



THE COUNCIL OF
INDEPENDENT COLLEGES

***TEACHING SCHOLAR
PARTNERSHIPS: A FRESH
APPROACH TO COLLEGE/SCHOOL
COLLABORATIONS***

BY W. HUTCHINSON BEARCE

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TEACHING SCHOLAR PARTNERSHIPS:

A FRESH APPROACH TO COLLEGE/SCHOOL COLLABORATIONS

This paper is intended to be a handbook for independent college and university leaders interested in learning about a fresh approach to cooperation with local elementary, middle, and high schools. It draws from the Teaching Scholar Partnerships (TSP) program, a successful demonstration project that involved ten private institutions working in partnership with their local schools. This demonstration project was partially subsidized by a grant from the National Science Foundation, but (as indicated in the final sections of this paper) many of the participating colleges and universities have continued this work without that support—suggesting the possibility that other institutions may be intrigued by this model and find ways on their own to begin similar initiatives.

What is a Teaching Scholar Partnership? It is a relationship between a college or university and a nearby K-12 school that enables undergraduate science and mathematics students to help out in K-12 classrooms. The undergraduate students, designated as Teaching Scholars, use their preparation in science and mathematics to provide a resource for K-12 teachers. In return, Scholars receive a small stipend and gain insights into the profession of teaching. Scholars are trained for their classroom work by both a college faculty member and the K-12 teacher.

The paper summarizes, for chief academic officers and college faculty, the experiences of the participating institutions in this project. In so doing, it provides a touchstone for other institutional leaders as they design their own partnerships with local schools. Each new project will need to build K-12 partnerships, determine local needs, identify financial resources, and establish internal support mechanisms. The effort required is not insignificant but the potential rewards are considerable, both for the partner K-12 schools and for the college's undergraduates.

College faculty and administrators will, it is hoped, see the TSP project as a moderate cost opportunity that can accomplish several goals simultaneously: strengthen relationships with local K-12 schools by providing otherwise unavailable resources; provide undergraduates with an opportunity to serve their community based on their own expertise rather than as “cheap help”; develop a better understanding among undergraduates and faculty members about the inherent rewards in K-12 teaching; and assist in strengthening K-12 education, specifically in the areas of science and mathematics.

The TSP project was carried out under the auspices of three national education associations during the academic years 2001-2002 and 2002-2003; institutional selection and planning was carried out in 2000-2001. The American Association of Community Colleges (AACC), the Council of Independent Colleges (CIC), and the Independent Colleges Office (ICO) worked individually with their member colleges to select and plan the campus programs and collectively to coordinate grant activities, exchange experiences and operational ideas, and to prepare and disseminate reports on the successes and lessons of the project.

The TSP leadership team, on behalf of all the participating institutions, expresses appreciation to the National Science Foundation for support of this project. In our experience, few projects have generated as many useful and innovative approaches to achieving the goals initially set forth. The 28 participating undergraduate institutions put together 28 different approaches and each made significant contributions to the final report. The originating CIC institutions and contact persons are listed in Appendix I, and their projects are briefly described in Appendix II. Institutions selected for participation by AACC and ICO are listed in Appendix III.

PROGRAM GOALS

The goals of the Teaching Scholar Partnerships program were to: (1) enrich and strengthen the learning experiences of K-12 students in mathematics and science; (2) encourage undergraduates majoring in science, mathematics, engineering, and technology to consider K-12 mathematics and science teaching as a career option; and (3) generate national attention for the critical contribution that collaborative K-16 partnerships make to ensure the vitality of local schools.

Central Methodist University
Fayette, Missouri
Program Director: Linda Lembke

Success: Stephanie Harmon, a senior chemistry major, taught the lab sections of a high school class in the University's science building when the high school burned down and the regular teacher was unable to teach the required material. Stephanie has enrolled in an MS in Education program to gain secondary certification.

PROGRAM COMPONENTS

Teaching Scholars

The Teaching Scholars are at the heart of the TSP program. Every college major program has students who are committed to the intellectual discipline at the core of that major. For many of these students, the discovery of the underlying principles of a subject provides a kind of challenge and excitement that they have never before encountered. The hope is that these students can be induced to share their enthusiasm and understanding of the subject matter with students and teachers in K-12 schools.

