

THE STCC SCIENCE TEACHING INTERN PROJECT

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The Springfield Technical Community College (STCC) Science Teaching Intern Project was implemented as a pilot study to give community college students an opportunity to experience science teaching. At the same time, it provided seventh graders in inner city middle schools opportunities to interact with college students and to take advantage of science resources not usually available to them. Interns attended weekly meetings and participated in an all-day science field trip at the college. Most participants also made observations in a middle school science classroom and presented a science activity in the classroom. Not only did the project provide a partnership between STCC and two Springfield public schools, but it also involved interaction with the University of Massachusetts School of Education, since a doctoral candidate provided expertise in education methodology and in evaluation of the project. The project was evaluated by the interns, the two K-12 teachers, the seventh graders, and by the doctoral candidate. There was clear enthusiasm for the project provided by all the sources. The conversion of this project into a one-credit course is currently under development.

Introduction

It appears that the science community often does not place serious value on science teaching. According to K. Davis, positions outside of the traditional academic research setting are not valued and are often considered "dead-end jobs" occupied by "science drop-outs." [1] At the same time, science teacher shortages commonly lead to the assignment of middle school teachers and high school teachers to inappropriate subject areas [2]. Therefore, undergraduate science students do not often get a positive view of K-12 teaching from science faculty but there is still a great need for science teachers who are well trained in their disciplines. To help fill this growing need, it seems possible that exposing undergraduate science students to teaching opportunities might increase the likelihood that a teaching career will be pursued. The Springfield Technical Community College (STCC) Science Teaching Interns Project was devised as a means to test this idea by exposing students enrolled in biology courses at STCC to teaching opportunities. In addition, discussions on teaching methodology and peer-group interactions were provided. There were two different types of teaching experiences: one in a middle school classroom and the other at a field trip day at STCC. The teaching interns in the program were

required to attend weekly meetings. To be certain that the interns participating in the project had an adequate knowledge base, they had to have completed at least an introductory biology course.

Brenda Capobianco was asked to serve as a consultant for the project. Not only is she a knowledgeable doctoral candidate, but she is also a fourteen-year veteran teacher. She gave a presentation to the interns on what to expect during classroom visitation and on how to prepare for "teaching" an activity. She also helped with the evaluation of the project. At the interns' request, she was present for the field trip day at STCC to evaluate the teaching activities.

Description of the Project

The STCC Science Teaching Intern Project was developed during Fall 1998 for implementation in the Spring 1999 Semester. A preliminary proposal was presented to the science coordinator of the Springfield Public School Department. She was enthusiastic and with her help, two seventh grade teachers in two different middle schools were recruited to participate and to provide teaching expertise for the teaching interns.

Most of the interns observed a middle school seventh grade science class taught by one of the participating teachers. They also had an opportunity, under the supervision of the teacher, to present an activity or lesson to the same class. In addition to the teaching activities, the interns in the program were required to attend weekly meetings. These meetings were used to prepare for both observation visits and "teaching" visits to the middle schools, as well as the STCC field trip portion of the project. One week they viewed and critiqued a video of classroom teaching by a number of practice teachers. Another time, Brenda Capobianco was a guest presenter. Several meetings included the two middle school teachers who were involved in the project. The interns seemed genuinely glad to get together each week and they were certainly supportive of one another.

At the end of the semester, the two participating teachers and their classes, a total of about fifty seventh graders, were invited for an all-day field trip to the Department of Biological Sciences at STCC. The interns organized four 50-minute activities for the day. Two activities

were prepared by just one intern, and two were prepared by a pair of interns. These activities were presented four different times throughout the day in order for the guests to experience all four activities. The activities included, “The Invisible World,” “Exploration into Galls,” “A Look at Genetic Engineering,” and a “Nature Study.” Each planned activity was reviewed in detail with the teachers. In addition to the four activities, visiting seventh graders were treated to pizza for lunch and a discussion/evaluation period at the end of the day. When the seventh graders were gone, the interns spent time reflecting on the day and receiving constructive suggestions and praise from the evaluator.

