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# An Analysis on Problem Solving Skills of Students Studying in Balikesir University School of Physical Education and Sports

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## Abstract

The purpose of this study is to analyze the problem solving skills of the students in Balıkesir University School of Physical Education and Sports by the variables of age, sex, sports branch, department and grade and to reveal the differences. This is a descriptive research. The research population of this descriptive survey modeled study is composed of 1063 students approximately studying in different departments of Balıkesir University School of Physical Education and Sports while the sample consists of randomly selected 304 students. A questionnaire was used to determine the descriptive characteristics of the students in data collection and "Problem solving inventory (PSI)" developed by Heppner and Petersen (1982) and adapted into Turkish by Sahin *et al.* (1993) was used in the study. In data analysis, percentage and frequency values were used while One Way Anova, Man Whitney U and Kruskal Wallis test were utilized in comparison of data and these data were addressed at the significance level of $p<0.05$. All analyses were performed with SPSS v17.0 (SPSS Science, Chicago, IL, USA). When comparing the problem solving skills of students studying in Balıkesir University School of Physical Education and Sports by the variable of age, the problem solving skill of 30+ age group was found high. Problem solving perception of the students studying in sports management department by the variable of department was found high. It has been established that problem solving skills don't differ significantly by the variables of sports branch, sex and grade.

**Keywords:** Problem solving, Sports, Physical education, Sports management.

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## Contents

# 1. Introduction

## 1.1. Problem Solving Skill

When the literature concerning the concept of the problem is examined, it is seen that there are many different definitions. D'zurilla and Goldfried (1971) define problem as a situation in which individual has the difficulty in responding to internal and external tasks while (Bingham, 1998) defines problem as an obstacle for a person's existing strengths to achieve the desired goal and according to Morgan (1999) problem is a state of conflict where individual meets with an obstacle in reaching to the target.

## 1.2. Problem Solving Concept

D'zurilla and Goldfried (1971) defines problem solving as a cognitive and behavioral process that provides selecting the most effective option among many alternatives in order to overcome an unpleasant situation confronted by the individual. According to Bingham (1998) problem solving skill is a learnable concept that can be developed through experience. Thus, it contains intelligence, emotion, will and activity. The individuals who are inadequate in problem solving are more anxious than individuals who have this ability, they experience problems in their relations with other individuals and they suffer from emotional weakness. It has been observed that the individuals in this situation have various compliance problems psychologically (Heppner and Baker, 1997).

According to Jerath *et al.* (1993) confirming that stress, intelligence, extroversion are important elements in effective problem solving, another important element in learning how to solve a problem effectively is anxiety. People with more worries delay in focusing on the solution of the problem. Every time they cannot solve the problem, their worries increase more and their focus on problem solving is eliminated.

## 1.3. Problem Solving Steps

When we encounter a problem, it is very important to analyze and decide first. On the other hand, individuals use their own personal methods to solve their problems with the knowledge they have acquired at school together with their personality and the way they were raised (Arnold, 1992). However, it should be noted that problem solving skill is a learned skill. For this reason, the first thing to know is that problem solving process can be learnt.

Attitudes that are necessary in the problem solving process vary by the type of problem and from person to person. However, there are certain basic steps in solution process. The models directed to general steps determined within the process of problem solving are the slightly modified version of the John Dewey's model which has been in use since 1910. In the method of problem solving, there are such stages as understanding and determining, theoretically design of solution and continuing to try until the solution is reached in a positive sense (Oğuzkan, 1993). This process requires the skill of creative and scientific thinking.

Stevens (1998) sorts the problem solving stages as follows; understanding the problem, collection of required information, getting to the bottom of problem, revealing the solution suggestions, selecting the best solution and solution of problem.

