PRESERVICE TEACHERS' PERCEPTIONS ABOUT THEIR PROBLEM SOLVING SKILLS IN THE SCENARIO BASED BLENDED LEARNING ENVIRONMENT

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ABSTRACT

The purpose of this study is to determine how to react everyday lives problems in general. In the study, a pretest-posttest quasi-experimental design was used. The study group consisted of 37 students who were registered for Teacher Experience Course of Computer & Instructional Technologies Education in their 8th semester. In order to collect data The Problem Solving Inventory, a 6 point likert scale with 35 items was used. The scale was completed by the participants both at the beginning and at the end of the 8th semester. In the study as an online learning environment, MODDLE which is a learning management system was used. At the beginning of the semester students who would go to the public primary institutions once a week were randomly assigned to one of the five schools. In the study, participants were given scenarios once a week, totally 8 scenarios and wanted to generate solutions for these problems. Scenarios and solutions were discussed at the face to face courses, semiweekly and gave feedback to them about their solutions by the researchers. At last week, the period of Teaching Practice and generated solutions according to presented problems were assessed, and participants were wanted to respond the scale again. Descriptive statistics and t-test statistical technique were used to analysis of data. The result of the study indicated that there is a significant difference in favour of average points of posttest.

Keywords: **Scenario based learning, blended learning, problem solving, perceived problem solving skills.**

INTRODUCTION

Contemporary needs make it obligatory to have an education that is suitable to social life, develops personality, targeted towards sensible goals, provides opportunity for scientific research methods, independent and individual learning and gives service to mass of people (Alkan, 2005). Developments in information and communication technologies and adopting new approaches in educational system provide solutions for these obligations and enable the use of various methods and mediums in education.

Scenario based instruction which is one of the new approaches is grounded in Situated Learning Theory (Brown and Druid, 1989; as cited in Akins and Crichton, 2003). According to Akins and Crichton (2003), this learning theory focuses on the importance of contextualizing activity and learning into real life scenarios and contexts. It promotes the acquisition of meaningful learning in authentic contexts.

A scenario was defined by Porter (1985) as an internally consistent view of what the future might turn out to be - not a forecast, but one possible future outcome (as cited in Buytendijk, Hatch and Micheli, 2010). Scenarios are stories. They are stories about people and their activities. For example, an accountant wishes to open a folder on the system desktop in order to access a memo on budgets. However, the folder is covered up by a budget spreadsheet that the accountant wishes to refer to while reading the memo. The spreadsheet is so large that it nearly fills the display. The accountant pauses for several seconds, resizes the spreadsheet, moves it partially out of the display, opens the folder, opens the memo, resizes and repositions the memo and continues working (Carroll, 2000).

Scenarios could be used to prepare an organization or an individual for what might happen in the future (Buytendijk, Hatch and Micheli, 2010). Creating a scenario is not a simple task. In order for it to be authentic, you must try to make the scenario as realistic as possible. Elements of a scenario include the role the students will play, the tools they will use, and the actual activity in which they will be engaged. In the creation of the task, it is important to consult with experts who work professionally in the area you will be investigating. This will help to authenticate the activity and provide students with expert mentors, if possible. Evaluation of scenario-based inquiry is focused on the learner and usually takes the form of performance-based assessment. The process during the inquiry is interactive, allowing the instructor to provide feedback to the students on a continual basis (Akins and Crichton, 2003).

Table: 1
A Comparison of Traditional and Scenario-Based Learning Approaches

Characteristics	Traditional Approach (Linear/Systematic)	Scenario-Based Approach (Iterative/Intuitive)
Scope	Deductive: experts determine the scope of learning by examining the subject and its components and establish right and wrong answers	Inductive: stakeholders assemble to share experiences about the subject event, create indicators of successful outcomes, and establish descriptions of successful and unsuccessful behaviors
Focus	The object or subject to be mastered	The learner's behavior
Learning objectives	Listed and prioritized objectives based on judgments about knowledge and skills required Static; based on the lesson's building blocks until course revision	Outcomes of learning event based on use of device or interaction Dynamic around the flow of the scenario experience; particular objectives dependent on paths and review of outcomes Not fully known until after the lesson

