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The Effectiveness of Problem-Solving Training on the Entrepreneurship and its Dimensions and Problem-Solving Skills in Distance Education Students

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Abstract
The purpose of this study was to determine the effect of problem solving training on entrepreneurship and its dimensions and problem solving in distance learning students. The research method was quasi-experimental with control and experimental groups with pre- and posttest design.The statistical population of this research included distance education students of Payam Noor University and through the available sampling, 20 of them were in the experimental group and 20 in the control group. The research tool was the Entrepreneurship Questionnaire of Kordnaich et al (2008) and the Hepner problem solving questionnaire (1982). For data analysis, Manova test and covariance analysis were used. The Research results showed that problem solving training had an impact on entrepreneurship and problem solving in experimental group students. The greatest impact of this training on entrepreneurship dimensions on the challenge dimension was 0.54 and also on the problem solving ability of students was 0.67. Because challenge is the capability of individuals to cope with daily problems and face challenges and based on the research results, problem solving training can increase this ability in students;it is recommended that problem solving instruction be developed to enhance students' skills and educated through academic and educational programs.

Keywords
Problem-Solving Training, Entrepreneurship and its Dimensions, Problem-Solving Skills, Distance Education Studentst.

Introduction

Nowadays Undoubtedly process of economic development in developed countries explains this fact that economy is influenced by entrepreneurship. As entrepreneurs play basic roles on economic development of developed countries and regarding that students are promising futures, it is necessary to consider methods of reinforcing entrepreneurship dimensions in all societies. Creativity is the base of entrepreneurship. Today creativity and innovation are necessity of surviving, protecting and promoting situation of organizations. Changes and transitions are extremely fast in a way that creativity and innovation are considered as the main factors of surviving organizations and innovation is regarded as the most important competitive resource. In these conditions, organizations can be successful if the possesses creative and innovative human forces and more importantly managers who can make a creative and innovative space in organizations [1]. Entrepreneur is a person who tries to work in economic world lonely by establishing his/her company in order to gain profits and should adopt risks (challenging morale). Also, for making deep cultural changes and changing life methods, today many people lack necessary and basic abilities to face life problems and it makes them vulnerable against modern life problems. All of us face some challenges and problems in life, but everyone responses problem in his/her own method [2]. facing problems some people try to cope the position by correct and rational assessment of it and using some strategies such as problem-solving, positive thought and effective use of supportive systems. In contrast, others try to use incorrect methods

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instead of coping problems suitably. Today researchers have shown very important points by studying coping strategies of successful and unsuccessful people. These studies have shown whom cope problems successfully are people who are provided by a set of coping skills. One method to prevent emerging behavioral problems is promoting people's ability of problem solving that is achieved by problem solving training skills. Problem solving contains some stages: adopting position, in the first step people should learn that they've adopted their problems and don't avoid them. While facing bad problem, many people may find it so difficult and unbearable and even impossible to think about. Next stage is defining the problem that is explaining the problem which someone's faced. Third stage is thoughtful precipitation of solutions and making decision; this stage includes choosing the best solution. Planning to perform the best solution after choosing the best method for problem solving; performing that method needs planning. Next stage after planning chosen solution is performing it. Assessing results of performing solution increases importance of evaluating its effects. It should be examined if the solution has been effective? And if it is possible to gain better results using another solution? [3]. as the problem is solved by this procedure, process of problem solving is ended. Otherwise, four stages (making decision) should be referred and other option should be chosen from the list of solutions. It's also possible to think about better solution by gained experiences. A research was conducted related to designing and preparing program of interpersonal problem solving training by a creative approach and studying its effectiveness on improving gifted students' problem solving skills and research results showed that there is a significant different on problem solving skill between average marks of experimental group and control group [4]. Reinforcing skill of interpersonal problem solving in gifted students can help them to face life problems. In a research on effectiveness of problem solving training on regulating spontaneity processes of selection, optimization and compensation in students it was shown that problem solving training has a significant effect on regulating spontaneity processes (selection, optimization and compensation) in students [5]. In research on effect of Dezorilla and Goldfride social sample of problem solving training on nursing students' problem solving skills, it was shown that problem solving training affects students' problem solving skills [6]. Results of Zenozian et al's research (2011) as "effectiveness of problem solving training on changing students' coping strategies" showed that problem solving training causes to change coping strategies which in some of them (problem solving, social supportive attraction) there was statistically a significant different between experimental group and control group [7]. Also, as in other coping strategies (such as cognitive assessment, emotional control, physical control) some clinical changes were observed which weren't statistically significant. It can be concluded that problem solving training can in general lead to change coping strategies [7]. Yousefi et al (2013) in a research as "effect of problem solving training on self-efficiency and perceived self-efficiency in teenagers" showed that problem solving training causes to promote teenagers' self-efficiency [8]. Latifi et al (2010) in a research as "effectiveness of cognitive-social problem solving training on improving interpersonal relationships, social behaviors and self-efficiency perception of students with learning disability" showed that cognition and regulation of emotion and social problem solving training by cognitive method improve performance of students with learning disability in the field of increasing social problem solving, decreasing improper behaviors such as aggression and resignation and also changing social goals. Results also explained improvement of students' judgement and increasing their social self-effectiveness in the field of adjustment and increasing friendly behavior [9].Moatari et al (2006) in a research on effect of problem solving training on self-conception of nursing students of Shiraz Hazrat Fatemenh Nursing and Midwifery College showed that level of self-conception was significantly different between two groups one months after training course completion. A significant statistical difference was observed between average marks of self-conception before and one months after intervention of experimental group; but this difference wasn't significant in control group [10]. Akbari et al (2012) in a research on effect of training problem solving skills on

