Development of positive interest and attitudes toward science and interest in teaching elementary science: influence of inquiry methods course experiences

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Abstract

This study evaluates the effectiveness of a science methods course in promoting interest in science, interest in teaching science, and choice to teach science. Subjects were 53 preservice teachers in two sections of a science methods course at a large American university. The course used hands-on activities at varying levels of inquiry to teach content and inquiry methods and to model effective teaching. The study involved analyses of pre/post course surveys, daily ratings, and final course ratings. End of course results showed that participants found course activities fun and interesting, and pre/post t-tests indicated that participants increased their interest in science and positive feelings about teaching science. Regression analysis found that the best predictors for *interest in teaching science* at the end of the course were ratings of course activities as *fun* followed by the participants' initial interest in science. Finding that fun was the best predictor suggests that a science methods course should provide a playful and risk-free learning environment in which preservice teachers should have the freedom to explore their "wonderings," curiosity, and questions. For preservice teachers not initially interested in science, such a course not only models good teaching methods but can increase interest in science, an important motivator.

Keywords: interest in science, interest in teaching science, attitudes, inquiry methods course.

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Although the American *National Science Education Standards [NSES]* (National Research Council, 1996) advocate teaching science through inquiry in schools as well as in the preparation of teachers, many American elementary school teachers teach very little science and seldom engage their students through inquiry (Weiss, 1997; Fulp, 2002). There are many possible reasons for this including the following: commitment to school system adopted textbooks, difficulties in assessing results of inquiry learning, concerns about how to manage inquiry classrooms in which teacher and student play new roles (facilitator and active inquirer, respectively), lack of lab materials, and dominant commitment to "coverage" to prepare students for standardized testing and the next grade level (Anderson, 2002). Given the above, teachers who have negative attitudes toward science and are unenthusiastic about teaching and learning science may be unlikely to involve their students in inquiry science experiences.

The reason teachers have negative feelings and attitudes about science may relate to their own science related experiences in elementary and high schools (deLaat & Watters, 1995; Jarrett, 1999; Watters & Ginns, 2000). According to Hawkins (1990), an unproductive cycle in education is that people uninterested in science may pass that disinterest on to the children. This has serious implications not only for the preparation of scientifically literate citizens but also for the preparation of the next generation of teachers. To break this cycle, teacher preparation programs must confront preservice teachers' negative attitudes toward science and lack of personal interest in teaching science (Weiss 1997). The *NSES* stressed that only the teachers who "exhibit enthusiasm and interest and who speak to the power and beauty of scientific understanding can instill inquiry skills as well as curiosity, openness to new ideas, and skepticism that characterizes science" (NRC, 1996, p.37).

This study addresses the following research questions: Can a hands-on inquiry science methods course affect preservice teachers' interest and attitudes toward science? What aspects of the course contribute to participants' interest in teaching science and choice to teach science?

Interest and motivation

According to Dewey (1933/1986), there is a strong connection between interest and effort, i.e., the more a person becomes interested in a subject the more effort he will put in it. Dewey (1913/1979, p.160) described an interested person as "being engaged, engrossed, or entirely taken up with some activity because of its recognized worth." For Dewey, "interest is a tool through which the distance between the person and the materials is annihilated, facilitating an 'organic union' between the two" (p.160). According to Dewey (1933/1986), in many learning tasks in school, the process and outcome are separated which results in "divided interest," and students cannot connect the process of executing a task and with its outcome. For Dewey, this dilemma is the biggest "enemy of effective thinking" (p.137). Dewey believed that children give external attention to school learning tasks (e.g., to teachers and to textbooks and lessons) while their deepest thoughts are concerned with objects and materials.