Nature of learning and structure of learning experience	**Hierarchical, linear, rule-based** ✓ **branching points** ✓ **instructor control** ✓ **examples/contrived context** ✓ **few paths** ✓ **low data availability** ✓ **grading** ✓ **right and wrong answers** ✓ **scoring**	**Systemic, non-linear with multiple feedback, evaluative** ✓ **decision points** ✓ **learner control** ✓ **realistic context** ✓ **controlled and multiple paths** ✓ **high data availability** ✓ **advice and guidance** ✓ **problematic solutions** ✓ **performance feedback**
Learning styles	**Can be multiple, but usually less kinesthetic**	**Usually highly visual and highly kinesthetic**
Design process	**Systematic prototyping**	**Action research**
Subject types best suited to	**Relatively simple, well-known, and well-structured topics often with high knowledge requirements** **Knowledge-focused**	**Complex topics with high interaction or practice requirements** **Performance-focused**

(Kindley, 2002)

If scenario planning is a useful strategic decision making method, it should be taught in schools, health professionals should be used to encourage patients to think strategically about their health, families could use it in planning their lifestyles and individuals should use it to cope with the uncertainty inherent in modern life (Harries, 2003).

Kindley (2002) uses elements shown in Table 1 to represent a comparison of traditional and scenario based learning approaches. This chart quickly illustrates the characteristics of scenario based learning in relation to traditional learning activities.

As seen in Table: 1, scenario based approach is more interactive than traditional approach, learner based and performance focused. Its aim is in a real world context, studying on a complex topic and in this sense having a possible outcome about the topic. During this process, instructor helps learners and provides feedback about their ideas on the topic. Interaction and cooperative learning make it easy to reach the possible solutions in a constructive context.

Teaching strategies that emphasize collaborative work (Johnson and Johnson, 2004) and the use of cooperative groups (Heller, Keith and Anderson, 1992; Heller and Hollabaugh, 1992) have been shown to be effective. Social interaction is critical to scenario-based instruction. It is through collaborating peers, working with experts, and using tools in an authentic learning environment that learners are able to situate their learning and develop personal meaning within the activity.

Based on the beliefs of constructivism, the learning methods of cooperative learning and case study require the student to be actively involved in the classroom constructing ideas and debating decisions through a scenario situation that involves problem-solving (Baumberger-Henry, 2005). Because of the recent changes in the information era and with the adoption of the constructivist approach, it is a requirement for students to be lifelong learners and to have higher order thinking skills such as critical thinking, problem solving, creative thinking etc. in their everyday lives as well as educational system. People face lots of problems in their everyday lives and try to solve these problems. To live in a quality and efficient life, people must solve these problems in a sensible way and this can be possible by using present problem solving skills, thus making it necessary to have problem solving skills during their lives.

In homes, businesses, organizations, and societies in every culture, learning is driven by problems that need solving (Jonassen, 2004). Problem is a conflict situation that the individuals face any obstacles to reach a goal (Morgan, 1985). The problem for a student can be a failure in any lessons, for an adult it can be not having any promotions in his profession, and for teachers, it can be problems about their students or learning methods.

The problems can only be definitively analyzed by being solved; the appropriate solution methods must typically be executed in order to be identified; the solutions must be implemented in order to be specified (Carroll, 2003). Problem solving is of the special concern for professionals who are interested in helping others solve problems which are particularly troublesome (Heppner and Peterson, 1981). For much of the 20th century, educators have devoted their attention to trying to define and teach problem solving skills. In the early 1900s, problem solving was viewed as a mechanical, systematic, and often abstract (decontextualized) set of skills, such as those used to solve riddles or mathematical equations. These problems often have correct answers that are based on logical solutions with a single correct answer (convergent reasoning) (Kirkley, 2003).