## 1.4. Problem Solving Skills

The obstacle in front of the strengths that the person has gathered in order to reach the desired target is called the problem (Yıldırım and Özkahraman, 2011). Problem solving is defined as the way to choose and use tools and behaviors that are effective and useful to achieve the desired goal (Vural, 2004). From the perspective of human history, we follow the struggle of human beings with the problems they face in every period. As we get closer to today's world, the qualities and difficulty levels of problems have become even more intricate and difficult to overcome, which brings the problem solving skill to a highly important position in human life (Alagözlü, 2006). Although there are a number of ways of problem solving that everyone develops based on their knowledge, skills and experiences, many philosophers have some evaluations related to the topic. The steps in problem solving are composed of the following periods; a preparation period in which the individual collects the information about the problem, the incubation period in which the individual gives up seeking a solution for some time, the enlightenment period in which the individual forms completely new ideas suddenly and lastly the evaluation period in which the individual tests whether the ideas created in the enlightenment period suddenly work (Morgan, 1999).

## 1.5. Research Population and Sample

The research population of the study is composed of 1063 students approximately studying in Balıkesir University School of Physical Education and Sports while the sample consists of randomly selected 304 students.

## 1.6. Data Collection Tool

Problem Solving Inventory: Problem solving inventory (PSI) was developed by Heppner and Petersen (1982) and adapted into Turkish by Sahin *et al.* (1993). The Problem Solving Inventory is a self-assessment scale that measures self-perception of the individual regarding problem solving skills. The inventory is composed of 35 items and 6-point Likert scale. The answers given are rated from 1 to 6. The items of 9, 22 and 29 were excluded in rating. The rating is applied over 32 items. The items of 1, 2, 3, 4, 11, 13, 14, 15, 17, 21, 25, 26, 30 and 34 are rated reversely. The score range to be obtained from the inventory is 32-192. The high level of total scores obtained from the scale indicate that the individual perceives herself/himself as inadequate in problem solving skills (Savaşır and Şahin, 1997). The overall reliability of the problem solving skills inventory was found to be high with a rate of 0.817.

The value of $p<0.05$ was taken into account while calculating the inter-group statistical differences.
Anova test, Independent Samples t-test, Kruskal Wallis test and Man Whitney U test were used in data analysis. All analyses were performed with SPSS v17.0 (SPSS Science, Chicago, IL, USA).

## 2. Demographic Statistics

**Table-1.** Demographic Statistics of Students.

| Variables | | N | % |
|---|---|---|---|
| Age | 18-21 | 104 | 34% |
| | 22-25 | 148 | 49% |
| | 26-29 | 37 | 12% |
| | 30+ | 15 | 5% |
| Sex | Male | 171 | 56% |
| | Female | 133 | 44% |
| Sports Branch | Team Sports | 170 | 56% |
| | Individual Sports | 134 | 44% |
| Department | Coaching Training | 118 | 39% |
| | Physical Education and Sports Teaching | 84 | 28% |
| | Sports Management | 102 | 34% |
| Grade | 1 | 68 | 22% |
| | 2 | 64 | 21% |
| | 3 | 84 | 28% |
| | 4 | 88 | 29% |

**Source:** Obtained from primary data.

The majority of the participants are male (56%). 49% of the participants are in 22-25 age group, 34% of them are in 18-21 age group. 56% of the participants are engaged in team sports. Those studying in coaching training department constitute 39% of the sample, those in sports management constitute 34% of the sample. Also, 4th grade students rank first with a rate of 29%, 3rd grade students rank 2nd with a rate of 28%. Table 1.

**Table-2.** One Way Anova Table Showing Change in PS Levels of the Participants by the Variable of Age.

| Problem Solving Inventory | | | | | |
|---|---|---|---|---|---|
| | Sum of Squares | df | MeanSquare | F | Sig. |
| Between Groups | 134.04 | 3 | 44.34 | 15.94 | .000 |
| Within Groups | 846.74 | 301 | 28.29 | | |
| Total | 981.78 | 304 | | | |

**Source:** Obtained from primary data.

**Table-3.** Averages of PS Levels of Participants by the Variable of Age.

| Variable | | Problem Solving Inventory |
|---|---|---|
| | | Mean |
| Age | 18-21 | 96.42 |
| | 22-25 | 103.08 |
| | 26-29 | 95.45 |
| | 30+ | 73.27 |

**Source:** Obtained from primary data.

Anova test will be applied to understand whether problem solving inventory differs by age. The main hypothesis of the analysis expresses that there is no difference between ages. The main hypothesis is rejected since the probability value calculated after the test (Sig) is below 0.05 and this indicates that there is a statistically significant difference between ages. 22-25 age group has the lowest level of problem solving skills while 30+ age group has the highest level of problem solving skills Table 2, 3.