An underlying assumption of the TSP project is that undergraduates majoring in science and math have expertise (with respect to both depth and currency) beyond that of many K-12 teachers. As few K-12 teachers have the time or money for continuing professional development, the Teaching Scholar serves as a resource for the supervising K-12 teacher, to be used in ways that will be most helpful for supporting the required science or math curriculum. Teaching Scholars have served as everything from research assistants to laboratory or classroom presenters. They have designed new

experiments for the classroom, provided tutoring services for at-risk students, overseen the preparation of projects for science fairs, and have even worked with K-12 teachers on the implementation of new science and math curricula.

Partner Institutions

The organizational context that enables Teaching Scholars to make genuine contributions in K-12 classrooms includes several layers of partnerships—between colleges and schools, and between college faculty members and K-12 teachers. The partnership can include other groups as well, such as school administrators, parents of K-12 students, and organizations that provide funding for program improvement. Needless to say, the Teaching Scholars must also be active participants in partnership discussions.

In order for a partnership to be effective, the organizers must establish clear goals in advance in consultation with the various partners. They also must provide a means for effective communication

among the various partners. Regular meetings, e-mail, electronic bulletin boards, and newsletters can serve as effective communication tools. As new K-12 teachers and Teaching Scholars enter the project, special care must be taken to incorporate them in partnership discussions.

Conversation

When a group of project participants (Scholars, college professors, and school teachers) gathered at the end of the project to develop shared insights about this program that might be communicated more widely in this paper, the importance of conversation between the multiple partners was a recurrent thread in the discussions.

Representatives of the organizations (colleges and schools) need to be clear about goals. The faculty members and teachers need a shared understanding of basics such as what to do and how to do it, and they both need to give Scholars a nuanced understanding of the Scholar's role. In some important ways, then, this document can be seen as a conversation guide, outlining for those organizing a TSP project the issues that need to be addressed, decisions that must be made, activities that should be assessed, and possibilities that might be considered. Maintaining a TSP project requires continuous monitoring to ensure quality performance, and

continuing conversation on the key features of the program is intended to convey a sense of how to make this project "work."

Mentors

Most Teaching Scholars will be unfamiliar with the responsibilities of teaching. In spite of their expertise in science and math, their only exposure to the teaching process may be what they have observed in the classroom. It is crucial that they be encouraged to think broadly about teaching and that they develop their own approach, within the context of effective practice expectations established by the college and the K-12 partners. Teaching Scholars are often best served by having a K-12 mentor and a college faculty mentor who can work together to promote the undergraduate's professional development. Continuing conversations between these three participants provides a foundation for the creation of an effective program.

Advisory Groups

One aspect of successful conversation in many of the ten partnerships in this demonstration project was an advisory group, composed of any appropriate group of individuals or representatives of organizations who offer support for the partnership. Advisory groups can provide a framework for fundraising, clarification of program goals, and support for external validation and recognition of accomplishments by K-12 students and the Teaching Scholars. There is great concern about the effectiveness of all programs in K-12 schools and no shortage of people offering fix-it-all solutions. Care must be exercised that advisory groups have clearly defined goals and objectives and that they do not stray outside their assigned roles.

Drury University
Springfield, MO
Program Director: Protima Roy

Success: Teaching Scholars assisted in designing and preparing science fair projects with public school students at various levels. Of the 30 students participating in the Ozarks Science and Engineering Fair (including a number of at-risk students), 16 were recognized with awards and two were selected to participate in a national competition. Two of these Teaching Scholars were involved in summer research projects at Drury.

A successful Teaching Scholar Partnerships program is a melding of several groups. For a program to be successful, each of these groups must “buy into” the concept. The roles and responsibilities of each group must be clearly delineated and understood, and each group must derive some positive results as well as satisfy some need to reward its participation.

Flexibility is important for successful partnerships. The experience of the schools involved in the TSP project suggests that there were many site and program-specific needs. As examples, several K-12 programs lacked adequate resources and the partner higher education institution provided supplemental curriculum materials and resources. Some elementary schools articulated a need for the enhancement of the content knowledge and process skills of its teachers. Formulation of a program that responds to the needs of the partnering school is imperative for a collaboration to be successful.