Dewey conceptualized the interest acquisition process into three distinct and cohesive components: active, based on objects, and having personal meaning or emotional value. Dewey (1913/1979) identifies direct and indirect interest. A direct interest originates from the individual or immediate experience, but indirect interest is mediated by a teacher or parent. Krapp, Hidi, and Renninger (1992), Hidi and Harackiewicz (2000), and Krapp (2004) use the terms "individual interest" and" situational interest" when expanding on Dewey's ideas on direct and indirect interest. Individual interest is defined as a long-lasting person-object relationship which develops over a period of time, and it is enduring and refers to behaviors such as highly focused attention, display of pleasure, and high degree of persistence in a task. However, situational interest refers to a state of interest generated externally or formed as a result of ongoing interactions between a person and the environment. According to Hidi and Harackiewicz (2000), individual and situational interest are distinct; but they seem to interact and influence each other's development. The hypothesized relationship between situational interest and individual interest is that situational interest can be turned into long lasting individual interest if the individual is exposed to situational interest over a certain period of time (Krapp et al., 1992; Hidi & Harackiewicz , 2000; Krapp, 2004). For the development of individual interest, the individual should experience both feeling-related experiences--enjoyment, involvement in doing an activity-- and cognitively represented factors--goals and values in doing an activity-- together in a positive way. The researchers argued that situational interest may have a critical role in learning, especially when students do not have pre-existing individual interest in particular subject matter (Hidi & Harackiewicz, 2000; Ainley, Hidi, & Berndorf, 2002).

In order to promote situational interest, researchers have focused on task and environmental factors. According to Ames (1992), tasks that involve variety and diversity are more likely to facilitate an interest in learning. According to Resnick, Martin, Berg, Borovoy, Colella, Kramer, and Silverman (1998), if people work on projects that are familiar, relevant and interesting, they work longer and harder and make deeper connections. In a review of research on interest and learning, Tobias (1994) concluded that "working on interesting, compared to neutral, materials may engage deeper cognitive processing, arouse a wider, more emotional, and more personal associative network, and employ more imagery" (p. 37). Two studies examined the development of interest during science methods courses. Jarrett (1999) found that background experiences of preservice teachers predicted initial interest in science and that an inquiry-based methods course increased both interest in science and confidence in teaching science. In another study, Palmer (2004) determined that interesting and enjoyable science activities in an elementary science methods class changed preservice elementary teachers' attitudes positively. The findings of these two studies suggest that interest in class activities might develop enduring interest. There were also studies that indicated positive relationships between situational and individual interest in statistics (Mitchell, 1997) and mathematics classes (Mitchell & Gilson, 1997).

In measuring interest as an outcome variable, it is hard to separate how much of it comes from situational interest (from activity) or individual interest (personal). Therefore, in this study, *interest* refers to both situational interest and individual interest. The intent of the weekly activity ratings on *interest* is to measure situational interest;

whereas the intent of the variables *overall interest in science* and *interest in teaching* is to measure individual interest.

Fun and Playfulness as Motivator

Play and science are often though of as dichotomous constructs, with play representing fancifulness and frivolity and science representing serious logical thinking. However, the intricate relationships among play, science, and creativity are well established. Severeide and Pizzini (1984) stated that science and play are complementary aspects of problem solving. The former encourages systematic behavior while the latter encourages creative behavior. According to Trumbull (1990), scientists often solve problems creatively in a spirit of play. In the discovery of the structure of DNA by Watson and Crick, (Ganschow & Ganschow, 1998), the sprit of playfulness, competitiveness, and creativity played an important role. According to Kean (1998), professional chemists continue to have fun and satisfaction throughout their career with discoveries about how the physical world works. Laszlo (2004) stated that chemists play games with chemicals in a similar way as a child who mixes various colors in a paint box to see what comes out. In the same way, chemists ask themselves the question "what would happen if I change…?" This playful attitude can be extremely fruitful and can motivate scientists.

The theorists that might best explain how learning can be motivating are Piaget (1964/2003) and Festinger (1957). According to these theorists, a state of perplexity and doubt, called "disequilibrium," is a necessary first step in learning. When the learner faces a situation that is in conflict with what he expects, doubt, perplexity, contradiction, and incongruity play an important role in stimulating the learner's curiosity. Events which don't fit one's existing expectations, "discrepant events," function by causing dissonance between what is observed happening and what one thinks should occur. Since it is impossible to change what has been physically observed, the only alternative is to begin seeking information which logically explains the occurrence. The discrepancy between scheme and object must not be too great, or loss of interest can result. Csikszentmihalyi (1990) described this balance as a flow channel in which a person's skill level is well balanced to level of task. Seeking answers to discrepant experiences may be highly motivating.