Project evaluation was provided several different ways. The teaching interns completed questionnaires at the beginning and after completion of the project. They also shared their views freely with the evaluator. The two K-12 teachers each wrote some comments shortly after the field trip to STCC. At the end of the field trip day, the seventh graders were asked to write three things they learned, two things that surprised them and one remaining question. They also participated in a group discussion with other students and one of the interns. Finally, the evaluator provided comments on the project.

Project Evaluation and Analysis

An intern questionnaire was administered on the first formal meeting day to learn about the interns' attitudes toward science and toward teaching as a possible career choice. Table 1 shows the specific questions, both individual and overall averages for each question and the average score for each student. It should be noted that one question, number 5, is written as a negative question.

Table 1 Intern questionnaire to determine intern attitude to science and to teaching. A "1" indicates strong agreement with the question and a "5" indicates strong disagreement with the question.

Question	Intern 1	Intern 2	Intern 3	Intern 4	Intern 5	Intern 6	Overall Average
1. I enjoy doing science experiments.	2	1	1	1	1	1	1.2
2. I can solve problems.	2	3	1	2	2	1	1.8
3. What I am learning in science will be useful to me outside of school.	2	1	1	1	2	1	1.3
4. I think about things I learn in science class when I'm not in school.	1	1	1	1	1	1	1.0
5. I do not want to take anymore science classes than I have to take.	4	5	5	5	3	5	4.5
6. Reading science is more fun than it used to be.	3	1	1	1	2	1	1.5
7. I enjoy working with children.	1	1	2	2	1	1	1.8
8. I am likely to pursue teaching as a career.	1	2	3	2	3	1	2.0
9. I am looking forward to working with a middle school teacher.	1	1	2	2	1	1	1.3
10. I feel confident about going out to a middle school.	2	1	2	2	1	1	1.5

Average score of the ten items for each intern after converting question 5 responses to a positive statement format.

Intern 1	Intern 2	Intern 3	Intern 4	Intern 5	Intern 6
1.7	1.3	1.5	1.5	1.7	1.0

Analysis: The six interns appear to vary little in their average scores for the ten questions. It is clear that they all enjoy science and feel enthusiastic about being able to interact with the seventh graders. With the exception of two individual responses, it can be said that the interns agreed (often strongly) with the statements related to science attitude. Two interns indicated that they were undecided about the likelihood of pursuing a teaching career. The other four were likely to pursue teaching as a career. Average scores of 1-1.7 indicate that the interns had a positive attitude about science and teaching. It should be pointed out that question 5 was the only question which was written in a negative question format and therefore, a score of "5" actually indicated a strong desire to take more science courses. Before computing the average score of the ten items for each student, question 5 responses were converted to a positive statement format.

A teaching experience questionnaire was completed by the teaching-interns during the discussion period that followed the field trip at STCC. The purpose of the questionnaire was to

obtain personal demographic information as well as final views on the project. The questions that followed the demographic information section allowed for open-ended responses.

Six interns participated in the project, five females and one male. Half of the participants identified themselves as White (Non-Hispanic) while the others described themselves as African-American, Native American, or "Other." The group, on average, was between 25 to 34 years of age. All but one of the students were full-time and had declared a major at STCC.

Interns reported peer support as positive, constructive, and informative.

"They were great! I learned so much from our constructive criticism and interactions."

"I enjoyed observing their different styles of teaching."

Teaching interns stated their interactions with the middle school teachers were resourceful, informative, and helpful. The teachers served as good role models and provided structure to individual lessons and ideas. The experience for some students allowed them to acquire a greater appreciation for and awareness of teachers and their abilities.

"She was consistent and displayed good skills in how she was able to get the attention needed from her students."

"Teachers are SAINTS!...Teaching is a huge job."

Interns were also appreciative of the project coordinator's work and involvement in the project. They found her to be supportive and appreciated her patience, flexibility, and guidance. They attributed the success of their own experiences to her efforts in making the program a productive one. One student indicated communication problems due to busy schedules.

"She fed us, she fed us pieces of education - she put us in touch with great people."

"She was very patient and supportive."

In addition, the interns were all extremely enthusiastic about the participation of the evaluator/guest presenter. They felt that she provided them with useful techniques, as well as productive criticism of their teaching.

