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# Effect of problem-solving Styles on academic achievement of agricultural students in the University of Tehran

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**ABSTRACT**

*The purpose of this study was assessing impact of problem-solving styles on academic achievement of Agricultural Students in the University of Tehran. The statistical population of this research consisted all of the fourth-year agricultural undergraduate students in the University of Tehran (N=250). Applying proportional stratified random sampling method 103 students were selected for studying. The main instrument of study was a questionnaire validity of which was approved by a panel of experts and its reliability tested by Cronbach's Alpha coefficient (α>0.70). Data were analysis (Descriptive statistics: frequency, percentage, mean, standard deviation, Minimum and Maximum) and (inferential statistics: correlation analysis and regression analysis) was conducted by SPSS for Windows. The results showed a significant positive relationship between academic achievement and creative and confidence problem-solving style. Results of stepwise multiple regression analysis revealed that among problem solving styles only creative problem-solving style had a significant effect on academic achievement of students. The findings can be used by managers, planners and educators to improve the academic achievement of students in higher agricultural education system.*

**Keywords**: problem-solving styles, academic achievement, creativity, agricultural students.

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## INTRODUCTION

Because of student selection system for higher education in Iran at last universities will constitute of students who are not homogenous in many aspects such as knowledge level, capability, educational background and advancement potential. Hence, curriculums are hard for some students and for some other easy and pour in content. Because of the entrance of some of these students to Iran universities conditional students, dropping and too much lasting of education period especially in agricultural majors is a matter of concerns which at last lead to educational quality reduction [1]. By the way in today competitive world, social and economic successes is dependent on education and educational development [2], and training of human resources in higher level so that they can meet the society economic, social and political needs is one of the universities functions [3]. Hence, for improving education it is necessary to address students' academic achievement factors affecting it as one of the educational system components, to suggest required mechanisms for improving it [4].

Academic achievement is the extent students reach the educational objectives [5]. [6] suggested that students, grade point average (G P A) can be used for measuring their academic achievement, so in this study GPA was used as a measure for students' academic achievement as many other researchers [7]; [8]; [9]; [10].

Since today it is proved that there are other factors affecting academic achievement besides intelligence [11], so problem-solving styles is one of the factors attracted attention of scholars.

Problem-solving styles are considered as matching individual differences with ways that people prefer to plan and focus on their activities in order to reach the awareness, to generate ideas and to prepare for the tasks. To deal successfully with problematic situations it's very effective to be awareness of individual factors, because individual factors are closely related to how an individual view the world and how respond to stressful situations and factors [12]. Natural state of a person towards change management and problem solving is affected partly by his/her thought, desire to participate in and response to an emerged situation and attitude. Theoretical foundations of understanding problem-solving styles are based on psychological type theory [13], learning style theory [14], [15] and cognitive style theory [16] [17], with research focus on creativity, creative productivity and instructing and teaching of creative problem-solving. Each of them is studying problem-solving styles from their own view. The main focus of this article is examining cognitive style theory of problem solving and its impact on agricultural student's achievement.

From the cognitive perspective, problem-solving is a personal -cognitive and innovative process that helps a person to develop effective and useful strategies to solve their everyday problems by using them. Four activities are related to this component: Problem definition, developing alternative solutions, decision making and implementation of the work, as cited in [18]. Each of four steps has a great role in developing an effective response to the problematic situations. [19], research introduced six styles of problem-solving including: creative problem solving, confidence, Approach, helplessness, control and avoidance styles. The first three styles of problem-solving are called constructive and the last three styles of problem-solving are called counterproductive. Creative problem-solving styles involving planning and considering various solutions depending on the problematic situation. Confidence problem-solving style represents one's belief in oneself ability to solve problems. Approach problem-solving style shows a positive attitude toward and desire to tackle problems. Helplessness problem-solving style shows being an alone person facing the problem. Control problem-solving style refers to external and internal controller in dealing with problematic situations. And avoidance problem-solving style refers to avoid of problems instead of solving them. Long and Cassidy defined problem-solving styles as a cognitive process that people suggest their own strategies to deal with problematic situations.