students' exam anxiety showed that training plans causes to decrease anxiety in experimental group [11]. Zeraat and Ghafoorian (2010) in a research on effectiveness of training problem solving skills on students' educational self-conception showed that training problem solving skills causes to empower and promote meaning of educational self-conception and educational development [12].Damirchi and Vafaee (2006) in a research on short- and long-time effect of creative problem solving training on problem-solving process and using solutions showed that creative problem solving training affects problem-solving process and solutions [13]. Shahbazi et al (2013) in a research as "effect of problem solving training on emotional IQ of Shiraz nursing students" showed that training problem solving skills causes to promote emotional intelligence of Shiraz nursing students in experimental group [3]. The statistical population of this research included distance education students.Success of trainees in distance education space not only needs academic skills but problem solving skills in order to communicate with others and have a suitable performance facing several problems. Also, students enter work market after graduating and must have necessary skills and properties to enter work market and it is necessary to be provided by entrepreneurship skills to benefit themselves and others. Based on a cognitive approach, today it is believed that learning is preferred by knowledge, skill and attitude by attitude [14], because a person lacking a suitable attitude can't apply his/her skill and knowledge suitably; as a result, regarding dimensions and properties of students' entrepreneurship and problem solving, author began to determine effectiveness of problem solving training on entrepreneurship dimensions (success, control focus, need to success, mental health, pragmatism, ambiguity tolerance, dreaming, challenging) and problem solving of distance education students.

Research purposes:

- Determining the effectiveness of problem solving training on dimensions and properties of distance education students' entrepreneurship
- Determining the effectiveness of problem solving training on distance education students' problem solving ability

Method

The research method was of applied ones from purpose dimension, and of quasi-experimental from gathering information dimension with control and experimental groups with pre-test- and post-test design. The statistical population of this research included distance education students. It is worth to note that 20-people experimental group, 20-people control group was possibly equal regarding age, educational status, sex and problem solving. Data gathering was done in two stages, befo78re and after training ended. People of experimental group received training in ten 2-hour sessions where methods of problem solving (steps of problem solving containing position adoption, problem definition, studying solutions, making decision, planning for the best solution, performing selected solution, evaluating results of performing solution), brain storming and Scamper technique were necessarily trained through ten 2-hour sessions. First session was introducing members and explaining principles of problem solving, considering problem solving framework while encountering problem, thinking and then trying to solve problem. Second session was hold relating to advantages of planning to solve problem, define problem, gather information, analyze problem to simpler components and determine real goals .

Third session- studying possible solution and probable selection of the most effective responses. Fourth session- training method of brain storming, mental precipitation and using them for problem solving. Fifth, making decision and predicting presumptive consequences of every selection and considering proficiency of these consequences in addition to assessing and prioritizing solutions by respondents. Sixth session- doing more exercise based on already prepared scenarios and conducting selected method. Seventh session- reviewing and observing results of performance. Eighth session- evaluating that problem can be solved by another way and

which component of solution can be replaced by better option? Can two steps of a solution integrated together? Which other things can be done especially in this regard and how can present solutions be improved? Which terms on solutions can improve results which methods can be used additionally? What's happened if this solution be omitted? How present conditions can be changed to make better results ?

