taşdere and Ercan, 2010; Kempa and Nicholls, 1983; Kostova and Radoynovska, 2008; Köseoğlu and Bayır, 2011; Kurt, 2013; Kurt and Ekici, 2013; Nakiboğlu, 2008; Özcan and Tavukçuoğlu, 2018; Turan, 2016; Taşdere, Özsevgeç and Türkmen, 2014; Tavukçuoğlu, 2018; Timur and Taşar, 2011; Torkar and Bajd, 2006; Yalvaç Hastürk, 2013), it has also been used widely in social sciences recently (Aykaç, Bilgin and Bacakoğlu, 2016; Aydemir, 2014; Balbağ and Kaya, 2019; Deveci, Çengelci Köse and Gürdoğan Bayır, 2014; Er Tuna, 2018; Işıklı, Taşdere and Göz, 2011; İnel, Akar and Üztemur, 2016; Tokcan and Yiter, 2017; Karakuş, 2019; Karatekin and Elvan, 2016; Kaya and Akış, 2015; Öztürk and Yılmaz Özcan, 2017; Ünal and Er, 2017). Moreover, when the research on the Life Sciences course within social sciences is examined (Apak Tezcan, 2019; Ekici and Ilgın Bilici, 2017; Gündoğan and Gültekin, 2018), it is seen that word association test is relatively less exploited. When this research is examined, it becomes clear that word association test can be used in studies specifically focusing on the Life Sciences course within social studies.

The main goal of the Life Sciences curriculum is defined as follows: "To raise individuals who have basic life skills, know themselves, lead a healthy and safe life, internalize the values of the society they live in, are sensitive to nature and the environment, research, produce and love their country" (MEB, 2018). To this end, it is aimed to train individuals who can use metacognitive skills, have a strong grasp of meaningful and permanent learning, and can practice their gained values and skills in daily life. It is of great importance for pre-service primary school teachers who will be the future teachers of elementary school students to be capable enough to impart not only knowledge but also skills such as communication, cooperation and decision making to their prospective students. These skills are among the basic life skills in the Life Sciences curriculum and are required for the individual at every moment of life. Knowing the cognitive structures formed by pre-service teachers who will impart these skills to students in relation to these skills can give us some insights into the process of inculcation of these skills in students. Thus, the purpose of the current research is to determine the cognitive structures of pre-service primary school teachers related to communication, cooperation and decision making skills, which are among the basic life skills included in the Life Sciences curriculum.

## 2. Method

The current study aiming to determine pre-service primary school teachers' cognitive structures of the skills addressed in the Life Sciences curriculum is a descriptive study in the survey model. Survey models refer to research approaches aiming to describe a state as it is or it was in the past (Karasar, 2009).

### 2.1. Study Group

Population of the current study is comprised of third and fourth year students attending the Department of Primary School Teacher Education in a state university located in the Marmara region in the spring term of 2018-2019 academic year. The sample of the study on the other hand consists of 111 pre-service primary school teachers participating on a volunteer basis. In the selection of the pre-service primary school teachers to constitute the sample, the basic criterion was that they must have taken the "Life Sciences Teaching"

course during their undergraduate education. The demographic features of the pre-service primary school teachers involved in the sample are presented in Table 1.

Table 1. *Demographic features of the participating students*

| Variables | Categories | N | % |
|---|---|---|---|
| Gender | Female | 89 | 80.1 |
| | Male | 22 | 19.9 |
| Grade Level | 3rd Year | 50 | 45.0 |
| | 4th Year | 61 | 55.0 |
| | Total | 111 | 100 |

As can be seen in Table 1, the numbers of the third year and fourth year students in the sample are close to each other yet the number of female students is considerably higher than that of the male students.