To sum up researchers came to the conclusion that problem-solving process vary in different levels of experience and different levels of expertise [20]. And that, problem-solving process varies in various fields and by different people and thus the results obtained in the laboratory cannot necessarily generalized to problem-solving situations outside the Labs. This issue over the past two decades has led to an emphasis on problem-solving styles.

Few studies have been done about problem-solving styles relationship with learners' academic achievement, Such as [21]; Poshtiban, 2007 as cited in [22]; Morton, 2001 as cited in [23] and [22]. In the review of mentioned researches we can say that problem-solving styles of students have a positive role in their academic achievement and success. But no research specifically has conducted about role of problem-solving styles of agricultural students on academic achievement. Considering that students of agricultural higher education system play an important role in development of agricultural sector, that is second largest sector after oil sector in the country, it seems that there is a need for research in agricultural higher education system to know how problem-solving styles can affect student academic achievement. This can help managers, planners and educators of agricultural higher education system for developing new strategies and methods to achieve more successes. In this regard, the main purpose of this study is to examine effect of problem-solving styles on academic achievement of agricultural students in Tehran University. Of particular interests were to:

1-To describe the demographic profile of agricultural students in the study;
2-To determine problem-solving styles and students' academic achievement;
3-To examine the relationship of problem-solving styles and students' academic achievement;
4-To determine effect of problem-solving styles on academic achievement.

## MATERIALS AND METHODS

Design of the study was a descriptive survey that done by single cross-sectional study. The population for study was all fourth year undergraduate students of agricultural majors in University of Tehran (N=250). Applying Cochran's

formula and proportional stratified random sampling method 103 students were selected for study. Cassidy and long (1996) questionnaire t including 24 questions translated into Persian and used to collect data. Validity of questionnaire was approved by a panel of experts including faculties of educational and psychology science college, University of Tehran. It was consisted of six parts: creative problem solving style, confidence style, approach style, helplessness style, control style and avoidance style. Each four questions measured one of the problem-solving styles. After conducting a pre-test with 30 people; reliability of the questionnaire was measured by computing Cronbach's alpha coefficient, a measure of internal consistency. Cronbach's Alpha coefficients for each parts of questionnaire were as follows: Creative style (0.75), Confidence Style (0.78), approach style (0.73), helplessness style (0.80), control style (0.71), and avoidance style (0.71). Therefore questionnaire had acceptable reliability. Descriptive statistics (Frequency, Percentage, Mean, Standard deviation, Minimum and Maximum) and inferential statistics (correlation and regression analysis) were used. All data were analyzed using the SPSS for Windows.

**Finding**

**1- Demographic profile of agricultural students**

Mean of age of respondents was 22.67 years with a standard deviation of 1.21 and range of age was 20 to 27 years. 65 (60.7%) of students were male and 42 (39.3%) were female. Students' distribution based on major was as follows: agricultural extension and education (10 students), agronomy (10 students), animal sciences (10 students), plant protection (8 students), horticulture (12 students), economy (8 students), food industry (9 students), soil sciences (12 students), agricultural machinery (6 students), agricultural mechanization (6 students) and water science (12 students).

**2- Problem-solving styles and students' academic achievement**

The results of descriptive analysis of independent variables (Problem-solving styles) and dependent variable (academic achievement) are presented in Table (1).