“She is a person who I inspire to be. She seems so natural and so positive when talking about the children. I hope I grow to become the kind of teacher she is. I need a mentor and I like her personality best.”

“She has a personality that is just so beautiful that she is just a joy to talk to, or just share any situation you may have.”

The interns made a number of suggestions for improving the project for the following year. All but one intern would have preferred credit towards graduation to a stipend. There was a general sentiment that the project required a lot of work and that starting the project earlier in the year and delaying the field trip experience until several weeks after final exams would have been helpful. Several of the interns desired more interaction with the K-12 teachers.

“Start a lot earlier in the year.”

“Make this worth a credit towards graduation.”

“Conduct the field trip a couple of weeks after finals.”

“More interactions with teacher.”

“Expose middle school students to classes in different disciplines.”

The K-12 teachers were given a fairly open-ended evaluation form on the day of the field trip to send in at their convenience. Sample comments follow.

“The interns chosen for the project were very knowledgeable, enthusiastic, creative, organized, and excellent candidates for future science teachers.”

“It was definitely a pleasure having them observe and teach in my classroom.”

“The only thing I would suggest is to have the interns observe and teach a couple more times before the culminating field trip at STCC.”

“This program was a wonderful way to get my students interested in science and scientific careers.”

“I feel bad that so few of my students got to experience the excitement and enthusiasm I felt running through my students after the trip.”

Both K-12 teachers indicated that they felt the project was a great success and were very enthusiastic about their interactions with the interns. It was suggested that it would be beneficial to have the interns observe and teach more times in the middle schools before the field trip. It was also suggested that it would be nice to involve more than one class of students from each school.

The visiting seventh graders were brought together at the end of the field trip experience into four circles for the purpose of reflecting on the day at STCC through the use of the “3-2-1 exercise.” Each circle had one of the interns or a team of interns to facilitate. One of the K-12 teachers joined a circle and the other opted to watch. The students were each given a large index card and asked to write three things they learned, two things that surprised them, and one question that remained. There was a little confusion and some groups produced three surprises and two things they learned. These responses were shared in the circle before they were collected.

“I hope that you and the other teachers can let us come again. “

“Three things that surprised me today were, glow in the dark bacteria, gall flies only live for two weeks, and the bacteria in the invisible world.”

“I learned three things today and they were, DNA is placed in a gel, one maple tree makes 1 fourteen quarts of maple syrup, and there are animals that live two weeks.”

“One question I have is ...how they make STCC so beautiful?”

It is clear from the student responses to the 3,2,1 exercise that aspects of all four activities stayed with them throughout the day. Some clearly indicated a desire to visit again.

Brenda Capobianco, evaluator for the project, provided a write-up on the classroom observations she made on the field trip day as well as her observations from the discussion session at the end of the day. Some of her comments appear below.

“Students conveyed a heightened awareness of and appreciation for teaching. They did not realize the amount of time and energy required to teach one lesson multiple times within a day. They felt proud of their accomplishments and recognized the assistance they received in making it successful.”

“When asked, “if you were to do it over again what would you do differently?” most of the students stated that they would talk less, make it more hands-on, and try to answer most student questions. There was a growing awareness of what they were doing when they were teaching.”

Analysis: The evaluator felt that the program succeeded in giving the interns an appreciation for teaching. She also indicated that they had gained an understanding of the approach they would take to teaching in the future.

Experiences that Supported the Project Goals

The goals of the project were listed in the original proposal, which was presented to the Springfield School Department. Project experiences have supported all of these goals. Table 3 lists both the original project goals and the experiences that supported these goals.