### 2.2. Data Collection Tool

In the current study, a word association test was used as the data collection tool. Word association test is one of the alternative measurement and evaluation techniques to analyse students' cognitive structures and the relationships between the concepts in the cognitive structure (Bahar et al., 1999). In the current research, communication, cooperation and decision making skills, which are among the basic life skills in the Life Sciences curriculum, were selected as the concept. Before starting the application, necessary explanations were made about the word association test, and the instruction with an example on how to do the application was presented. Then they were asked to write 10 concepts that came to their mind about these three skills and to form a related sentence with these concepts. In addition, 60 seconds were given to write 10 concepts for each skill and this process was repeated for each key concept. Bahar, Nartgün, Durmuş and Bıçak (2014) stated that 10 words were written one under the other about the key concept in order to prevent the risk of chain response. In addition, they stated that if the students do not return to the key concept in each writing of a word, they will write the words that come to their mind about the word they wrote in response, not about the key concept, and this will also harm the purpose of the word association test.

Communication…….
Communication …….
Communication …….
Communication …….
Communication …….
Communication …….
Communication …….
Communication …….
Communication …….
Communication …….
Related Sentence ……...

### 2.3. Data Analysis

In the analysis of the data, the students' responses related to communication, cooperation and decision-making in the word association test were analyzed. If a word was repeated 5 times or fewer, then this word was not included in the analysis. Moreover, the words that were not related to the key words were excluded from the analysis and words or phrases that were same or similar in meaning were combined into one word. For example, the following

words and phrases all meaning "being in a dilemma" in Turkish: "ikilemde kalmak", "arada kalmak", "arada", "araf" were combined into "ikilemde kalmak" and the following words; "kişi meaning person", "birey meaning individual", "insan meaning human" were combined into "insan meaning human". In this connection, frequency tables showing the repetition frequency of the concepts produced by the pre-service primary school teachers in relation to communication, cooperation and decision-making skills were formed. Then, on the basis of the frequency tables, concept maps were created by using the cut-off point technique to elicit the students' cognitive structures of these skills. While creating the concept maps, the cut-off point technique defined by Bahar et al., (1999) was used. In the cut-off point technique, the responses to each skill in the frequency table are analyzed, the most frequently mentioned response is found and a certain value below this is determined as the cut-off point and then cut-off points at certain intervals are created so that all the concepts can be included in the concept map. The frequencies of the emerging concepts were taken into consideration in the process of using the cut-off point technique and the first cut-off point was determined to be "60 and above", the second cut-off point "45-59", the third cut-off point "30-44" and the fourth cut-off point "15-29". For example, the words at the cut-off point 60 meant that these words were repeated 60 times or more by the pre-service teachers while the words at the cut-off point 45-59 meant that these words were repeated 45-59 times by the pre-service teachers. The concept map of each concept is given below and a different colour is used for each cut-off point. Blue arrows are used for cut-off points 60 and above, purple arrows for cut-off points 45-59, red arrows for cut-off points 30-44 and orange arrows are used for cut-off points 15-29.

## 3. Findings

In the current study, the responses produced by the pre-service primary school teachers were analyzed and then the frequency table of the words related to the concepts "communication", "cooperation" and "decision-making" which are among the basic life skills was constructed. Frequencies of the words produced as responses to the key words are given in Table 2.

Table 2. *Frequencies of the words produced as responses to the key words*

| Produced concepts | Key words | | | Produced concepts | Key words | | |
|---|---|---|---|---|---|---|---|
| | Communication | Cooperation | Decision-making | | Communication | Cooperation | Decision-making |
| Family | 9 | 8 | 2 | Making decision | 1 | 5 | - |
| Wisdom | - | - | 8 | Decisiveness | - | 3 | 6 |
| Receiver | 17 | 2 | - | Indecisiveness | - | - | 29 |
| Understanding | 13 | - | 4 | Reciprocal | 10 | 4 | - |
| Agreeing | 22 | 11 | - | Fight | 7 | - | - |
| Explaining | 4 | 2 | - | Anxiety | - | - | 5 |
| Momentary | - | - | 5 | Self-expression | 2 | - | 3 |
| Researching | - | 6 | 6 | Certain | - | - | 17 |
| Friend | 6 | 24 | 3 | Interpersonal | 7 | - | - |
| Context | 6 | - | - | Easiness | - | 14 | - |
| Success | - | 7 | 8 | Topic | - | 2 | 7 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Skill | 6 | 1 | 4 | Speaking | 57 | 3 | 3 |