Under the influence of cognitive learning theories, problem solving shifted to represent a complex mental activity consisting of a variety of cognitive skills and actions (Kirkley, 2003), and has been acknowledged as a paradigm of "complex cognition" that is part of our everyday experience (Mayer, 1992; Sternberg and Ben-Zeev, 2001; as cited in Metallidou, 2009).

Problem solving as a goal directed behavior requires an appropriate mental representation of the problem and the subsequent application of certain methods or strategies in order to move from an initial, current state to a desired, goal state (Metallidou, 2009).

In generally, solving problems consists of the following stages (Heppner and Peterson, 1981);

- **Facing the problem (General orientation)**
- **Identifying the problem (Problem Definition)**
- **Generating alternatives for the solution (Generation of alternatives)**
- **Making decisions considering the possible consequences of the alternative courses of action (Decision making)**
- **Implementing the decisions and evaluating the possible consequences (Evaluation).**

Problem solving included higher order thinking skills such as "visualization, association, abstraction, comprehension, manipulation, reasoning, analysis, synthesis, generalization- each needing to be 'managed' and 'coordinated'" (Garofalo and Lester, 1985, p.169; as cited in Kirkley, 2003). Today there is a strong movement in education to incorporate problem solving as a key component of the curriculum. The need for learners to become successful problem solvers has become a dominant theme in many national standards (AAAS, 1993; NCSS, 1997; NCTE, 1996; NCTM, 1989, 1991; as cited in Kirkley, 2003).

Problem solving skills of university students have received considerable concern among employers, university professors and the public at large. Among the competencies that students should demonstrate at the end of the program, as stated in the document, are critical thinking, problem solving, creative decision making, and ability to communicate, apart from mastery of knowledge in specific fields.

Despite the focus on problem solving skill at all levels of education and especially at the university level, research studies (Nickerson, 1994; Kessel, 1996a, 1996b, 1997; Woods et al., 1997) have shown that university students are not acquiring the skill (as cited in Yunus et al., 2006). So we can say that there is much more study requirement on the university students to determine their problem solving perceptions. Perceived problem solving skills are important factors for determining educational needs of students. Because, the demands of a changing workplace and a complex global society have raised expectations regarding thinking and problem solving among students. Problem solving are not only the results of development and socialization, but also inevitable processes that go on throughout the life of an individual. Modern educational systems aim to develop the competency to approach problems with responsibility and make the right decision about the solutions (Gucray, 2003).

Discussion on a problem scenario with peers in a collaborative way is a useful method to improve problem solving skills and perceived problem solving skills. Online learning is a suitable environment for students' social interaction. In an online learning environment students are active learners. Asynchronous discussion forums, cooperation with peers, scaffoldings, peer feedbacks, teacher feedbacks are critical to acquire higher order thinking skills.

So, a primary goal of educators should be to provide students with interactive online learning experiences that keep them engaged with one another (Zydneya, de Noyelles and Seo, 2011). Researchs showed that online interactions had positive effects on students' learning (Jyothi, McAvinia, and Keating, 2011).

But nowadays, researchers suggest that rather than delivered instruction just online, it should be forced with traditional learning. So, blended learning developed as an alternative learning environment.

According to So and Brush (2008) in general, blended learning means any combination of learning delivery methods, mostly including face-to-face instruction with asynchronous and/or synchronous computer technologies. Hybrid learning is another term which has been used synonymously with blended learning.

It is important to distinguish blended learning from other forms of learning that incorporate online opportunities. First, blended learning is distinguished from that of enhanced classroom or fully online learning experiences. A blended learning design represents a fundamental reconceptualization and reorganization of the teaching and learning dynamic, starting with various specific contextual needs and contingencies (e.g. discipline, developmental level, and resources) (Garrison and Kanuka, 2004).

In this sense the purpose of this study is to examine the effects of scenario-based learning environment which supports the course management system on the perceived problem solving skills of students. One of the implications of this study is the need to rethink the teaching strategies that can be implemented in universities to foster the development of perceived problem solving skills.

METHOD

One group pretest and posttest experimental group design has been used in the study. Preservice Teachers enrolled in course offered by the Computer and Educational Technology Department at Ankara University in Turkey, participated in the study. The design is susceptible to most of the threats to internal validity (Gliner and Morgan, 2000).

