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The Effects of Authentic Tasks on Preservice Teachers' Attitudes towards Classes and Problem Solving Skills*

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Abstract

This study aimed to investigate the effects of authentic tasks on preschool preservice teachers' attitudes towards the course and problem solving skills. The study was designed in accordance with the pretest – posttest control group model. The data were collected by using the "Problem Solving Skills Inventory", the "Course Attitude Scale", and the "Structured Interview Form" to obtain participant views about the process. The study was conducted with a total of 100 third-year preservice teachers who were enrolled in the course "Special Education Methods I" at Marmara University Atatürk Faculty of Education's Preschool Education Department during the 2010-2011 academic year. Of these participants, 35 were in the experimental group, 35 in the 1st control group and 30 in the 2nd control group. The results showed a positive significant difference in the attitudes of the experimental group towards classes and their problem solving skills perceptions at the end of the experiment, while no such difference was observed in the two control groups. The responses to the interview forms included positive views regarding the process of using authentic tasks from the experimental group, but mostly negative views from the two control groups who underwent traditional instruction. The tasks used in the experimental group in order to develop problem solving skills and recognize professional problems and solutions improved preservice teachers' problem solving perceptions and attitudes towards classes.

Key Words

Authentic Learning, Authentic Task, Attitudes towards Classes, Problem Solving, Preschool Education, Preservice Teacher.

Learning is an active process of meaning-making through experience (Berdnar, Cunningham, Duffy, & Perry, 1993 cited in Burke, 2005). Many studies support student-centered or constructivist classes against traditional teacher-centered teaching (Brooks & Brooks, 1993; Bruer, 1993; Elmore, 1990; Marshall, 1992; Sizer, 1992; Wells & Chang-Wells, 1992 cited in Newman, Marks, & Gamoran, 1995). These researchers advocate actively constructing meaning out of one's own experience rather than simply reproducing information. This approach is known as active learning (Newman et al.).

Active learning involves activities such as sustainable small group discussions, cooperative learning tasks, independent research projects, the use of manual skills, scientific tools and artistic materials, the use of computer and video technology, oral stories and community based projects. However, even students learning actively can produce superficial and weak work. In order to allow effective and deeper learning in such cases, authentic learning experiences based on real life should be used. Authentic learning is a teaching method that encourages students to explore, discuss, construct concepts, develop projects and connect

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them meaningfully to real life problems (Donovan, Bransford, & Pellegrino, 1999). Authentic learning has real life value, enables students to actively construct knowledge, and is used in order to solve problems and complete open ended tasks. According to Glatthorn (1999), authentic learning is more complicated and challenging than standard school learning. It involves higher-order learning through solving problems by placing a word or expression in the proper context.

Students should be able to achieve beyond the classroom. Authentic learning helps them bring their experiences, knowledge, beliefs and interests into the classroom. This enables them to experiment with and use the knowledge they have constructed rather than to simply memorize facts (Mehlinger, 1995). The aim of authentic learning is not direct learning but the creation of solutions to real life problems. It starts with authentic tasks followed by authentic activities and assessment, a process in which teachers act as guides and students are active participants. In order to use authentic learning in educational settings, real life problems and topics should be brought into classrooms. Brophy and Alleman (1991) have defined authentic tasks/activities as "anything students are expected to do, beyond getting input through reading or listening, in order to learn, practice, apply, evaluate or in any other way respond to curricular content". According to Lockwood (1992 cited in Reeves, Herrington, & Oliver, 2002, pp. 562-564), tasks that encourage and support learning can take many forms but they basically expect students to be active rather than passive.

The aim of authentic tasks is to create learning communities closely related with the collaborative practices of real societies. In an authentic environment, students are expected to take responsibility for their own learning and develop high level cognitive skills in order to monitor and manage their own learning and performance. When students collaborate on authentic tasks, they add their own viewpoints and nature to the activities. This enables them to consider a problem from different perspectives and thus make new meaning or create new solutions out of their collaboration (Hsiao & Daphne, 2007).