Table 2. *Frequencies of the words produced as responses to the key words (Continued)*

| Produced concepts | Key words | | | Produced concepts | Key words | | |
|---|---|---|---|---|---|---|---|
| | Communication | Cooperation | Decision-making | | Communication | Cooperation | Decision-making |
| Body language | 14 | - | - | Culture | 5 | | - |
| "I" language | 6 | - | - | Cluster | - | 6 | - |
| Knowledge | 6 | - | 6 | Leadership | - | 5 | 2 |
| Computer | 15 | 1 | - | Logic | - | - | 9 |
| Consciousness | - | - | 5 | Letter | 14 | - | - |
| Finding a way | - | - | 6 | Message | 28 | - | - |
| Togetherness | 3 | 53 | 3 | Happiness | - | 2 | 3 |
| Working | - | 22 | 1 | Being clear | - | - | 13 |
| Conflicting | 4 | - | 1 | School | 8 | 12 | 7 |
| Environment | 16 | 6 | 5 | Positive attachment | - | 8 | - |
| Solution | - | 1 | 5 | Approval | - | - | 5 |
| Solidarity | 1 | 41 | 1 | Cooperatively | 1 | 44 | - |
| Evaluation | - | 1 | 18 | Play | 1 | 8 | - |
| Lesson | 1 | 5 | 3 | Homework | - | 17 | 2 |
| Diction | 6 | - | - | Student | 1 | 5 | 1 |
| Language | 35 | - | - | Learning | - | 5 | - |
| Listening | 14 | - | 1 | Teaching | 3 | 2 | 2 |
| Dialog | 12 | - | - | Measuring | - | - | 5 |
| Friendship | 3 | 4 | - | Importance | 1 | 1 | 3 |
| Feedback | 10 | - | 2 | Freedom | 1 | 1 | 5 |
| Emotion | 11 | - | 2 | Self-confidence | 2 | 1 | 2 |
| World | 5 | - | - | Sharing | 4 | 30 | 1 |
| Thought | 6 | 3 | 21 | Planning | - | 7 | 14 |
| Thinking | - | - | 35 | Problem solving | 3 | - | 2 |
| Regulation | - | 3 | 3 | Project | - | 12 | 2 |
| Hand in hand | - | 7 | - | Risk | - | - | 6 |
| Touching | - | - | 5 | Healthy thinking | 3 | - | 2 |
| Empathy | 19 | 7 | 4 | Respect | 9 | 15 | 1 |
| Interaction | 14 | 8 | 6 | Option | - | - | 10 |
| Effective | 10 | - | - | Choosing | - | - | 44 |
| Marriage | - | 2 | 3 | Tone of voice | 16 | - | - |
| Idea | - | - | 18 | Love | 9 | 6 | - |
| Opinion exchange | - | 11 | 3 | Exam | - | 1 | 5 |
| Sender | 7 | - | - | Class | 2 | 7 | - |
| Task | - | 13 | 3 | Conversation | 10 | - | - |
| Work distribution | - | 13 | - | Reaching a conclusion | - | 4 | 66 |
| Visual | 5 | - | - | Question marks | - | - | 5 |
| Eye contact | 8 | - | - | Responsibility | - | 27 | 22 |

| Group | 1 | 61 | 4 | Problem | - | 3 | 2 |
|---|---|---|---|---|---|---|---|

Table 2. *Frequencies of the words produced as responses to the key words (Continued)*

