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The Perceptions and Views about Problem Solving Process of Pre-Service Science Teachers

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Abstract

In this study, it is aimed at determining pre-service science teachers' perceptions and views about problem solving process. In the study, a questionnaire consisting of six questions was used as data collecting tool. 116 pre-service science teachers studying at different grade levels participated in the study. Using descriptive analysis and content analysis assessed the data obtained from the study. As a result of the analysis of data, generally it is said that pre-service science teachers see problems faced with as obstacles that are needed to overcome; they think that every problem has a solution and have different views about how problem solving process can be taught to students. It is thought that the results obtained from the study will contribute to the relevant literature about the identifying and developing of the perceptions and views towards problem solving process of pre-service science teachers.

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1. Introduction

When individuals that meet various problems through the life can solve the problems they meet, they can adapt daily life and can succeed in different areas. Generally, problems are described as obstacles that individuals meet and made difficult that an objective should be achieved (Yavuz, Arslan & Gulden, 2010). In other words, it can be said that the problems are difficulties individuals meet their life. Since problems are the main way of surviving in daily life, individuals need to solve the problems they meet (Tambychik & Meerah, 2010). So, it is needed individuals that meet the various problems through their life (Güven, 2010) should be used their problem solving skills in order to

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overcome the so-called problems. As is known, problem solving skills help to individuals in solving of the problems met in not only academic life but also all stage of life (Armağan, Sağır & Çelik, 2009). Generally problem solving that mean as coping with the problems and need that problem solving skills should be used, is complex process included in cognitive, affective and behavioral activities (Serin, Serin & Saygılı, 2009). Since it is complex process, specialists suggest that this process should be divided into certain stage (Çalışkan, Selçuk & Erol, 2010). Therefore, problem solving process involve in various stages as from the definition of the problem to problem solving. In solving the problems met firstly problem is defined, the subjects needed to be investigated in order to solve the problem is determined, researches are made and problem is solved with knowledge obtained (Ekici & Balım, 2013). Individuals that chair the problem solving process well could be more successful in their life. When it is thought that the education-instruction process is an important process, it is able to say that teachers need to have problem solving skills (Yavuz, Arslan & Gulten, 2010). Generally since teachers have perceptions about problem solving process, they want for students to solve the problems by using the concepts and principles they have taught (Lee, 2010). But, it is not possible solving of the problems with only the concepts and principles learned. At first, It is needed that problem solving skills of the students that ask for support to improve themselves (Cifarelli et al, 2010) should be improved by helping from different teaching methods and techniques. For this reason, the knowledge levels, perceptions and views about problem solving process of the teachers are of great importance for them to teach the so-called problems to their students and use problem solving skills in their life. It is thought that the perceptions and views about problem solving process of pre-service science teachers to be teacher in the future is important since they meet various problems in their career and instruct to their students for them to learn problem solving process. So, it is aimed at describing the perceptions and views about problem solving process of pre-service science teachers in the so-called research.

2. Research Method

In this research, it has been used case study design that is one of the qualitative research methods (Yıldırım & Şimşek, 2006). It is aimed at determining the perceptions and views about problem solving process of pre-service science teachers by a questionnaire developed as data collection tool and included in 5 open-ended and 1 closed-ended questions. In developing of the questionnaire, literature has been researched and experts' view has been taken. Since, current research designed as a qualitative study, sampling has not been done and working group has been determined. In determining of the working group, purposeful sampling has been used. One hundred sixteen pre-service science teachers learn in first, second, third and fourth class in Usak University have been participated in the study.

3. Findings

The answers about questions in questionnaire of the pre-service science teachers and the percentages and frequencies of the answers are included in this part.