Owing to the authentic tasks used in a constructivist learning environment, students can construct new knowledge and understanding based on previous ones. They are allowed to work on real life problems and, as they do so, they are encouraged to find new solutions, collaborate with other students, test and revise their ideas and hypotheses, and find the best solutions they can.

In organized learning environments, authentic problems should be given due importance, and students should be taught how to solve authentic, open-ended and complex real life problems (Paavola & Lakkala, 2004; Tynjala, 1999). Furthermore, authentic tasks must be based on complex problems from real and professional life. Problems should not be simplified for teaching purposes as reality requires continuous construction of problems (Terhart, 2003, pp. 25-44). Reeves et al. (2002) list the characteristics of authentic tasks as follows: *(i)* Authentic tasks are related to real life. *(ii)* It is necessary for authentic tasks to be as complex as those in real life. Tasks should be related with problems not well-defined. *(iii)* Authentic tasks consist of complex goals which need to be pursued by students over a time period. *(iv)* Authentic tasks provide students with opportunities to define a problem from various viewpoints by using various resources. *(v)* Authentic tasks provide opportunities for collaboration which is essential in classrooms as well as in real life. *(vi)* Authentic tasks give students opportunities for self-expression. *(vii)* Authentic tasks relate to various subject areas. Students may refer to other areas while fulfilling their tasks. *(viii)* The evaluation of authentic tasks should involve process evaluation as well as product evaluation *(ix)* Authentic tasks allow different products to emerge at the end of the process. Authentic activities end with the creation of a unique product. *(x)* Authentic tasks give way to multiple interpretations and products.

Recently, many studies have been conducted on authentic tasks (Akça & Ata, 2009; Choo, 2007; Clayden, Desforges, Mills, & Rawson, 1994; Fook & Sidhu, 2010; Herrington & Herrington, 2006; Newman et al., 1995; Oliver, Herrington, & Reeves, 2006; Reeves et al., 2002) which emphasize the benefits of using such tasks in the instructional process. Findings of these studies reveal that authentic assessment is better embraced by students (Fook & Sidhu; Varley, 2008), constructivist and authentic learning environments give students more self-regulation and responsibility to learn, (Loyens, Rikers, & Schmidt, 2009; Ruey, 2010), authentic activities make positive contributions to professional development (Choo; Slepkov, 2008; Stein, Isaacs, & Andrews, 2004), authentic learning environments benefit not only cognitive but also affective skills (Bolin, Khramtsova, & Saarino, 2005), authentic learning and authentic tasks are connected with real life problems and thus develop problem solving skills through its this aspect (Risko, Osterman, & Schusser, 2002).

A primary skill intended for students to acquire in

the learning environments of our day is problem solving. As the authentic learning process presents students with complex real life issues through activities leading to critical thinking, they are expected to solve these problems in novel ways. During this process, students who know what and how to learn in real life become able to set personal learning goals, even though with the guidance of the teacher (Watters & Ginns, 2000 cited in Gatlin & Edwards, 2007).

It will be useful for preservice teachers to build their knowledge and experiences from primary sources, and encounter and solve real life problems so that they can better guide students in the future. The present study aims to explore the effectiveness of using authentic tasks on preschool preservice teachers' attitudes towards the course and their problem solving skills. To this end, comparisons have been made among the experiment and control groups.

Method

This study adopts the pretest-posttest a control group design. It involves the testing of participants before and after the experiment in relation to the dependent variable (Büyüköztürk, 2007, p. 10). As experimental designs aim to explore cause and effect relationships, a research environment is created. This method is used to establish the effectiveness of a given "thing" (a new learning method or curriculum, etc.) and to make recommendations (Arıkan, 2005, p. 77; Büyüköztürk, p. 3; Ekiz, 2003, p. 99).