| Produced concepts | Key words | | | Produced concepts | Key words | | |
|---|---|---|---|---|---|---|---|
| | Communication | Cooperation | Decision-making | | Communication | Cooperation | Decision-making |
| Power | - | 9 | - | Social media | 19 | - | - |
| Trust | 1 | 2 | 2 | Socialization | 9 | 12 | 1 |
| News | 4 | - | - | Utterance | 10 | - | 1 |
| Correspondence | 7 | - | - | Verbal | 22 | - | - |
| Getting into action | - | 3 | 3 | Non-verbal | 17 | - | - |
| Life | - | 1 | 7 | Process | - | 4 | 27 |
| Animal | 6 | - | - | Team | - | 14 | - |
| Target | - | 5 | 5 | Discussion | 7 | 3 | 2 |
| Feeling | 4 | - | 2 | Technical | - | 5 | - |
| Tolerance | 2 | 10 | - | Technology | 7 | - | - |
| Expressing | 7 | - | - | Telephone | 55 | - | - |
| Need | 1 | 1 | 3 | Television | 18 | - | - |
| Being in a dilemma | - | - | 9 | Preference | - | - | 13 |
| Dialog | 8 | - | - | Meeting | 1 | 5 | - |
| Communication | - | 21 | 3 | Society | 8 | 24 | 1 |
| Collective work | - | 23 | - | Attitude | 3 | - | 3 |
| Human | 78 | 38 | 15 | Harmony | - | 4 | 1 |
| Human relations | 2 | 3 | - | Product | - | 10 | 2 |
| Internet | 16 | - | - | Making a wrong decision | - | - | 17 |
| Willpower | - | - | 6 | Labour | - | 6 | 4 |
| Wish | - | 2 | 6 | Help | - | 16 | - |
| Division of labour | | 11 | 2 | Helping | - | 45 | 5 |
| Sign language | 5 | - | - | Written | 19 | 2 | - |
| Function | 1 | 2 | 3 | Method | - | 14 | 2 |
| Gesture/Facial expression | 31 | - | - | Time | 1 | 3 | 15 |
| Chanel | 13 | - | - | Difficulty | 1 | 3 | 8 |

As can be seen in Table 2, the pre-service teachers produced a total of 154 concepts for the three pre-determined words. When the concepts produced were examined, it was found that the most frequently produced concept for the "communication" key word is "human (f=78)", that the most frequently produced concept for the "cooperation" key word is "group (f=61)" and that the most frequently produced concept for the "decision-making" key word is "reaching a conclusion (f= 66)". In the current study, the cut-off point technique was used to reveal the relations between the concepts produced for the key words. The concept map

constructed with the words having 60 and above repetition frequency (blue) is presented in Figure 1.

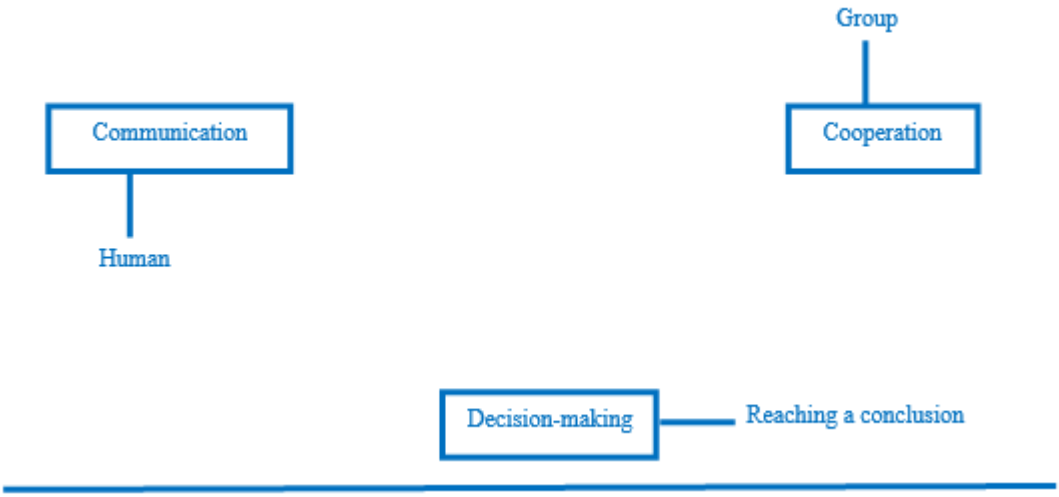


Figure 1. *The concept map constructed with the words at the cut-off point 60 and above*

As can be seen in Figure 1, the most frequently produced concept by the pre-service primary school teachers for the communication key word is "human", the most frequently produced concept for the cooperation key word is "group" and the most frequently produced concept for the decision-making key word is "reaching a conclusion". The concept map constructed with the words having 45-59 repetition frequency (purple) is presented in Figure 2.