**Table-4.** Independent Samples t-Test Results of the PS Levels of Participants by the Variable of Sex.

| Test values | | | Problem Solving Inventory | |
|---|---|---|---|---|
| | | | Equal variance assumed | Equal variances not assumed |
| Levene's Test for Equality of Variances | F | | .022 | |
| | Sig. | | .882 | |
| t-test for Equality of Means | T | | 1.381 | 1.386 |
| | Df | | 303 | 289.456 |
| | Sig. (2-tailed) | | .168 | .167 |
| | Mean Difference | | 2.858 | 2.858 |
| | Std. Error Difference | | 2.069 | 2.062 |
| | 95% Confidence Interval of the Difference | Lower | -1.214 | -1.201 |
| | | Upper | 6.930 | 6.917 |

**Source:** Obtained from primary data.

Independent samples t-test will be applied to understand whether problem solving inventory differs by sex. The main hypothesis of the analysis expresses that there is no difference between sexes. The main hypothesis is accepted since the probability value calculated after the test (Sig) is above 0.05 and this indicates that there isn't a statistically significant difference between sexes Table 4.

**Table-5.** Mann Whitney U Test Results by the Variable of Sports Branch.

| Test values | Problem Solving Inventory |
|---|---|
| Mann-Whitney U | 99.50 |
| Wilcoxon W | 18.50 |
| Z | -1.94 |
| Asymp. Sig. (2-tailed) | .052 |

**Source:** Obtained from primary data.

Mann Whitney U test will be applied to understand whether problem solving inventory differs by sports branch. The main hypothesis of the analysis expresses that there is no difference between sports branches. The main hypothesis is accepted since the probability value calculated after the test (Sig) is above 0.05 and this indicates that there isn't a statistically significant difference between branches Table 5.

**Table-6.** One Way Anova Table Showing Change in PS Levels of the Participants by the Variable of Department.

| Problem Solving Inventory | | | | | |
|---|---|---|---|---|---|
| **Test Values** | **Sum of Squares** | **df** | **MeanSquare** | **F** | **Sig.** |
| Between Groups | 301.22 | 2 | 150.113 | 4.78 | .009 |
| Within Groups | 951.56 | 302 | 314.936 | | |
| Total | 981.78 | 304 | | | |

**Source:** Obtained from primary data.

**Table-7.** Averages of PS Levels of Participants by the Variable of Department.

| Test Values | | Problem Solving Inventory |
|---|---|---|
| | | Mean |
| Department | Coaching Training | 97.18 |
| | Physical Education and Sports Teaching | 103.39 |
| | Sports Management | 95.71 |

**Source:** Obtained from primary data.

Anova test will be applied to understand whether problem solving inventory differs by department. The main hypothesis of the analysis expresses that there is no difference between departments. The main hypothesis is rejected since the probability value calculated after the test (Sig) is below 0.05 and this indicates that there is a statistically significant difference between departments. Physical education and sports teaching has the lowest level of problem solving skills while sports management has the highest level of problem solving skills Table 6, 7.

**Table-8.** Kruskal Wallis Test Results of PS Levels of Participants by the Variable of Grade.

| Test Values | Problem Solving Inventory |
|---|---|
| Chi-square | 2.990 |
| Df | 3 |
| Asymp. Sig. | .393 |

**Source:** Obtained from primary data.

Kruskal Wallis test will be applied to understand whether problem solving inventory differs by grades. The main hypothesis of the analysis expresses that there is no difference between grades. The main hypothesis is accepted since the probability value calculated after the test (Sig) is above 0.05 and this indicates that there isn't a statistically significant difference between branches Table 8.