For Dewey, both process and outcome can be "for its own sake" when they are not separated. Resnick (2004) create a playful learning environment in his Media Lab at (MIT) which integrates play and learning for pupils from 10 to 18 years old. According to Resnick, integration of play and learning creates self-motivation, responsibility, and great concentration. Children are likely to learn the most and enjoy the most when they are engaged as an active participant, not passive recipient. Resnick's Lab is a representative example of how a playful learning environment can be serious, creative, and imaginative as well as being fun and playful. Research studies with school age students on play, playfulness and creativity indicate a positive relationship between playfulness, creativity and problem-solving (Russ,1998, 1999; Trevlas, Matsouka, and Zachopoulou, 2003). Holden (2004) found out that primary school children' knowledge of basic skills and their attitude toward mathematics scored higher than the national and international averages when mathematics was taught in a fun way and in a playful context.

There are research studies that illustrate that hands-on activities and demonstrations capture students' attention in the science classrooms (Banet & Nunez, 1997; Court, 1993; Nussbaum & Novick, 1982) and also help them to change their incomplete understanding of natural phenomena (Bulunuz & Jarrett 2004, 2005). Palmer (2004) found that exciting hands-on activities and discrepant events have motivational value in a teacher preparation program. In a study with preservice teachers, Jarrett (1998) found that exploratory activities tended to be rated playful, fun and interesting and that preservice teachers intended to implement those activities in their future classrooms. In another study, Palmer (2002) found that preservice teachers who observed children at an interactive science center recognized the importance of hands-on science teaching and the value of making science fun. Due to a professional development program, Radford (1998) found increases in positive attitudes toward science among middle-grades life science teachers. These increases were explained by the inclusion of fun activities that could be implemented in the classroom.

Play is not a separate variable in this study but is being defined here because it is discussed in the literature review and is connected with fun and playfulness in science activities. According to Klugman and Fasoli (1995, p.101) play includes some but not necessarily all of the following aspects: intrinsic, self-selected, enjoyable, active, mind involving, and empowering. It is intriguing and captivating, frequently involves choice on the part of the player, and can be self-perpetuating. Play takes a variety of forms. Some of these are exploratory, functional, constructive, symbolic, and games with rules. According to Dewey (1933/1986), *playfulness* is an attitude of mind and play is expression of that attitude. *Playing* in the context of doing research refers to exploring, "messing around," "tinkering," and toying with various ideas or data. *Fun* is defined as a subset of play but all play is not fun and not everything that is fun would be considered play (Arieti, 1976). In this study, fun generally refers to having enjoyment while working or doing a class activity or assignment (e.g. science fair project).

Method

Participants and Context

The participants in this study were undergraduate preservice elementary teachers in two sections of a science methods course during the spring semester 2006 in the Early Childhood Education Department of the College of an urban southern university in the U.S.A. The preservice teachers were second semester juniors in the undergraduate program. The program was heavily field-based with school placements for different methods courses each semester in schools having various levels of partnership with the university. Following a developmental sequence, preservice teachers were placed in pre-K and Kindergarten classrooms and eventually were placed in grades four or five classrooms. They were in schools two days a week, placed with an experienced cooperating teacher and observed at regular intervals by a university supervisor. They also took classes on campus two days a week. They had taken at least two semesters of laboratory-based science content courses before being admitted to the early childhood education program. One section of the science methods course with 25 students was taught by the researcher (a doctoral student). The other section with 28 students was taught by another doctoral student. All the preservice teachers, a total of 53 participants, agreed to participate in this research study.