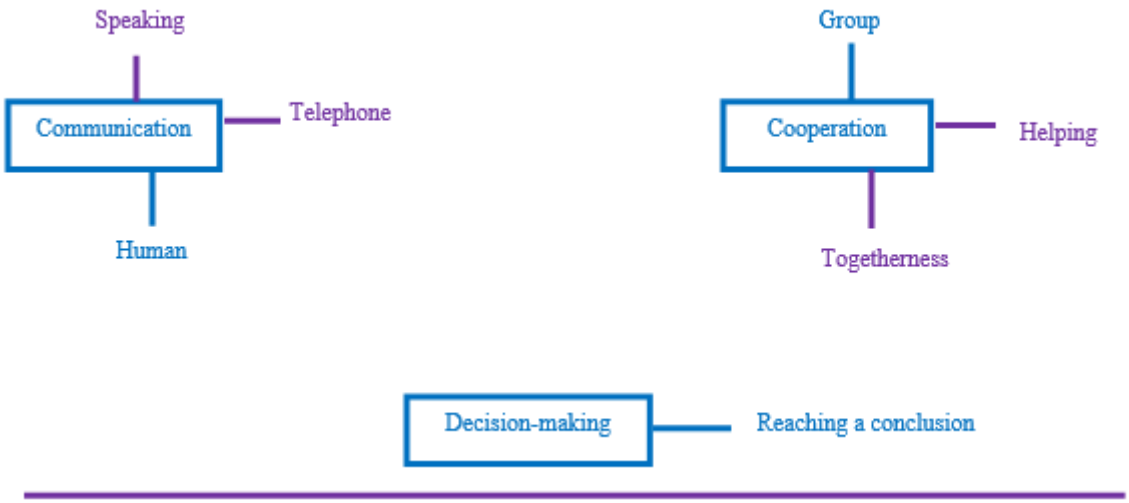


Figure 2. *The concept map constructed with the words at the cut-off point 45-59*

As can be seen in Figure 2, the pre-service primary school teachers produced the "speaking" and "telephone" concepts for the communication key word, the "togetherness" and "helping" concepts for the cooperation key word. The pre-service teachers did not produce any concept for the decision-making key word. The concept map constructed with the words having 30-44 repetition frequency (red) is presented in Figure 3.