With the exceptions of selection and morality threat to internal validity, which are not factors due to the lack of a control group, this design is subject to five other threats to internal validity. If a historical event related to the dependent variable intervenes between the pretest and the posttest, its effects could be confused with those of the independent variable. Maturation changes in the subjects could also produce differences between pretest and posttest scores. If paper-and pencil measures are used on a pretest and a different test measure was used on the posttest, a shift of scores from pretest to posttest could occur resulting in a testing threat. Regardless of the measurement process utilized, instrumentation changes could produce variation in the pretest and posttest scores. Finally, if the subjects were selected because they possessed some extreme characteristic, differences between pretest and posttest scores could be due to regression toward the mean (Abrahams, 1997).

There are 37 Preservice Teachers who attending the course of Teaching Practice in the Department of Computer and Instructional Technologies Education of Faculty of Educational Sciences at Ankara University in third grade who constitute the study group.

In order to reach the identified goals of the course, following will be pursued;

- **The students are required to attend the classes regularly,**
- **The students are required to participate in the discussions, and also to demonstrate and to reflect on their teaching/learning process,**
- **The students are required to prepare a course plan about an instructional material, which they will choose in the curriculum.**

The Problem Solving Inventory (PSI), Form A (PSI; Heppner, 1988; Heppner and Petersen, 1982) is an instrument used to assess an individual's perceptions of his or her own problem solving attitudes and behaviours. The PSI is designed to measure an individual's perception of problem solving capability and not actual problem solving skills. The PSI consists of 35 statements. There of the statements are "research items" and are not scored. For each statement, respondents use a 6 point scale with statement (1= strongly agree, 6= strongly disagree).

The total score range is 32 to 198. Low scores represent positive appraisals of problem solving ability. Fifteen items are negatively worded and require reserve scoring. The Original PSI is consisted of three factors; problem solving confidence, approach avoidance and personal control (Sahin, Sahin and Heppner, 1993).

The Turkish version of PSI was applied 244 Turkish university students (153 women, 71 men) by Sahin et al. (1993) and has showed its reliability and validity. The Turkish version of the PSI showed the instrument to have satisfactory reliability. An estimate of internal consistency (Cronbach's alpha) revealed alpha coefficients of .88 for total inventory, and .76, .78, and .69 for the three factors. The inter-item correlations within the scales ranged between -.46 and .52. The Turkish version of the PSI consist of six factors; Impulsive style, reflective style, problem-solving confidence, avoidant style, monitoring, planfulness. The factor loadings of six factors solution ranged from .43 to .77. The alphas coefficients for six factors were .78, .76, .74, .69, .64, and .59, respectively. The interscale correlations ranged from .09 to .51 (Sahin et al., 1993).

The research has been conducted during second term of 2008-2009 Academic Years for 8 weeks in the course of Teaching Practice. Teaching Practice is given during last semester of education period and preservice teachers can get the exposure of putting into practice what has learned. With this course, preservice teachers go to the primary and secondary school and observe the school, teachers and course procedures.

After observation, they begin to lecture and so they can gain experiences and can get some suggestions from the teachers of the school for their vocational lives. The course of Teaching Practice imply "learning by doing". total of 37 students responded the PSI at the beginning of the course as a pretest. After, implementing scenario based learning at eight weeks, again posttested. It would seem that any differences between the pretest and posttest measures would be due to how the perceived problem solving skills.

In the study as an online learning environment, MODDLE which is a learning management system was used. At the beginning of the semester students who would go to the public primary institutions once a week were randomly assigned to one of the five schools. The study took 10 weeks.

Beginning from 4th week, students were given scenarios once a week, totally 8 scenarios. The main aim of these scenarios was to assist students in order to improve their standpoints according to the problems that they encountered in the school. Scenarios and solutions were discussed at the face to face courses, semiweekly.

The period of Teaching Practice and generated solutions according to presented problems were assessed with students at the last week of the study.