The overall goal of the course as stated in the course syllabus was: "To teach science content and inquiry methods in such a way that those teaching pre-K-5 will feel confident, skilled, and motivated to integrate inquiry science into the curriculum." The course was designed in a way that similar content and pedagogy were used in both classes. They were taught by the researcher and his wife, a doctoral candidate in the department. The instructors planned the course together and the instruction in both sections was similar. The same strategies and activities were used in both classes. They both modeled how to teach through inquiry by using hands-on centers, discovery tub activities, demonstrations, and dialogue journaling. Students participated in hands-on stations and discovery tubs, wrote in journals, and engaged in classroom discussion. Most of the class time was spent on modeling hands-on learning stations and discovery tub activities (Pearce, 1999, 2002). Some of the hands-on learning stations were designed to teach specific science content and required structure, instruction, and predetermined questions in each station. Others were open-ended discovery tub activities (Pearce, 1999, 2002) that included a variety of materials that could be used in various ways.

Throughout the semester, over 73 hands-on activities at various levels of inquiry were implemented in the 37.5-hour course. Activities were chosen to model inquiry teaching, teach some content, and develop conceptual understanding. In addition, priority was given to activities suitable for children but also fun for adults, especially activities designed to generate student interest in science and hopefully in teaching science: (a) discrepant activities to provide excitement (for example, cutting a magnetic field with scissors, making polymers, Bernoulli Principle), and (b) enjoyable activities to engage in playful science (for example, paper helicopters, scientific toys, making games out of such materials as magnets, electric motor, batteries, toy cars). Most of the activities used local, readily found and inexpensive materials. The majority of the activities involved active participation and group work of preservice teachers to investigate the different aspects of an activity by posing questions and conducting investigations. More detailed descriptions of the class activities are found in Bulunuz (2007).

Assignments included: reflections on readings, doing a science fair project, and implementing activities with children during their field assignments. To apply what they learned, the preservice teachers implemented discovery tubs (materials the children could explore and investigate) and learning stations with children during their field placements, using their course experience as a model. The discovery tubs and learning stations could include materials and suggested questions implemented in class or they could be entirely developed by the students. In both assignments, the preservice teachers were expected to plan the activities, assemble materials, give instructions, and, as appropriate, allow students to pose questions, plan investigations, and make discoveries.

Data Sources

Science Teaching Survey I & II. One purpose of these surveys was to describe students' initial attitudes and interest in science and to detect any changes in their attitudes and interest from the beginning to the end of the science methods course. Science Teaching Survey I, given as a pretest at the beginning of the semester, includes six statements adapted from the studies by Radford (1998) and Jarrett (1999). The Radford survey reported no reliability or validity measures. The two five-point Likert scale questions adapted from the survey by Jarrett (1999) have test-retest agreement as follows: 71% identical answers and 29% answers varying by one point.

Science Teaching Survey II, given as a posttest, includes the questions in Survey I plus two additional questions; one on interest in teaching science, the other on whether one would choose to teach science. The latter question involved a forced choice on whether one would choose to teach science, given the offer of two otherwise similar teaching positions (See Question 10 on the Science Teaching Survey II in the Appendix for the scenario). Those two questions were dependent variables in regression analyses on the contribution initial interest in science and the science methods course as predictors of interest in science teaching and the choice to teach science. With a small sample, test-retest agreement was calculated on the nine five-point Likert Scale items on Science Teaching survey II. There was 92% general agreement, either exact agreement or the answer varied by one point. For the dichotomously coded item (Question 10), 83% of the students gave identical answers both times.

Activity Rating Survey. In order to measure situational interest at the end of each class period, students rated the hands-on activities they engaged in during that class using a five-point Likert Scale ranging from 1 (low) to 5 (high). Their ratings were on three dimensions: (a) *fun*, how much fun it was, (b) *interest*, how interesting it was, and (c) *learning*, how much they learned from it. The students' ratings on these qualities were averaged to determine the level of situational interest in the course.