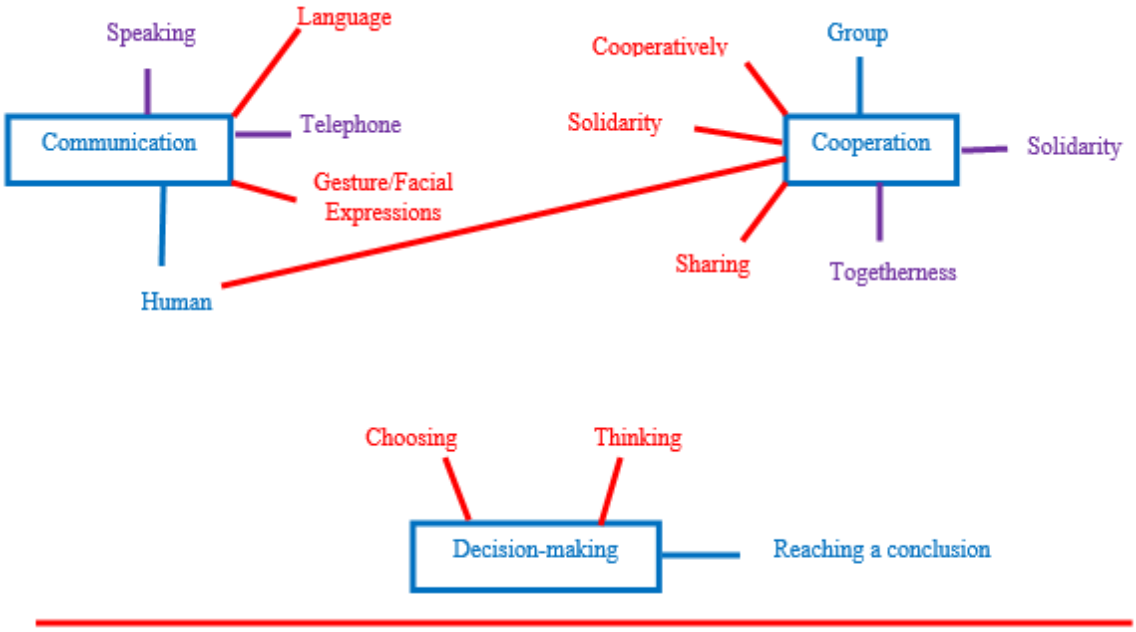


Figure 3. *The concept map constructed with the words at the cut-off point 30-44*

As can be seen in Figure 3, the pre-service primary school teachers produced the "language" and "gesture/facial expressions" concepts for the communication key word, the "cooperatively", "human", "solidarity" and "sharing" concepts for the cooperation key word and the "choosing" and "thinking" concepts for the decision-making key word. Moreover, in this range of cut-off points, the human concept is associated both with the communication and cooperation key words. The concept map constructed with the words having 15-29 repetition frequency (orange) is presented in Figure 4.