Table 1 The perceptions and views of pre-service science teachers about the first question

| In your opinion, What does the problem mean? | | | |
|---|----------|----------|--|
| <i>Codes</i> | <i>f</i> | <i>%</i> | <i>The examples of some statements</i> |
| Trouble / Difficulty/ Negative | 35 | 32 | It is obstacle be needed to overcome (3) |
| The event needed to solve | 18 | 17 | It is the mistake that made through the event (5). |
| The obstacles needed to overcome | 17 | 16 | It is the negative thing that I meet (11). |
| The event that has not solution | 15 | 14 | It is the thing that I couldn't know the results of it (22). |
| Mistake / Misfortune / Uncertainty | 13 | 12 | It is the obstacle that met (35). |
| The event that has solution | 10 | 9 | It is the unknown events and uncertainty (54) |

As is seen at table 1, pre-service science teachers have used more negative statements about the meaning of the problem. Pre-service science teachers have usually been associated the problems with the concepts like trouble, difficulty, obstacle and mistake. Besides, pre-service science teachers described the problems as the events to be needed solving, in % 17 frequently, the events have not solution in % 14 frequently and the events have solution in

% 9 frequently.

Table 2. The perceptions and views of pre-service science teachers about the second question

| In your opinion, what to do firstly when meet the problem? | | | |
|---|----------|----------|---|
| Codes | f | % | The examples of some statements |
| To search the solving method by thinking | 49 | 44 | Making research and collecting information is needed (7). |
| To search the source of the problem | 30 | 27 | Producing a solution is needed (35). |
| To understand and describe the problem a | 23 | 21 | Thinking different solution ways is needed (46). |
| To search and collect information | 9 | 8 | |

As is seen at table 2, pre-service science teachers have been given 4 different answers about needed what to make firstly when have been met. Pre-service science teachers have stated it is firstly needed that the solution way should be searched in % 44 frequently, the source of the problem should be searched in % 27 frequently, the problem should be described in % 21 frequently and research should be made in % 8 frequently.

Table 3. The perceptions and views of pre-service science teachers about the third question

| In your opinion, what to do to solve the problems met in daily life? | | | |
|---|----------|----------|--|
| Codes | f | % | The examples of some statements |
| To search the solution way | 34 | 26 | To speak calmly and not to decide immediately (6). |
| To determine the source of the problem | 28 | 21 | We should search the most suitable solution calmly (13). |
| To be calm | 27 | 20 | It should be searched the most suitable solution for problem (26). |
| To be careful / to make plan | 19 | 15 | |
| To try the solution way | 14 | 10 | It is needed to be calm and search the solution way |
| To make research | 9 | 8 | (116). |

As is seen at table 3, pre-service science teachers have stated it is firstly needed that the solution way should be search in % 26 frequently, the source of the problem should be determine in % 10 frequently, the solution way should be tried in % 10 frequently and the research should be made in % 8 frequently in order to be able to solve the problems in daily life. Besides, pre-service science teachers stated it is needed to be calm, careful and planned in order to be able to solve the problems by emphasizing affective behaviors.

Table 4. The perceptions and views of pre-service science teachers about the fourth question

| In your opinion, What are the problem solving processes needed to following to solve the problem met? | | | |
|--|----------|----------|--|
| Codes | f | % | The examples of some statements |
| To determine the problem | 45 | 25 | The event firstly is tried to understand. The feasible solution way is found and applied (17). |
| To search / to get information | 33 | 19 | Thinking, getting information and solving (25). |
| To produce the solution way | 20 | 11 | To find the reason of the problem, to search the solution way and applying (30). |
| To hypothesize | 19 | 10 | |
| To search the reason of the problem | 19 | 10 | The problem is tried to understand and search the solution way (36). |
| To try different solution way | 17 | 9 | |
| To apply the most suitable the solution | 11 | 6 | |
| To make controlled experiment | 10 | 5 | The problem is determined and understood. The method is chosen (84). |
| To make an observation | 10 | 5 | |

As is seen at table 4, pre-service science teachers have stated that the definition of the problem in % 25 frequently, making research in % 19 frequently, producing the solving way in % 11 frequently, hypothesizing in % 10 frequently and researching the reason of the problem in %10 frequently are problem solving processes needed to follow to solve the problem. Besides, some pre-service science teachers have stated that trying different solving way, applying the most suitable solving way, making controlled experiment and observation compose the problem

solving process.