Course Rating Survey. On this survey, given during the final class session, students were asked to rate the following on a five-point Likert scale: their learning about inquiry, their overall enjoyment of the course, and their description of the course on dimensions of fun, interest, hands-on, student input, learning, and understanding. They were also asked aboutexperiencing inquiry learning, learning about teaching through inquiry, and feeling prepared to teach science as inquiry. Answers on this survey were used as predictor variables in regression analyses on the contribution of the course to interest in teaching science.

Results

Impact of the course on participants' interest and attitude toward science

In order to ascertain whether the course activities created a situational interest in science for most of the students, the weekly ratings on fun, interest and learning were averaged. The ratings on these qualities were all positive. The students had a rating on fun with mean (s.d) of 4.21 (.52). The rating on learning had mean and (s.d) of 4.12 (.53). Similarly, the ratings on interest had mean (s.d) of 4.31 (.51). Since the mid point of the scale is 3, this numbers indicate that the course activities had created situational interest for most of the students.

To determine whether students became more positive toward science from beginning to end of the course, pretest and posttest scores on common items on the Science Teaching Surveys I and II were compared using paired samples t-tests. Table I shows the means and standard deviations of the questions common to the two surveys.

Insert Table I about here

Students were significantly more positive at the end of the course on Question 2 (solving own problems, $p<.001$), Question 3 (ability to think scientifically, $p<.001$), Question 4 (fun to teach, $p<.001$), Question 6 (allow students to conduct own experiments, $p<.01$), and Question 7 (interest in science, $p<.001$). On Question 5 concerning emphasis on process skills, the students became significantly less positive, $p < .001$. The increase on Questions 1 and 8 concerning science being fun approached significance ($p = .10$).

Science Methods Course Contribution to Participants' Interest in Teaching Science

It was assumed that desire to teach science at the end of the course was a combination of initial interest in science and the effect of the course. Therefore, to answer the research question concerning the effect of the course on interest in science teaching, initial interest in science, interest in teaching science and various aspects of the science methods course from the Course Rating Survey were analyzed. Table II includes the means and standard deviations of answers on the Course Rating Survey. Since all the means are greater than 4 in 5-point Likert scale, this result indicates that science methods course was positive on dimensions of fun, interest, hands-on, student input, learning, and understanding emphasis. Also, the course was positive in terms of experiencing, learning and feeling prepared to teach science through inquiry.

Insert Table II about here

To investigate the best predictors of interest in teaching science, step-wise regression analyses were computed. The variables that were significantly correlated with interest in teaching science were included in the regression analyses to determine which variables significantly predicted *interest in teaching science*. The independent variables and the dependent variable, *interest in teaching science*, are all on 5-point scales with 5 as the highest response. The results of the regression analysis predicting the most variance in interest in teaching science are found in the following table.

Insert Table III about here

The regression analysis found that *fun in method course* and *initial interest in science* were significantly associated with preservice teachers' interest in teaching science. These variables explained 34% of the variance. The best predictor of interest in teaching science was doing fun activities in the methods course followed by *initial interest in science.*

To determine the influence of science methods course on the development of motivation to teach science, second regression analyses was originally proposed to predict *choice to teach science* (Question 10), from the Science Teaching Survey II. The question involved a forced choice on whether one would choose to teach science, given the offer of two otherwise similar teaching positions. The frequency for *choice to teach science* indicated that only four participants out of 53 did not choose to teach science.

This disparity in numbers violates the assumptions for multiple linear regression analysis. However,descriptive analysis indicated that the four students who chose not to teach science were all low in initial science interest.

Conclusions and Implications

The finding that preservice elementary teachers' overall interest in science increased from the beginning to the end of the semester suggests that the course provided many activities of situational interest (Krapp, Hidi, & Renninger, 1992). The analysis of background science experiences indicated that 42% of the preservice elementary teachers came to the methods course with low interest in science and only 13 % left the course with low interest in science. Pre-post positive changes in interest in science could mean that situational interest generated by many hands-on activities at varying levels of inquiry promoted personal interest as discussed by (Hidi, & Harackiewicz, 2000; Krapp, 2003). These results correspond to previous research findings that preservice teachers' interest in science (Jarrett, 1999) and attitudes toward science (Palmer, 2004), can be improved in a science methods course through active participation in hands-on activities and collaboration with peers.