Ninth session- respondents reported stages of their performance and result of problem solving method of their problems. Tenth session- a group discussion was conducted relating to stages and obtained results. Meanwhile, students were allowed to present their questions and answers by email and to make a group with their professor in social networks. Statistical population of the research includes 64 distance education students who were trained electronically and traditionally. First, 40 students who were in equal conditions and in lower levels of problem solving abilities, were selected in viewpoint of age, educational status and sex, and also by gathering information using Hepner problem solving questionnaire and were randomly classified in two 20-people groups containing experimental group and control group. Experimental group includes 20 students who were trained for problem solving and 20 people who weren't trained (control group). Both groups were studies using Hepner problem solving questionnaire (1982) and Cordnaich et al entrepreneurship questionnaire (2008) before and after intervention. Hepner questionnaire contains 35 questions based on Likert 6-option scale. In this questionnaire people answered questions based on Likert Scale. problem solving questionnaire has three distinct measures based on factorial analysis:

Reliance on PSC problems solving with 11 expressions, tendency style- AA avoidance with 16 expressions, PC, personal control with 5 expressions.

problem solving questionnaire has been regulated and tested by several samples of respondents. It has relatively high consistency with alpha values between 0.72 and 0.85 in sub-scales of PC 0.72, AA 0.84, PSC 0.85 and 0.90 for general scale. (Hepner and Peterson, 1982). Test validity showed that tools measure some structures which are related to personal variables and are considerably in control focus (Hepner and Peterson, 1982). Retest reliability of total questionnaire mark has been in a range of 0.83 and 0.89 through two weeks explaining that problem solving questionnaire is a reliable tool for measuring problem solving ability. This questionnaire was translated by Rafati led by Khosravi in 1997 and was used for the first time in Iran [16]. Cronbache Alpha obtained from Khosravi and Rafati's research (1999) equal to 0.86 and in Bazl's research (2005) equal to 0.66 (17). Also, in Rastgoo et al's research (2011) reliability of this research was reported between %83 and %89 based on two performances through two weeks [18]. It is also acceptable based on validity and Cordnaich et al (2008) entrepreneurship questionnaire with 95 questions contains scales of 1-success, 2- internal control focus, 3-risk, 4-ambiguity tolerance, 5- mental health, 6- dreaming, 7-pragmaticism, 8- challenging for which total Cronbache Alpha is %92.

Results

Describing entrepreneurship variable and its dimensions and problem solving ability in pre and post-test.

Table1. Descriptive indexes of entrepreneurship variable and its dimensions and problem solving ability in pre and posttest

Entrepreneurship variable	Pretest Standard deviation	mean	Posttest Standarddeviation	Mean
Experimental group	o.749	1.04	0.192	3.98
Control group	0.108	1.63	0.256	1.86
Success variable				
Experimental group	0.410	1.77	0.400	3.04
Control group	0.607	1.36	0.379	1.48
Internal control focus variable				
Experimental group	0.355	1.33	0.290	3.47
Control group	0.111	1.29	0.207	1.08
Risk-adopting variable				
Experimental group	0.337	2.02	0.470	3.65
Control group	0.236	1.9	0.265	2.21
Ambiguity tolerance variable				
Experimental group	0.414	1.14	0.194	2.88
Control group	0.102	1.77	0.210	1.86
Mental health variable				
Experimental group	0.749	1.74	0.133	4.09
Control group	0.273	2.07	0.304	1.95
Dreaming variable				
Experimental group	0.507	2.21	0.313	2.69
Control group	0.331	1.99	0.204	1.86
Pragmatism variable				
Experimental group	0.255	2.13	0.190	3.75
Control group	0.340	2.66	0.167	2.58
Challenging variable				
Experimental group	0.457	1.22	0.177	3.34
Control group	0.195	1.63	0.142	1.52
Problem-solving ability variable				
Experimental group	0.94	1.83	0.296	3.85
Control group	0.13	1.38	0.21	1.91

Results of above table show that entrepreneurship posttest mean (3.98) and its dimensions and ability of problem-solving have increased in experimental group; mean and standard deviation in control group have been less than those in experimental group and in general percentages of posttest have increased compared to those of pretest .

In order to response to research hypotheses in this research covariance analysis was used.

Secondary hypothesis 1: problem solving training affects problem solving of distance learning students.

For this hypothesis multi-variable covariance analysis was used. Before presenting results of this analysis normality of variable distribution and variance homogeneity were studied. Results are shown in following tables respectively.