Study Groups

The study used an experimental group and two control groups comprising third-year preservice teachers from Marmara University Atatürk Education Faculty's Department of Preschool Education and taking the course "Special Education Methods I". This particular course was mainly chosen as the researcher was familiar with it and it includes a theoretical and practical part. The study groups were formed with the "Group Matching" technique in which groups are created according to group means of the chosen variables (Büyüköztürk, 2007, p. 19). The preservice teachers were equalized with a pretest using the matching technique and the groups were created with random assignment. When forming the experiment and control groups, the Course Attitude Scale and the Problem Solving Skills Inventory were implemented as pretest, and the results were used in matching the groups. Following this, the results of the Course Attitude Scale and the Problem Solving Skills Inventory were entered in the statistical package and One-Way Analysis of Variance (ANOVA) was conducted. Group matching was done until there was no difference at $p<.05$ significance level. These new groups were randomly defined as experiment, 1st control and 2nd control groups. One experiment and two control groups were created in order to control instructor bias. Instruction was given by the researcher in the experiment group and one of the control groups, and by another instructor in the other control group.

After group matching, 35 preservice teachers were assigned to the experiment group, 35 to the 1st control group and 30 to the 2nd control group. There were 3 males and 32 females in the experiment group, 4 males and 31 females in the 1st control group, and 1 male and 29 females in the 2nd control group.

Data Collection

The experiment with authentic tasks lasted fourteen weeks. Both control groups received traditional instruction and acted as comparison groups. Classes were conducted by the researcher in the experimental group and the 1st control group, and by a different instructor in the 2nd control group. The classes in the experimental group followed the constructivist approach and was based on student activities during the first 5 weeks. Following this, between weeks six and fourteen, the preservice teachers went to their teaching practice schools with the daily plans prepared with the guidance of the researcher, the materials listed in these plans and the necessary equipment to deliver the lessons. As they implemented the lesson plans in the practice school with pre-school children, they recorded the process on video. Following the completion of this stage, the preservice teachers presented their authentic tasks implemented and recorded in a genuine setting in their course. These presentations clearly revealed the problems and shortcomings that were unknown or had not been anticipated.

The presentations which spanned eight weeks (week 6 through 14) included a discussion of the problems which emerged as practice teaching was done, and the researcher and fellow students proposed solutions, alternatives and interpretations. Both control groups received similar instruction over the 14 weeks. This involved traditional, topic-centered, teacher frontal lessons. Pre and posttests were given to all groups in weeks 1 and 14, respectively. Additionally, individual opinions were obtained throughout the 14 weeks (5 days).

Data Collection Instruments

The data were gathered by using the Course Attitude Scale, Problems Solving Skills Inventory, and Structured Interview Form aiming at gaining pre-service teachers' opinions related to the process.

Course Attitude Scale: Student attitudes towards the "Special Education Methods I" course in this study were obtained with this five point Likert scale designed and statistically tested by Akar (2003) with the aim of defining the attitudes of students towards constructivist courses. The scale consists of 42 items with positive and negative expressions. Answers range between "Totally agree (5) and "Totally disagree" (1)". Akar found the Cronbach Alpha reliability coefficient to be α= 0.93, and in this study, it was α =0.89.

Problem Solving Skills Inventory: Designed by Heppner and Peterson (1982) and adapted to Turkish by Taylan (1990), this inventory evaluates the individual's perception of problem solving attitudes and behaviors. It has 35 items reflecting the individual's recognition and evaluation of his problem solving skills and styles. The negative expressions are coded inversely. Each item is scored between 1 and 6. Items 9, 22 and 29 are excluded from scoring. The lowest point possible is 32 while the highest point possible is 192. A lower score reveals the efficiency of solving problems while higher points show inefficiency (Taylan). The Cronbach Alpha internal consistency level is α= 0.90. In this study, it was α=0.85.

Interview Form: A structured Interview Form was devised in order to collect student opinions related to the process. While preparing the form, a survey of the literature was followed by an analysis of similar studies. Based on the views of three field experts, the form is geared to obtain views about the tasks, implementation and evaluation. Similar views were grouped together and analyzed descriptively under prespecified themes. In this study, the data were organized around the questions asked in the interviews. Analysis results and the raw data were examined by another instructor and the match between the two analyses was taken into account. Eight questions were emphasized in the interview form, and any different view was specified under the heading "other comments".