**Table (1)-Descriptive statistics for dependent and independent variables**

| Variables | Maximum | Minimum | SD | * Mean |
|---|---|---|---|---|
| Control | 5.25 | 1 | 1.18 | 2.67 |
| Helplessness | 6.25 | 1.75 | 1.09 | 3.73 |
| Avoidance | 7.00 | 2.50 | 1.17 | 4.93 |
| Confidence | 7.00 | 2.50 | 1.09 | 4.47 |
| Creative | 7.00 | 2.50 | 1.09 | 4.36 |
| Approach | 7.00 | 1.67 | 1.33 | 4.75 |
| Academic achievement (GPA) | 18.33 | 12.97 | 1.39 | 15.30 |

** The mean of styles of problem-solving is from 7 and Academic achievement mean is from 20*

According to results presented in Table (1) all styles of problem-solving have a mean higher than medium (3.5), except for the control style. Classification of students' achievement (weak, less than 14; medium, between 14 and 17 and strong, more than 17) revealed that students' academic achievement is at the average level.

**3- Relationship between the problem-solving styles and students' academic achievement**

Pearson correlation analysis was used to investigate problem-solving styles relationship with students' academic achievement. Table (2). Results revealed that there is only a positive and significant relationship between the creative and confidence styles of problem-solving and students' academic achievement. In interpreting of these results it can be stated that the more agricultural students have confidence and creativity in solving problems, their academic achievement will be higher.

**Table (2) - Relationship between problem-solving styles and academic achievement**

| problem-solving styles | academic achievement | |
|---|---|---|
| | R | Sig |
| Control | 0.008 | 0.937 |
| Helplessness | 0.107 | 0.373 |
| Avoidance | 0.158 | 0.105 |
| Confidence | 0.263** | 0.006 |
| Creative | 0.278** | 0.004 |
| Approach | 0.075 | 0.442 |

*** Significant at 1% level*

**4- The effect of problem-solving styles on academic achievement**

We use stepwise multiple regression techniques in order to determine effect of problem solving styles on the academic achievement. Styles of creative and confidence problem-solving that had significant correlation with the dependent variable entered in regression. The results in the table (3) show that creative problem-solving style enters into the equation. Value of multiple correlation coefficients (R) is 0.278 and the $R^2$ value is 0.077. It means that 7.7 percent of changes of dependent variable can be explained by creative style table (4).

**Table (3) Multiple regression to examine the effect of problem-solving styles on academic achievement**

| Step | Problem-solving style | correlation coefficient (R) | ($R^2$)Coefficient of determination |
|---|---|---|---|
| 1 | Creative style | 0.278 | 0.077 |

**Table (4) - The effect of problem-solving styles on academic achievement**

| Problem-solving style | Not standardized coefficient (B) | standardized coefficient (Beta) | t | sig |
|---|---|---|---|---|
| -Constant factor | 13.746 | - | 25.43 | 0.000 |
| -creative style | 0.356 | 0.278 | 2.96 | 0.004 |

## CONCLUSION

This paper investigated effect of problem-solving Styles on academic achievement of agricultural students in the University of Tehran. The research findings showed that relationship between creative and confidence problem-solving styles and academic achievement of students was statistically significant [22], researches also showed a significant relationship between creative problem-solving style and academic achievement. The relationships can explain by studies of creativity. According to the Threshold theory [24], there is a certain level of intelligence which is necessary for creativity. Since most of undergraduate students have such a level of intelligence, thus it seems that intelligence factor as major factors in academic achievement and simultaneously creativity, causes positive relationship between academic achievement and creative style. With respect to confidence problem-solving style, it has been recognized that individual differences in the academic achievement is not only depend on intelligence and memory, and other factors that have low correlation with the mental abilities affect the academic achievement [11]. Hence confidence problem-solving style can be considered as second factor affected academic achievement. [25], idea of self-efficacy that means assessment of the individual confidence or his ability to accomplish a specific task. More confidence means more probability of starting a task and more readiness for facing its barriers. Thus it seems confidence factor as one of the factors has relationship with academic achievement simultaneously can lead to more probability of one's effort for academic achievement. Finally regression results showed that among styles of problem-solving affecting on academic achievement, only style of creative problem solving had a positive and significant effect on it. It could explain seven percent of variance of the dependent variable.

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