Table2. Levin test for confidence of variance homogeneity

Variable	Levin statistics	Freedom degree 1	Freedom degree 2	Significance Level
Problem solving ability	28	1	0.429	0.156

Regarding significance level in Levin test assumption of variance homogeneity in two groups is approved; regarding normality test, above mentioned variable has normal distribution. Also, regarding sample size covariance analysis can be used to analyze this hypothesis.

Table 3. Results of covariance analysis

Changes resource	Freedom degree	F	Significance level	Statistical power
Pretest	0.001	782.16	1	0.68

The recent results (table 3) show that pretest marks have a significant relationship with posttest marks. It means that produced difference in respondents' marks of experimental group, before and after training course, is significant based on which hypothesis is approved. In this regard, problem solving training course affects students' problem solving. Regarding mean value and standard deviation in experimental group and control group, it can be said that problem solving training causes to reinforce students' problem solving skill.

Secondary hypothesis 2

Problem solving training method is affectingon entrepreneurship and its dimensions in distance learning students.

For this hypothesis multi-variable covariance analysis was used. Before presenting results of this analysis normality of variable distribution and variance homogeneity were studied. Results are shown in following tables respectively.

Table4. Levin test for confidence of variance homogeneity

Variable	Levin statistics	Freedom degree 1	Freedom degree 2	Significance level
Entrepreneurship	0.016	1	28	0.889
Success	0.011	1	28	0.470
Internal control focus	0.041	1	28	0.319
Risk-adopting	0.012	1	28	0.224
Ambiguity tolerance	0.055	1	28	0.315
Mental health	0.035	1	28	0.214
Dreaming	0.074	1	28	0.137
Pragmatism	0.065	1	28	0.129
Challenging	0.035	1	28	0.214

Regarding significance level in Levin test assumption of variance homogeneity in two groups is approved; regarding normality test, above mentioned variable has normal distribution. Also, regarding sample size covariance analysis can be used to analyze this hypothesis.

Table 5. results of covariance analysis

Changes resource	Freedom degree	F	Significance level	Statistical power
Pretest (entrepreneurship)		1284.02	0.001	0.71
Pretest (success)	1	874.77	0.001	0.39
Pretest (internal control focus)	1	839.37	0.001	0.42
Pretest (risk adopting)	1	895.66	0.001	0.37
Pretest (ambiguity tolerance)	1	775.33	0.001	0.29
Pretest (mental health)	1	1044.84	0.001	0.46
Pretest (dreaming)	1	880.73	0.001	0.45
Pretest (pragmatism)	1	845.25	0.001	0.40
Pretest (challenging)	1	930.48	0.001	0.54

Results shown in above table show that pretest marks have a significant relationship with posttest marks. It means that produced difference in respondents' marks of experimental group, before and after training course, is significant based on which hypothesis is approved. In this regard, problem solving training course affects entrepreneurship and its dimensions. Regarding mean value and standard deviation in experimental group and control group, it can be said that problem solving training causes to increase entrepreneurship and its dimensions. According to obtained results, among dimensions of entrepreneurship problem solving training has the most effect on challenging dimension of distance learning students.

Discussion and conclusion

The purpose of this study was to determine the effect of problem solving training on entrepreneurship and its dimensions and problem solving in distance learning students. Results of analyzing main research hypothesis showed that problem solving training affects dimensions of entrepreneurship and problem solving of students and its most effect is on challenge dimension of entrepreneurship variable. Results of this research are congruent with research by Shahbazi et al (2013), Shahbazi and Heidari (2013), KashaniVahid et al (2013), Zolfaghari et al (2013), Zenozian et ql)2011), Yousefi et al (2013), Latifi et al (2010), Damirchi et al (2006). Relating research subject, no study has been conducted relating to distance learning students except two research on distant training and its effect on academic success by Saeedi Nejat and VafaeeNajjar (2012). In a research on effect of MOOC-based distance training programs on educational performance of Payam Noor students, Dortaj et al (2017) showed that training by MOOC affects increasing students' educational performance [20] .