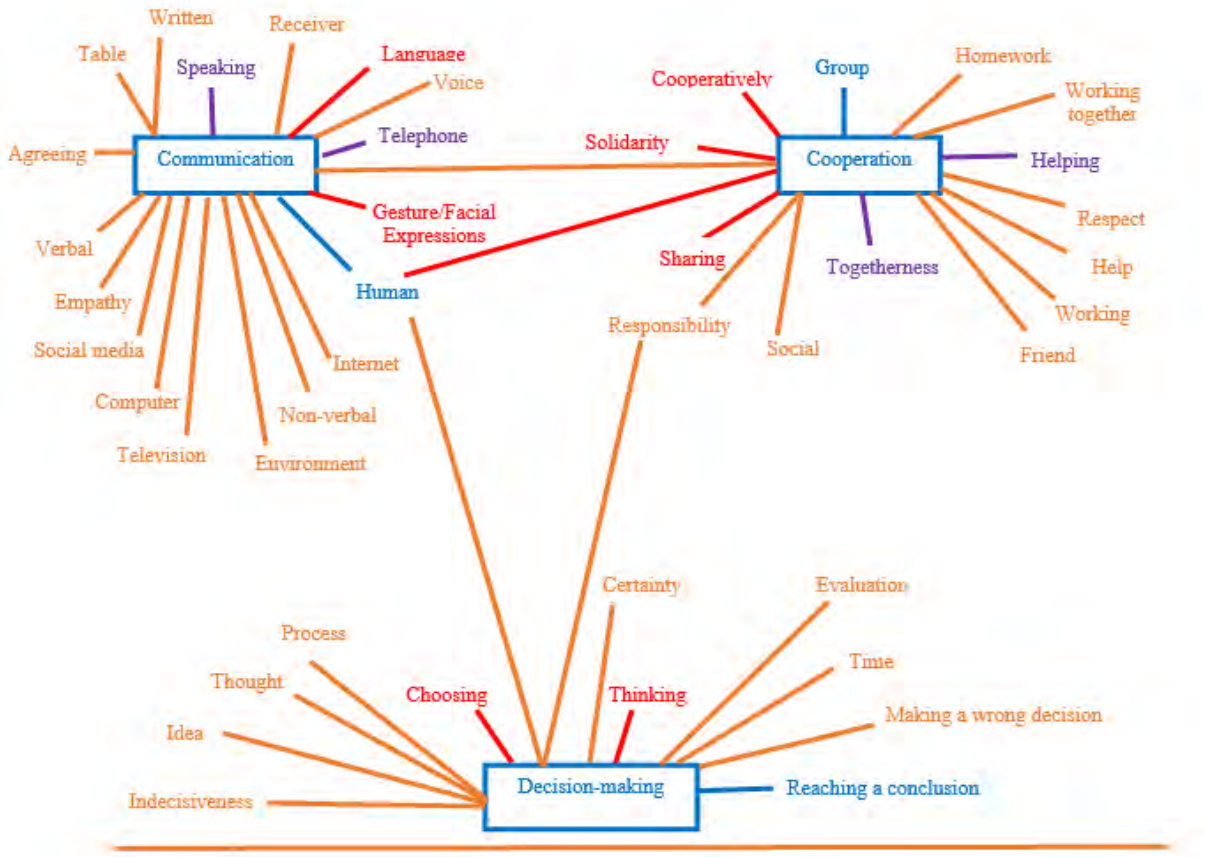


Figure 4. *The concept map constructed with the words at the cut-off point 15-29*

As can be seen in Figure 4, the pre-service primary school teachers produced the "table", "agreeing, "verbal", "empathy", "social media", "computer", "written", "television", receiver", "voice", "non-verbal", "environment" and "internet" concepts for the communication key word. They produced the "society", "friend", "responsibility", "working", "help", "respect", "homework", "working together" and "communication" concepts for the cooperation key word. They produced the "idea", "thought", "process", "indecisiveness", "certainty", "time", "making a wrong decision", "evaluation", "responsibility" and "human" concepts for the decision-making key word. Moreover, in this range of cut-off points, the human concept was associated with the communication, cooperation and decision-making key words and the responsibility concept was associated with the cooperation and decision-making key words. In addition to this, there is an association between the cooperation key word and the communication key word.

## 4. Discussion, Conclusion

The findings of the current study have revealed that the pre-service primary school teachers produced a total of 154 concepts. When the concepts most frequently produced by the pre-service primary school teachers were examined, it was found that "human (f=78)" is the concept most frequently produced for the communication skill, "group (f=61" is the concept most frequently produced for the cooperation skill and "reaching a conclusion (f=66)" is the concept most frequently produced for the decision-making skill. When the concepts produced by the pre-service primary school teachers for the communication skill were examined in relation to cut-off points, it was found that the most frequently produced concepts are "human", "speaking", "telephone", "language", "gesture/facial expressions". Koç Akran, Acıdemir and Uludağ (2018) investigated the university students' metaphorical

perceptions of the communication concept and found that the participants associated the communication concept with the words such as "human, telephone, language, first talk". Bozpolat (2015) and Lüle Mert (2013) researched the pre-service Turkish teachers' metaphorical perceptions of the four main language skills; listening, reading, speaking and writing and reported that the concepts of listening and speaking occupy an important place in communication. In the current study, it was also found that the pre-service primary school teachers mentioned the concept of listening in relation to the communication and decision-making skills, the concept of speaking in relation to the communication, cooperation and decision-making skills and the concept of writing in relation to the communication and cooperation skills. Taşdemir, Taşdemir, Buyuran and Cesur (2016) conducted a study to determine how the pre-service teachers define and perceive a teacher devoid of human relations and they associated such a teacher most with the concepts such as plant, inanimate object, belongings and machine. While defining a teacher devoid of human relations, they used statements such as he/she is a plant in a desert because he/she is useless as he/she does not communicate with people, he/she is non-living and insensitive like machine, he/she only does his/her job; thus, it can be concluded that human, language, speaking and gesture/facial expressions have an important place in communication. Sever (2004) defined speech as a sub-dimension of communication and as the exchange of thoughts and feelings of the individual with others. Akkaya (2011) investigated middle school eight grade students' perceptions of the concept of speech and stated that speech is a means of communication and a natural need. As Güneş (2007) stated, speech is a process that starts in the mind and is completed by verbal expression of thoughts. In verbal communication expressed as speech, the person can tell his/her thought more effectively to the other person (Tutar and Yılmaz, 2010). In their study investigating students' metaphorical perceptions of the concept of public relations, Koçyiğit, Aktan and Çakmak (2018) found that one of the words most frequently associated with the target concept is "communication". Eren (2012) used the word association test consisting of the words computer, internet, technology, communication, computer-aided teaching and information technologies to examine elementary school students' perceptions of information technologies. When the words produced for the word "communication" were examined, it was seen that concepts such as phone, facebook, computer, internet, letter were produced. In this regard, the findings of the current study seem to concur with the literature in general.