North Central College
Naperville, IL
Program Director: John Zenchak

Success: One Teaching Scholar was invited to apply for an open full-time teaching position. A second changed her major from Biochemistry to Elementary Education and plans on making teaching her career. A third, who graduated mid-year, took a teaching assistant position in an elementary school and applied for a full-time position for the next year.

Stakeholders

For a Teaching Scholar Partnership to be successful, the needs of partnering K-12 schools should be ascertained and then a clear set of goals must be established. Assessing needs is best accomplished with awareness of state-mandated curricula, and by soliciting input directly from the K-12 community. “Community” refers to the multiple groups involved in the educational process. TSP programs presented information to and, on several occasions, solicited input from the following groups: teachers, school boards or boards of education (North Central College), parental groups (St. Edward’s University), teacher education advisory councils comprised of community members or district personnel or other related parties (Carroll College, St. Edward’s University), rotary groups (Central Methodist University), corporate and business groups (St. Edward’s University, Saint Joseph’s College), and academies and teachers’ associations (Drury University, Widener University).

Building on Established Relationships

All the participating institutions of higher education relied on previous associations with the K-12 schools. These associations ranged from teacher education and grant programs to corporate partnerships, dual credit courses, professional development agreements, common faculty members, shared facilities, and alumni connections.

Identifying Needs

Programs are most meaningful when they are designed to address the unique needs and circumstances presented by a partnering K-12 program. Thus each partnership had its own character, reflective of community needs and aspirations. Despite these differences, several needs were consistently reported anecdotally and through formal and informal assessment data and questionnaires: (1) addressing state standards in math and science and preparing students for state-mandated exams;

(2) fostering mathematical and scientific literacy in K-12 students; and (3) linking math and science content with practical applications.

Recruiting Faculty Mentors

College faculty members must be recruited to serve as mentors and to help initiate the program. Some program directors utilized science or mathematics education faculty advisors while others relied on faculty members from departments of science, mathematics (Central Methodist University, Pfeiffer University), and education (Drury University). Prospective faculty mentors need to understand the goals of the program. In addition, each faculty member needs to understand his or her responsibilities as a mentor, and how these responsibilities will affect their teaching load and contribute to professional growth. The college administration needs to support and recognize the efforts of college professors involved in the program by offering recognition and, if possible, merit raises, release time (Drury University), and credit toward tenure and promotion. Some TSP programs found it advantageous to offer stipends to faculty mentors (Pfeiffer University, Carroll College). Once the college mentors have been chosen, the college team should meet with the administration of the partnering K-12 districts and individual schools to develop the vision and mission of the TSP program and identify those who will be supportive of the program. Colleges with successful TSP partnerships found that administrative support from the K-12 institutions was of utmost importance.

Recruiting K-12 Faculty Mentors

College mentors and administrators were typically invited, along with potential K-12 teachers, to an informational meeting. The program director should emphasize how the program will benefit the K-12 students, as well as teachers, through the exposure of students to college undergraduates. It should be made clear how the Teaching Scholars can serve as disciplinary resources and role models,

St. Edward's University Austin, TX Program Director: John Paige

Success: A local bank, which had adopted a school with many at-risk students, was very impressed with the quality of performance of the Teaching Scholars at that school. The bank agreed to continue support for the TSP program after NSF funding expired.

and how the program can provide access to college facilities, personnel, and special programs. K-12 teachers in particular can attain access to college faculty for program resources, problem-solving expertise, laboratory trouble shooting, and professional development.

Recruiting Teaching Scholars

Prospective Teaching Scholars should understand that it is an honor to be selected as a Teaching Scholar, and experiential benefits should be emphasized by the program director during recruitment. Teaching Scholars may receive stipends, work-study money, or internship or practicum credit for their work in their program. The Teaching Scholars should be chosen on the basis of interest in the program, leadership skills, ability to relate to others, and academic records. Students may be recruited directly by the program director or selected through an application process. (See the Recruiting Teaching Scholars section on page 8 for details on how the recruitment process worked at the pilot institutions.)