The study also showed that it is possible to improve preservice teachers' attitude toward science, which was measured by participants' ratings on their ability to think scientifically and personal satisfaction in solving problems they had posed themselves. However, their ratings of "science is fun" and "science is fun to study" changed only slightly from pre to posttest. Participants seem to have come to the science methods course with high positive attitudes that "science is fun" (mean = 4.19) and "science is fun to study" (mean = 4.19). Therefore, there was not much space for improvement.

In addition to improvement in attitude toward science, there were also improvements in preservice teachers' attitude toward science teaching. For example, agreement with the items "science is fun to teach" and "when I teach science I will have students plan and conduct their own experiments" increased significantly from the beginning to the end of the course. However, on one item, concerning emphasis on process skills in teaching science, there was a significant decrease from pretest to posttest. One explanation for this may be that students were confused about the meaning of the construct, *science process skills*. This terminology was not explicitly taught or discussed in the course. Even though the students used most of the science process skills in the course activities, they might not have connected what they did with the phrase, "science process skills," confirming that research surveys need to include terminology with which respondents are familiar.

The findings of this study can be interpreted through the lens of several theories. According to Krapp, Hidi, and Renninger (1992), Hidi and Harackiewicz (2000), and Krapp (2004) interesting situations, "situational interest," can build to create sustained "personal interest." The students' perceptions of hands-on activities as interesting can be interpreted as situational interest in those activities. Situational interest might be an important factor in generating sustained personal interest, demonstrated in high ratings of interest in science or interest in teaching science.

In addition to inquiry based hands-on activities, students were exposed to several discrepant event activities and demonstrations during the semester. Experiencing novelty and surprise in those activities and demonstrations might have increased preservice teachers' development of interest and attitude toward science and science teaching. This is consistent with Piaget's (1964/2003) ideas on equilibration and Festinger's (1957) theory of cognitive dissonance that learning new things is satisfying and motivational. Also, throughout the semester, participants were involved in many science activities on various science topics, consistent with Ames' views (1992) on task motivation that experiencing many different types of activities is motivational by providing relevance to ranges of students in the classroom.

To answer what aspects of the course contributed to participants' interest in teaching science, various course variables that might add to initial interest in science in predicting interest in teaching science were considered for the regression analysis. The best predictors of interest in teaching science were fun in the methods course and the participants' initial interest in science. Even though several aspects of the methods course (e.g., learning a lot and student input) were highly related to interest in teaching science, they did not enter the regression equation as predictors of interest in teaching science. One explanation for this is the high intercorrelations among fun and other aspects of the methods course. The finding that fun in the methods course predicted interest in teaching science supports the view that playful involvement with science (Laszlo, 2004; Piaget, 1964/2003; Pearce, 1999; Resnick, 2004) is a salient motivator for learning and teaching science. Fun can be critical in breaking the unproductive cycle in science education (in which teachers who don't enjoy science prepare the next generation). In order to enhance preservice teachers' interest in science teaching, science methods courses need to find ways to motivate students, especially those with negative previous science experiences and attitudes toward science.

When the preservice teachers were asked on Science Teaching Survey II to choose whether they would or would not accept a teaching position where they would teach science, only four out of 53 participants, all with low initial interest in science, said they would not take the science position. Their choice could have resulted from low interest in science or from particular interest in other subjects. However, for the other 18 participants with low initial interest in science to opt for teaching science suggests that the course had a positive effect on motivation.

Increases in interest in science and desire to teach science through inquiry and the finding that fun was the best predictor of interest in teaching science suggest that the fun and interesting course activities at varying levels of inquiry had a major effect on the students. In this course environment, preservice teachers had the freedom to explore their "wonderings," curiosity, and questions, suggesting that course activities should allow students to experience a sense of playfulness and excitement. Classroom atmosphere should be positive, friendly, and supportive, creating a learning environment where participants should be able to engage actively with scientific phenomena and discuss their understandings with friends and instructors. If prospective teachers are already interested in science, learning about science pedagogy might be sufficient for teaching them methods of teaching science. However, especially if preservice teachers are not highly interested in science, a methods course that focuses on engaging their interest and sense of fun and that teaches them things they did not know before can be effective in building their desire to teach science. Such a course also models ways of teaching that could be crucial in building science interest in elementary school children.