Data Analysis

The previously standardized Likert-type Course Attitude Scale and Problem-Solving Skills Inventory were pretested for validity and reliability. The internal consistency of the tools was examined by Cronbach Alpha analysis and One-Way Analysis of Variance (ANOVA) was performed for group matching. In order to determine the difference between the pre and posttest scores of each group, the Paired Samples t-Test was utilized. In order to examine the difference in the three groups' pretest-posttest mean scores in relation to the Course Attitude Scale and Problem-Solving Skills Inventory, Two-Way ANOVA for Mixed Measures was used. In addition, the qualitative data obtained from the interview forms were analyzed by using the descriptive analysis approach.

Results

The joint effects of the pre and posttest repeated measures of the three groups on attitudes towards the course differed meaningfully in favor of the experimental group at $p<.05$. This finding shows that authentic task-based practices, which created a bigger increase in attitude scale scores as compared to pre-experiment scores, is more effective in developing a positive attitude towards the course than topic-based practices. No meaningful difference was observed in the joint effects of pretest and posttest repeated measure factors of the 1st control and 2nd control groups on course attitudes *(p>.05)*. A significant difference was found in favor of the experimental group at $p<.05$ in the joint effects of the pre and posttest repeated measures factors of the experimental and 1st control and 2nd control groups on problem solving tendency. Authentic task oriented practices, which caused a bigger decrease in the Problem Solving Inventory scores as compared to the pre-experiment period, seem to be more effective in developing problem solving skills than topic-based practices. A meaningful difference was not seen in the joint effects of the pre and posttest repeated measures factors of 1st control and 2nd control groups on problem solving skills *(p>.05)*.

In their responses to the interview form, the pre-service teachers in the experiment group stated that they participated actively in the Special Teaching Methods I course; displayed attention and interest as they had to evaluate both themselves and their peers during the evaluation process; believed that authentic tasks were compelling but motivating, permanent and enjoyable; and all of these helped them develop a positive attitude towards the course.

Preservice teachers in the experiment group also stated that the tasks assigned during the course contributed to their problem solving skills and provided them with opportunities to foresee future

professional problems and possible solutions. At the same time, they stated that the evaluation processes took too much time and peer evaluation became overly critical at times. On the other hand, the interview forms of the two control groups revealed that these pre-service teachers thought they were passive in the course; did not participate in the evaluation process, which caused boredom; envisioned a discrepancy between classroom tasks and real-life ones; that the methods used in the course did not make them active but they found motivation in certain elements of the course such as the instructor and attendance; and that their attitudes either did not change or they developed negative attitudes.

Discussion

Based on the findings of this study, it may be concluded that the use of authentic tasks contributes to the development of positive attitudes towards the course and problem solving skills on the part of preservice teachers. In addition, the interview results showed that more positive statements were obtained from the experimental group which received authentic tasks.

Similar results were reached in previous studies as well. One conclusion reached in the present study has been that authentic tasks provide a positive contribution to preservice teachers' problem-solving skills. In the study that Dabbaqh and Blijd (2010) analyzed student perception of their learning experiences in an authentic instructional setting and concluded that students perceived their learning experiences positively in spite of initially experiencing anxiety and confusion. In a study by Kaya (2010), a constructivist curriculum was followed with an experimental group of preservice teachers and a topic-based curriculum with a control group, and examined both groups' problem solving skills with a pre and posttest. While there was no significant difference between the groups in the pretest, the results of the posttest revealed significant differences in favor of the experimental group. In another study, Risko et al. (2002) concluded that authentic learning and authentic tasks aimed at real life problems developed students' problem solving skills.