## 3. Discussion

The findings obtained from this study which aims to determine whether the problem solving skills of students studying in Balıkesir University School of Physical Education and Sports differ by the variables of age, sex, sports branch, department and grade are discussed below in the light of relevant literature.

As a result of comparing the problem solving levels of the participant students by the variable of age, it has been observed that the athletes in 22-25 age group has the lowest level of problem solving skills while 30+ age group has the highest level of problem solving skills. High level of scores that can be obtained from the problem solving inventory indicates that problem solving perception of the individual is low. Thus, the problem solving perception of the athletes in 30+ age group is at the highest level. Looking at the studies that investigate the relationship between problem solving and age in athletes, it is stated that individual gains practicality in problem solving due to the increased knowledge and experience together with the age and the person exhibits higher level of problem solving success (Eroğlu and Eroğlu, 2016; Con *et al.*, 2017; Demir, 2018). Our findings are supported with the relevant literature. No significant difference has been found between the Problem Solving Skills of the participant students by the variable of sex. In the related literature, significant difference is established between the problem solving skills and the sex variable in some studies while no difference has been found in others. These differences in the literature can be related to the age range of the sample group (Cilingir, 2006; Dündar, 2009). The smaller the age range of the sample group is, the closer the problem solving skills will be. The fact that there is no significant difference in terms of sex in our study can be caused by the concentration of our sample group in 18-21 and 22-25 age group. No significant difference has been found between the Problem Solving Skills of the participant students by the variable of branch. This result may arise from the fact that the sports lives of the students constituting the sample group of our study are at amateur or professional level. The study analyzing the problem solving skills of elite university athletes in different branches supports our findings (Pulu *et al.*, 2012). In the study of Demđrtaş and Dönmez (2008) analyzing the problem solving skills of teachers, a significant relation hasn't been found between the branch variable and problem solving skill. The results of the study investigating the relation between assertiveness and problem solving skills of female and male athletes in different branches also support our findings (Atan *et al.*, 2018). In the study of Cağlayan (2007) no significant relation has been ascertained between the branch variable and problem solving skill. A significant difference has been found between the

Problem Solving Skills of the participant students by the variable of department studied. The students of sports management department are observed to have higher problem solving skills compared to the students of other departments. It is thought that the differences between the departments can be caused by the contents of the courses the students have taken. A sports manager must be successful in problem solving. Therefore, the students of sports management department exhibit more positive and quicker behaviors while solving the problem since this department aims to provide problem solving skills to students. A sports manager must be successful in problem solving since s/he will undertake the leader position in the institution served. Thus, due to the fact that the curriculum of the sports manager department aims to bring students in problem solving skills, the students of this department display more positive and rapid behaviors in problem solving. Our findings are supported with the literature (Saracaloçlu *et al*., 2001). Likewise, the students of sports management department become entitled to enter into university through their central placement scores, the students of other departments are subject to special talent tests. For this reason, it can be stated that the students of sports management department are more successful in academic terms. This has ensured a positive improvement in their problem solving skills. In the study investigating the relation between emotional intelligence, problem solving and academic success of prospective teachers, a positive relation has been ascertained between problem solving and academic success (Arlı *et al*., 2011).

No significant difference has been found between the Problem Solving Skills of the participant students by the variable of grade. The results obtained from the study of Altunçekiç *et al*. (2005) investigating the problem solving skills of prospective teachers and the study of Tasgin (2011) analyzing the problem solving skills of the students in physical education and sports department by some variables support our findings.

## 4. Conclusion

In the study, the problem solving skills of 30+ age group were found to be high in the comparison of problem solving skills of the students studying in the School of Physical Education and Sports by the variable of age. Problem solving perception of the students in sports management department by the variable of department was found high. It has also been concluded that problem solving skills don't differ significantly by the variables of sports branch, sex and grade.

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