Beginning the Project

The program director should bring the Teaching Scholars, faculty mentors, and K-12 teachers

Saint Joseph's College
Rensselaer, IN
Program Director: Karen Donnelly

Success: Sarah Morningstar, a chemistry major, developed lessons in statistical analysis using lab data acquired with TI-92 handheld calculators. She enjoyed her students and the classroom environment so much that she is now teaching high school science and math in Indiana.

together to establish program guidelines and spell out the roles, responsibilities, and time commitment required of each participant. The schedules of the involved Teaching Scholars and K-12 teachers should be considered and coordinated. Lines of communication should be established, and it is a good idea to create a “chain of command” at this time, including the identification of a K-12 liaison to facilitate communication between the college and K-12 entities.

Following this meeting, the program director should compile a manual of guidelines listing expectations and responsibilities for the Teaching Scholars, faculty mentors, and K-12 teachers. These manuals should be distributed, read, and

signed by all partnership participants. This manual may serve as a binding contract and provide a protocol for dismissal if requirements are not met.

Continuing Needs

The partnership should evolve to meet the needs and the abilities of each of the partners with particular attention paid to the relationship between the Teachings Scholars and K-12 teaching mentors. The program should constantly be evaluated and updated, or modified as needs change or new needs are identified. Although most of the original TSP programs did not have a formal advisory board, each used a loose-knit affiliation among partners for this role. Many of the program participants believed that including an outside evaluator in this relationship was valuable. This evaluator can consider the program as a whole and may be able to suggest improvements and modifications more readily than those directly involved with the program.

Several TSP programs found it valuable to have informal, social meetings at least once a semester (Central Methodist University, Saint Joseph's College) in order to build the partnerships. These gatherings helped to strengthen connections and trust among partnership members. Some of the TSP projects also included a celebration at the end of each semester where all participants were recognized for their accomplishments (Drury University, Saint Joseph's College).

PROGRAM ACTIVITIES

Across all participating colleges and universities, the goals for K-12 students were to increase content knowledge and process skills and generally to increase the presence of math and science in students' lives. These goals were realized through experiences both at the K-12 partner school and on-site at the college or university. Examples of activities designed to achieve these goals are given for all partners.

K-12 Classroom

Elementary school activities included work on science fair projects, developing and performing classroom demonstrations, and lesson plans illustrating how to design an experiment. Middle and high school activities also included work on science fair projects, as well as laboratory experiments focused on data acquisition, math games at a family fun night, forensic science data gathering (work with fingerprints and DNA), field trips to industrial laboratories, tagging monarch butterflies, field trips to the partner college campus for lab projects, practical application projects for calculator and computer, and special tutoring for at-risk students.

Teaching Scholar Role

The Teaching Scholars were responsible for presenting math and science content to K-12 students with a focus on practical applications. While exploring career interest and special skill needs, Teaching Scholars served as role models for K-12 students, and provided support and teaching resources for K-12 teachers. Teaching Scholars also reflected on their experiences using journals to consider means for performance improvement.

K-12 Teacher Responsibilities

Through interaction with the Teaching Scholars, K-12 teachers were able to develop new and enhanced teaching skills, meet state standards, incorporate new content and examples into teach-

ing, mentor the Teaching Scholars, foster relationships with the partner college or university, and expand one-on-one support for K-12 students.

Support by the College or University Faculty Members and Administrators

In addition to the responsibilities to select, orient, and mentor Scholars, the higher education institutions were able to develop true partnership relationships with K-12 math and science teachers, find ways to support efforts of K-12 schools to strengthen offerings in math and science, exchange ideas and experiences with the Teaching Scholars, and heighten the visibility of the college or university in the community by providing support to the K-12 system.

West Virginia Wesleyan College Buckhannon, WV Program Director: Tom Williams

Success: Two Teaching Scholars developed and presented lessons in a high school biology class. The mentor teacher so impressed these two with his commitment to and enthusiasm for teaching, that they have changed majors in order to become high school teachers.

Publicizing Opportunity

The first step in recruiting Teacher Scholars is promulgation and there are several effective methods of spreading the word. Teaching Scholars may be handpicked by program directors, recommended by college faculty or academic advisors, or selected through an application process. At North Central College, one of the program directors scouted for Teaching Scholars in his classes and also received recommendations from other faculty members in the department. He in turn approached prospective Teaching Scholars about the opening positions. Experience has demonstrated that recruitment was most successful when program directors approached students with a personal invitation to participate. Flyers and newspaper articles may also be useful in bringing the student body's attention to the program, however, students warned that flyers posted on walls tended to blend in with the plethora of other announcements. At Drury University, program information and applications were hand-delivered to qualified prospective Teaching Scholars. For continuing programs, word-of-mouth passed on by previous Teaching Scholars to interested students may help recruit new Scholars.