At the analysis of the respective data, beside the descriptive statistical techniques, t-test statistical technique was also used to analysis of data.

FINDINGS and INTERPRETATIONS

37 students (12 female, 25 male) completed the pretest-posttest inventory. The Inventory data was analyzed using the SPSS software program paired t test. As seen Table 2, all of the subscales mean scores and total pretest mean scores decreased at the end of the study. In other words PSI posttest total mean scores ($\overline{X}$=78.64 df=16.76) lower than pretest mean scores ($\overline{X}$=86.32 df=19.23). That difference is statistically significance.

Table: 2
The Problem Solving Inventory Pretest and Posttest Scores

		Impulsive style		Reflective style		Problem-solving confidence		Avoidant style		Monitoring		Planfulness		Total	
	N	$\overline{X}$	df	$\overline{X}$	df	$\overline{X}$	df	$\overline{X}$	df	$\overline{X}$	df	$\overline{X}$	df	$\overline{X}$	df
Pretest (PSI)	37	32.70	6.88	0.70	.88	13.08	6.21	14.16	6.80	7.10	3.71	10.40	4.72	86.32	19.23
Posttest (PSI)	37	30.32	4.89	0.59	.88	12.16	4.41	10.67	3.75	6.78	2.78	11.24	2.00	78.64	16.76
Pretest-Posttest	37	-2.37	7.74	.01	,15	-.91	6.04	-3.48	5.79	-.32	3.88	.83	4.46	-7.67	18.22
P value		.070		.916		.362		.001*		.615		.262		.015*	

*=.05 significance value

In generally, according to the findings, posttest subscale scores of PSI were lower than pretest subscale scores except planfulness subscale. Mean score of planfulness subscale increase in time. Low scores on the PSI indicated that perceptions of problem solving of students improved after the practice process.

In other words, the change on pretest and posttest scores of PSI negatively showed an improvement in self-perception of problem-solving skills over the course of the semester. When these findings were examined, we saw that the differences between avoidant style and total scores had been significant statistically.

According to these results, it could be said that, scenario based learning environment was positively effective on perceived problem solving skills of students. Especially it was seen that scenario based learning environment contributed significantly the improvement of avoidant style perceive.

And so, because scenario based learning supported the perceived problem solving skills and improved the problem solving skills of students, using this learning environment in the future could be useful.

Tews, Michel and Noe (2011) purposed on their research to develop and provide initial validation evidence for the performance impact of a measure of an individual's perceived ability to learn and solve problems. They saw at the end of the study that, the results of the study supported their perspective that using a predictor that focuses specifically on confidence relating to learning and problem solving was important given the relevance of learning and problem solving. In other words, the results demonstrated that perceived ability to learn and solve problems is a significant predictor of performance. According to this study, we can say that if learners perceive them as good problem solvers, they can show higher performance.

Similarly, Baumberger-Henry (2005) purposed on his study to investigate the effectiveness of cooperative learning techniques combined with case study on nursing students' self-perception of problem-solving and decision making skills in comparison with other teaching-learning methods.

The results showed that the experimental group obtained scores indicating somewhat better self-perception of both problem-solving and decision making skills. According to the researcher, it was expected that solving problems with scenarios presented through case study would improve students' perceptions of problem-solving.

The results obtained this research is similar to our study. Altun (2003), explored the perceived problem solving ability and values of student nurses and midwives. He has obtained the following result from his study, participants considered themselves quite successful in perceived problem solving.

Students who expressed that they solved a problem systematically and those who acted decisively in problem solving were also found to evaluate themselves as successful in problem solving. As shown in studies, perceived problem-solving skills of learners can be increased in several ways.

According to our results, we can say that the presentations of topics of the course by scenario based learning environment increase the problem solving skills of the preservice teachers and it can also be stated that the use of scenario based learning environment has positive effects on the learners' perceptions about their problem solving skills. When we look at the literature, there are a number of studies on problem solving skills but studies on perceived problem solving skills are limited. So in the future, researchs can focus on improving problem solving skills perceptions of learners.

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