When the concepts produced by the students in relation to the cooperation skill on the basis of the cut-off points were examined, it was found that the most frequently produced concepts are group, togetherness, helping, cooperatively, human, solidarity and sharing. Moreover, the human concept was found to be associated with both the communication and cooperation skills. Baştürk and Bektaş (2019) investigated elementary school students' metaphorical perceptions of the concept of cooperation. When the concepts the elementary school students associated with the concept of cooperation were examined, it was found that they produced words such as helping, solidarity, happiness, togetherness, friendship, brother, brotherhood. Similar concepts were also found to be produced by the pre-service teachers in the current study. Cooperation is a working method unconsciously used by the individual in every stage of life and the individual works with others in order to deal with many problems he/she encounters in daily life. Similarly, with the cooperative learning where students work by helping each other learn in small groups (Açıkgöz, 1992) the between-groups solidarity is enhanced and their attitudes towards school and learning are positively affected. Aktepe (2010) researched the value of altruism and found that the concept of altruism is used as synonymous with many different terms and is seen to be related to many concepts such as sharing, cooperation, generosity, volunteerism, sacrifice, mercy, social responsibility, empathy and benevolence. This finding is similar to the finding of the current study.

When the concepts produced by the students in relation to the decision-making skill on the basis of the cut-off points were examined, it was found that the most frequently produced concepts are reaching a conclusion, choosing and thinking. When the concepts produced in one lower range of cut-off points were examined, the most frequently produced concepts were found to be indecisiveness, process, evaluation, certainty, making a wrong decision. Decision-making is the process of creating possible options by defining the problem in any subject and choosing the most suitable option from these options by considering the possible results (Mitchel and Krumboltz, 1984 cited in Güçray, 2001). In the study, where the perceptions of third grade students in primary school about the values of love and respect were examined through metaphor analysis, the value of love was found to be the source of happiness, knowledge source, labour / effort / struggle, socialization / unity-togetherness and protection and the value of respect was found to be expressed in the categories of patriotism, authority, gratitude, unity-togetherness, knowledge (Tunç, 2019). In the current study, some of the concepts produced in relation to the communication, cooperation and decision-making skills are common to these three skills. In this regard, the concepts of love and respect were produced for both the communication and cooperation skills while the concepts of socialization/togetherness for the communication, cooperation and decision-making skills. These findings concur with the findings reported by Tunç (2019).

On the basis of the findings of the current study, it can be said that word association tests can be effectively used in the Life Sciences classes. Parallel to İnel et al. (2016), in the current study it was seen that word association tests can be used effectively in the field of science as well as social sciences. In addition, in the literature, there are findings showing that elementary school teachers use word association tests little, do not consider themselves competent in the application of these tests and do not have enough time to apply them (Aydoğmuş and Coşkun Keskin, 2012; Gümüş and Aykaç, 2012). Moreover, in a study conducted with elementary school teachers, it was found that the use of word association tests is of medium level (Duran, Mıhladız and Ballıel, 2013). Thus, it can be argued that if pre-service teachers and teachers are adequately informed about word association tests and their application process during their pre-service and in-service training, then they can more prefer word association tests to elicit the relations in their students' cognitive structures and in the measurement and evaluation process.

## 5. Recommendations

In light of the findings of the current study, following suggestions can be made:

- ✓ Educational processes should be planned taking into consideration the word maps in which pre-service teachers associate concepts with each other to develop their communication, cooperation and decision-making skills.
- ✓ Pre-service teachers' cognitive structures of the skills they have can be determined through alternative measurement and evaluation techniques such as metaphors and concept maps.
- ✓ In the current study, it was investigated which concepts were associated with the pre-determined skills in the minds of the pre-service teachers and future research can look at misconceptions.

## 6. Ethics committee clearance

The authors confirm that the study does not require ethics committee approval according to research integrity guidelines in their country.

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