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Table I
Comparison between Pre/Posttest on Paired Items on the Science Teaching Surveys I &II

		Pretest		Posttest			
	N	Mean	SD	Mean	SD	T	p
Q.1: Science is fun to study	52	4.19	.77	4.38	.60	1.65	.105
Q.2: Personal satisfaction in solving problem	52	3.93	.71	4.44	.61	4.40	.001
Q.3: Ability to think scientifically	51	3.80	.69	4.37	.69	5.04	.001
Q.4: Science fun subject to teach	52	3.75	.74	4.37	.56	5.26	.001
Q.5: Emphasis on science process skills	52	4.73	.49	4.26	.63	-4.42	.001
Q.6: Allow children to conduct their own experiments	52	4.07	.71	4.42	.69	2.64	.011
Q.7: Overall interest in science	52	3.67	1.00	4.19	.65	3.90	.001
Q.8: Feelings about “Science is Fun”	52	4.19	.84	4.40	.60	1.85	.070

Table II.
Descriptive Statistics for Relevant Aspects of the Course

Course Aspects	N	Mean	SD
Enjoyed methods course	51	4.43	.57
Fun	52	4.38	.56
Interesting	51	4.39	.66
Hands-on	51	4.82	.38
Much student input	51	4.51	.64
Learned a lot	51	4.24	.65
Understanding emphasis	51	4.43	.67
Experienced inquiry learning	51	4.69	.51
Learned a lot about teaching through inquiry	52	4.52	.61
Feel prepared to teach elementary school science as inquiry	52	4.13	.68

Table III
Regression Analysis for Preservice Teachers' Interest in Teaching Science

Variable	*B*	*SE B*	B
Fun (rating of Science Methods Course)	.49	.14	.41**
Initial Interest in Science	.26	.08	.38*

$p^* < .002$; $p^{**} < .001$
Note: $R = .58$; $R^2 = .34$

APPENDIX
Science Teaching Survey II

Last 4 digits of SS#___________________ Date__________________________

Carefully read each of the following statements. Some statements are about science teaching, and some describe feelings about science. You may agree with some of the statements and disagree with others. After you have read each statement, decide on your level of agreement or disagreement and circle the appropriate letter on this answer sheet.

SD= Strongly Disagree; D=Mildly Disagree; U=Uncertain; A=Mildly Agree; SA=Strongly Agree

1. Science is fun to study
   SD D U A SA
2. I get a lot of personal satisfaction when I solve a problem by doing my own testing
   SD D U A SA
3. I do not have ability to think scientifically
   SD D U A SA
4. Science is a fun subject to teach
   SD D U A SA
5. When I teach science I will emphasize science process skills.
   SD D U A SA
6. When I teach science I will have students plan and conduct their own experiments.
   SD D U A SA

Also answer the following questions, circling a number to represent your feelings between low and high and between disagree and agree.

7. What is your overall interest in science?
   (Low) 1 - 2 - 3 - 4 - 5 (High)
8. What are your feelings about the statement, "Science is Fun?"
   (Disagree) 1 - 2 - 3 - 4 - 5 (Agree)
9. What is your overall interest in teaching science?
   (Low) 1 - 2 - 3 - 4 - 5 (High)

10. Suppose the following happens when you are ready to take a teaching position:
    You have been offered two jobs, both at the same grade level. You like both schools. The principals are equally positive. The schools are about the same distance from your house. The pay is the same. The only major difference between the positions is that in Job A you would be teaching science among other subjects, but in Job B you would be teaching other subjects but not science. If everything else is equal, which job would you choose?

____ Job A, that includes teaching science

____ Job B, that does not include teaching science