Another result of the present study has been that authentic tasks contribute to the development of a positive attitude towards the course among pre-service teachers. A similar finding was obtained by Bay (2008) in a study which used constructivist practices and authentic tasks with a group of experimental pre-service teachers and topic-based applications with a control group. A difference was observed between the attitudes of the two groups towards the course, in favor of the experimental group. On the other hand, Akar (2003) reached contrary findings to these. He concluded that the difference between the attitudes of preservice teachers who underwent a constructivist curriculum and those who underwent a traditional one were meaningful in favor of the latter. Akar investigated student perception about this finding and attributed the negative attitude in the experimental group to the alternative assessment methods used and to the fact that these students continuously had to engage in collaborative work to construct knowledge.

The qualitative findings of the present study indicate that the preservice teachers in the experimental group participated actively in the course Special Education Methods I; were more careful about and interested in the course as they evaluated both themselves and their peers; were both challenged and motivated by the fact that the tasks were authentic; gained permanent knowledge and had fun, thus developing a positive attitude towards the course. A similar finding was also reached by Gulikers, Bastiaens, and Martens (2005). They found that when authentic tasks are given in an authentic learning environment, students first feel disappointed and find it difficult to adapt to these conditions, but these feelings changed well into the process.

The preservice teachers in the experimental group asserted that the tasks given in the course improved their problem solving skills and provided them with an opportunity to foresee problems and solutions to these problems which they may encounter in their future professional life. By the same token, Gulikers, Bastiaens, and Martens (2005) stated in their study that authentic learning by authentic tasks equips preservice teachers with skills they will use in the future to solve real-life or professional problems. As authentic tasks and learning environments presents students with complex real-life problems through critical thinking activities, they encourage students to produce novel solutions (Gatlin & Edwards, 2007). In this study, preservice teachers in the experimental group created various new solutions to real problems, thus encountering authentic problems and working on different alternative solutions. In a different study, Sasse (1997) created a cooperative learning and scaffolding environment in two college classrooms and used authentic learning and constructivist practices. He concluded that cooperative learning and scaffolding are not enough to create an authentic learning

environment, and as long as students do not go beyond the context of their school, authentic learning cannot be realised. Owing to the importance of real experiences in authentic learning, the authenticity of the problem improves the skill of using theory and practice together.

The experimental group in the present study believed that the evaluation processes used in the study took too long and some students could be overcritical during peer evaluation. Some expressions stated in the interview form show that preservice teachers in the two control groups were passive during the course Special Education Methods I, did not participate in the evaluation process and thus got bored, found the tasks different from those in real environments, and did not feel encouraged to be active by the instructional method used in the course. Even though they stated that the lecturers who taught the course and the attendance requirement motivated them, they felt that their attitudes either stayed the same or became negative.

As the authentic tasks used in the course "Special Education Methods I" with preservice preschool teachers in this study were effective in developing the participants' problem solving skills, it may be argued that such tasks should be incorporated into other courses offered in preservice teacher education. As authentic tasks involve real-life conditions, they not only enable preservice teachers to encounter possible future problems but also give them a chance to observe other problems faced by their peers and make recommendations. Preschool teacher training curricula may be revised by taking these problems into considerations. One important factor in sharing authentic tasks with peers and establishing a discussion forum is the use of materials and equipment supported by computer technologies. The present study made use of computer based presentations and video recording technology. By using the internet and other communication technologies in preschool teacher education, preservice teachers may be encouraged to share and discuss the tasks they have performed. In this study, the experimental group stated that peer evaluation took too much time. This problem is a result of crowded classes. To overcome this problem, courses may be conducted by dividing classes. The study showed that using authentic tasks encouraged preservice teachers to develop positive attitudes towards the course and their problem solving skills. Future studies may entail repeated measurements of the permanence of these gains. This study involved the course Special Education Methods I offered in a preschool education undergraduate program. Future investigations should also extend to cover other courses. This study used teacher, self and peer evaluation to evaluate the authentic tasks. In future studies, school teachers and families may also be invited to observe and evaluate practice teaching. The views of the group that receives the service is vital in the evaluation of authentic tasks; therefore, instruments should be developed for preschool children to evaluate preservice teachers and thus take part in the evaluation process.

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