Regarding that problem solving training emphasizes defining problem and methods of solving problems, as a result this training can affects dimensions of entrepreneurship. Twenty first century is named as Information Community Age, knowledge and awareness has formed the most basic properties of human, nations and communities and is of the main development indexes. Being associated with ever changing environment, learners should look for new methods and procedures in order transform knowledge and increase learning. Entrepreneurship is mentioned as a motor motivating economic and social development in several communities and also a changing factor in knowledge-based economic systems. In new theories of industrial revolution relationship between entrepreneurship and development is ever emphasized as its development in several communities is followed by important effects such as employment, growth, creativity and

innovation [22]. Although employment is one of the effects of entrepreneurship in communities, emerging and developing word of entrepreneurship is rooted from employment function of entrepreneurs[23].Entrepreneurship is ability of gathering resources in order to investing new commercial opportunities and trying to make a new commercial organization by business development. Applying productive forces which entrepreneurs have to solve problems creatively, they can tolerably make environmental threats to opportunities and cause to develop economic community quickly by ingenuity and fineness [24].Entrepreneurship means a process of making new thing creatively using time and resources [25].

Access and dominance on creating opportunities and using them in community strategic plans for training is considered as one of basic components of power and empowerments of educational systems. Entrepreneurship processes includes determining opportunities, explaining opportunities, applying opportunities, doing risky works and producing final result. Promoting these components is possible regarding stages of problem solving training. Findings show that problem solving training affects success of distance learning students. Need to success means desire to do something in high standards in order to be success in competitive positions. People with need to high success desire to be ever in challenge and they need regular and repetitive time feedback for their performance in order to undertake solving problems personally and achieve goals. Need to success simply means desire to be successful; it guides people to involve entrepreneurial behaviors. For this reason, in fact, entrepreneurs do somethings which everyone doesn't have ability to do [26]. Studying fourth research hypothesis showed that problem solving training method affects internal control focus of distance learning students. People who possess internal control focus believe that they control their lives enough and behave according to these believes. Some people believe that they are dominant on their fate; and people who possess external control focus say that fate plays with them and believe that life occurrences are by chance [27]. People with external control venter believe that their out of control and external events determine their fates, but successful entrepreneurs believe themselves and don't devote successes and failures to fate, chance and similar forces. In their beliefs, they influence and control successes and failures and think that they are effective on results of their performances. Studying fifth research hypothesis showed that problem solving training method affects risk-adopting of distance learning students. Adopting risk means that one is ready to accept something which has probability of success and failure in the same time. Of course adopting risk depends on someone's previous experience [26].

People with creativity and considered as entrepreneurs are humans who have high percent of risk-adopting; risk-adopting means probability of every result except what is predicted, so adopting risk means probability of loss or risk in the way to achieve goals. In studying hypotheses on the effect of problem solving training on entrepreneurship no similar research was found to compare. Studying sixth research secondary hypothesis showed that method of problem solving training affects ambiguity tolerance of distance learning students. Ambiguity tolerance is accepting uncertainty as a part of life, ability to live with deficient knowledge and desire to begin a direct activity without knowing that it is successful or not [26]. Ambiguity tolerance means someone's feeling of threat and difficulty to adopt environment while changes occur fast and unpredictably and information are insufficient and unclear where difference between humans affects their interactions. In studying this hypothesis no similar research was found to compare. Studying seventh research secondary hypothesis showed that method of problem solving training affects mental health of distance learning students. Being health and open-minded makes this opportunity for entrepreneur to create a clear picture of what he/she wants [28]. Researchers believe that some obtained skills will be the base of activities related to promoting mental health [29] and problem solving skill is one of them. Studying sixth research secondary hypothesis showed that method of problem solving training affects dreaming of distance learning students. Entrepreneurs have some views on their future which are interesting and friendly for themselves

and their business. Entrepreneurs are able to fulfill their dreams [26]. Some people loves dreaming and always pay attention to their dreams. Based on new studies applying some points of brain which belong to dreaming can increase their mental performance to do complicated mental tasks. In studying this hypothesis no similar research was found to compare. Studying ninth research secondary hypothesis showed that method of problem solving training affects pragmatism of distance learning students. As entrepreneurs decide to do something, it will be achieved in the first time and as soon as possible [26]. In studying this hypothesis no similar research was found to compare. Studying tenth research secondary hypothesis showed that method of problem solving training affects challenge of distance learning students and its most effect was assessed. Challenging is in fact degree of involving daily activities and they are forced to face challenge and difficulty in work [26]. In studying this hypothesis no similar research was found to compare. Explaining this hypothesis shows points to reinforcing abilities which makes the field of compatibility in addition to positive and useful behavior [30] and this empowerment means skillful and powerful use of knowledge. It increases people's ability to face problems, because these people can present several solutions while facing problems. As a result, they can accept their social roles and face daily life challenges and problems effectively without hurting self or others.

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