Table 2 Project goals and experiences which supported these goals

Goal 1	To provide an opportunity for students, enrolled in courses in the STCC Biology Department, to experience interaction with middle school children in an instructional capacity.
Supporting experiences and observations	<ul style="list-style-type: none"> ▪ "Teaching" an activity in a seventh grade classroom ▪ "Teaching" one of the four activities (four times) on the field trip day
Goal 2	To expose STCC students to information on teaching middle school-aged children.
Supporting experiences and observations	<ul style="list-style-type: none"> ▪ Watching and discussing a video showing practice teaching ▪ Guest lecture from Brenda Capobianco ▪ Seventh grade science textbooks and teaching journals were made available ▪ Meetings with K-12 teachers
Goal 3	To allow STCC students to create meaningful science activities and to be the instructors of the activities.
Supporting experiences and observations	<ul style="list-style-type: none"> ▪ Interns created their own science activities for both teaching experiences
Goal 4	To interest talented STCC students in becoming teachers in the future.
Supporting experiences and observations	<ul style="list-style-type: none"> ▪ It appears that the project reinforced the desire of four of the interns to become teachers and may have influenced one to head in that direction
Goal 5	To provide middle school children in the Springfield Public School System with science enrichment.
Supporting experiences and observations	<ul style="list-style-type: none"> ▪ Classroom activities presented by interns ▪ All day field trip to the STCC Biology Department
Goal 6	To introduce middle school children in the Springfield Public School System to a college campus facilities.
Supporting experiences and observations	<ul style="list-style-type: none"> ▪ All day field trip to the STCC Biology Department
Goal 7	To provide STCC students with the opportunity to interact with Springfield public school teachers.
Supporting experiences and observations	<ul style="list-style-type: none"> ▪ Two meetings at STCC ▪ Classroom observations ▪ Visits to the classroom with the purpose of "teaching" an activity ▪ The field trip to STCC
Goal 8	To view this project as a pilot for a possible one-credit course, since NSF funding will not always be available.
Supporting experiences and observations	An application to make this program a one-credit course will be filed with STCC Curriculum Committee

All eight of the original goals of the STCC Science Teaching Intern Project were supported by the experience. It was difficult to assess how successfully Goal 4, "to interest talented STCC students in becoming teachers in the future," was attained. Four of the interns

were very committed to pursuing teaching as a career before becoming involved with the project and these four students remained committed at the end of the project. There were two undecided interns. By the end of the project, one of these students was more favorably inclined to teach and the other decided to continue his goal of pursuing a career in biotechnology.

Conclusion

There is very little attempt to integrate a K-12 teaching component into courses in the Department of Biological Sciences at STCC. The STCC Science Teaching Intern Project was designed to provide an opportunity for students, enrolled in various courses in the department, to experience science teaching and perhaps be more inclined to seek a career in teaching in the future. Although it cannot be stated that the program definitely increased the likelihood of future teaching with this small group of students, the evaluation statements from all involved parties were very positive. Statements from the interns such as the two that follow seem to indicate that the experience encouraged interest in teaching.

“YES! I can do this! I really love getting back more than I put in - and I did! What a great investment, my future and theirs.”

“The kids were wonderful. They opened my eyes to a different world. They are so bright and I can't wait to be more involved with them.”

The fact that the project provided multiple levels of connections—middle school teachers and students, community college instructors and students, and the School of Education of a major university—may be somewhat unique. All of these levels were necessary for the success of the project. The opportunity to work with a graduate student/veteran teacher worked well. It proved to be an excellent way of providing methodology and expertise for the STCC students. The opportunity for the interns to interact with classroom teachers gave them a view of real-life teaching. The interactions with the seventh graders was a critical part of the program. The intern questionnaires clearly show the importance of the peer group that the project provided.

This project was undertaken as a pilot study that may lead to a one-credit course for students to explore teaching science. Conversion to a one-credit course is currently under development. ■

Bio

Nancy Rapoport is a full professor in the Department of Biological Sciences at Springfield Technical Community College. She holds a M.S. in Biology from the University of Pennsylvania and a M.S. in Microbiology from the University of Massachusetts.

Acknowledgments

Brenda Capobianco was invaluable to the success of this project. Not only was she an evaluator, but she also gave a presentation to the interns and served as a mentor to them. She suggested appropriate evaluation methods and then helped analyze the outcomes. Brenda is a doctoral candidate at the University of Massachusetts Amherst School of Education. Elizabeth Harvey from Chestnut Accelerated Middle School and Kevin Flebotte from Duggan Middle School were enthusiastic mentors for the interns. Their commitment to the project was much appreciated. The teaching interns, the two middle school teachers, and the doctoral candidate from the University of Massachusetts all received stipends for their involvement. Funding was provided by the STEMTEC NSF grant (DUE-9653966).

References

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