Table 5. The perceptions and views of pre-service science teachers about the fifth question

| In your opinion, What can be done to develop individuals' problem solving skills? | | | |
|--|----------|----------|---|
| <i>Codes</i> | <i>f</i> | <i>%</i> | <i>The examples of some statements</i> |
| To give information | 26 | 32 | It should be thought by living and observed |
| To learn by living | 15 | 19 | their attitudes among the events (5). |
| To help for solving the problem | 15 | 19 | It should be thought that every problem has |
| To meet with the problem | 9 | 11 | a solution (27). |
| With the solving application of the problem | 8 | 10 | It should be give information about these |
| With formal and informal learning | 7 | 9 | subject individuals (79). |

% 28 of pre-service science teachers has no idea about what can be done for individuals to improve problem solving skills. Pre-service science teachers answering the so-called questions have stated that problem solving skills of individuals can be able to improve by giving information about problem solving process in % 32 frequently, providing they should learn by living in % 19 frequently, helping them in solving of the problem in % 19 frequently. Besides, pre-service science teachers in % 9 frequently have stated that problem solving skills are be able to improve with formal and informal learning.

In the final questions in the questionnaire, it is aimed at determining the views about whether every problem has a solution or not of pre-service science teachers. % 80 of pre-service science teachers has stated that every problem has a solution. % 20 of pre-service science teachers has stated that every problem hasn't a solution.

4. Conclusion and Suggestion

In this study, it is aimed at determining the perceptions and views about problem solving process of pre-service science teachers. To this end, it is asked that pre-service science teachers should state what the problem means for them. Generally, pre-service science teachers have given negative statement about problem and they have associated problem to the concepts like obstacle, negative, mistake. Besides, some pre-service science teachers have indicated that the problems are the unsolved events. Consequently, it is possible to say that pre-service science teachers have the negative perceptions about the problems. According to another results obtained from the study, it has been determined pre-service science teachers think that it is needed to firstly search the solution way and make research on meeting with a problem. As is known, the determining and describing of the problem are the most important stage for the solution of the problem. In the other stages, it is focused on solving of the problem. If pre-service science teachers firstly focus on solving of the problem, they can have difficulty in solving the problem and can't chair the problem solving process. In the study, with other question it has been determined that the majority of pre-service science teachers think that every problem has a solution. However, some of pre-service science teachers have stated that every problem hasn't a solution. It can be said that the so-called views of pre-service science teachers can be caused they should avoid from solving the problem. In the study, two questions have been directed to pre-service science teachers about how they perceive the problem solving process in solving of problems in the daily life and the problems in the lessons. Pre-service science teachers generally have stated problem solving stages for both questions; but they have used expressions about affective domain like being calm, careful about the solving process of the problems in the daily life. So, it is possible to say that pre-service science teachers are more sensitive in solving of the problems in daily life and perceive more different daily life problem than the other problems. With the final questions in the questionnaire, it is aimed at determining the views' pre-service science teachers about what can be done for individuals to improve problem solving skills. Majority of pre-service science teachers have stated that individuals' problem solving skills will be able to improve by giving information on how the problem solving process occur. Some of the pre-service science teachers have stated that teaching-learning process will be able to use in improving problem solving skills of the students. According to this result, it is possible to say that pre-service science teachers aren't conscious about the importance of teaching-learning process in improving of problem

solving skills that are one of the life-long learning skills. According to results obtained from research, it can be suggest that lecturers should make exercises about the improving of problem solving skills of pre-service science teachers and overcoming prejudice about problem solving process. Besides, it can be suggest that pre-service science teachers should be informed about teaching methods and techniques used to improve the problem solving skills of their students.

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