Establishing Incentives

Teaching Scholar participation involved financial compensation in the form of stipends or scholarships in each of the pilot programs. If stipend funds are unavailable, the program may be incorporated into a work-study financial aid plan. Also, offering course credit in the form of a Teaching Scholar seminar may provide incentive, and internships may be offered as well. St. Edward's University, for instance, incorporated both of these strategies as their program took the form of a one-credit internship course. Carroll College offered its Teaching Scholars two credit hours for field experience toward their education degrees. Teaching Scholars will gain field experience whether or not they receive credit for it, in addition to networking opportunities and opportunities to build rela-

tionships with students, teachers, and the administration in partner schools. Examples of networking success stories include Teaching Scholars from North Central College and Pfeiffer University, who received jobs teaching at partnership schools immediately after graduation. Further along the lines of opportunity, Teaching Scholars may also have the chance to attend and present at conferences nationwide. The Teaching Scholar experience may encourage students to pursue a career in the field of education if they have thought about it, but only with reservation, or solidify their desire to teach if they are already working toward a degree in education.

Selection

When dealing with a large group of prospective Teaching Scholars, an essay application may be used to narrow down the selection. The essay should include the reasons why the student wishes to participate and include the student's qualifications. West Virginia Wesleyan College developed a list of prospective Teaching Scholars from a collection of essays that demonstrated student interest and availability. On the other hand, as mentioned above, one of North Central College's program directors personally selected Teaching Scholars based on classroom and lab environment observations and faculty recommendations from people who knew the undergraduates well. In this way,

Widener University

Chester, PA

Program Director: Stephen Madigosky

Success: Five of the six students in the program have changed majors in order to become teachers. A project tagging Monarch butterflies, to follow migration routes, captivated a group of elementary students.

the program director was able to select students already recognized as role models—an important quality for Teaching Scholars to have. Regardless of the method of selection (whether appealing to a larger portion of the student body or hand-selection), the application process must include an interview.

Depending on state requirements, it may be necessary to take into consideration student GPA. In Pennsylvania, for example, students need at least a 3.0 GPA to become teacher certified. Widener University therefore made GPA their foremost criterion. Alternatively, Carroll College considered financial need as a selection criterion.

General criteria for selection should include consideration of the prospective Teaching Scholar's ability to relate to others, leadership skills, availability, and commitment. Ability to relate to others is important because students in the classrooms need to feel comfortable working with the Teaching Scholars and vice versa. Leadership skills are also necessary, as the Teaching Scholar will be directing class activities. Moreover, it is pertinent that the Teaching Scholars have a significant block of time open in their schedules to dedicate to the program, and they must be willing to hold to their commitments. To ensure this, a signed agreement with a list of expectations may be used.

Setting Expectations

While recruiting the Teaching Scholars, it is important to be able to provide a general outline of responsibilities, guidelines, and expectations. Once all participants (Teaching Scholars, K-12 teachers, mentors, and program director) have been selected, a meeting to determine more specific guidelines and expectations should be held. The goal of this meeting is to move from a list of general expectations and guidelines to more specific expectations and guidelines geared toward the needs of the K-12 teachers and the Teaching Scholars. At their meeting, St. Edward's University's program director handed out an internship workbook that outlined the general responsibilities of the Teaching Scholars, the K-12 teachers, mentors, and the program director.

Once the general guidelines are discussed and possibly revised, each Teaching Scholar should meet

Pfeiffer University
Misenheimer, NC
Program Director: Bettie Starr

Success: At-risk students in biology were able, with tutoring from Teaching Scholars, to raise their grades to A's and B's.

with his or her K-12 teacher to discuss the specific guidelines and shared expectations that each has for the other. A continuation of this dialogue is important throughout the project year because expectations and needs will continuously change and adjustments must be made. By the conclusion of the meeting, it is important that all participants clearly understand the roles and responsibilities of each of the participants. This will go a long way toward alleviating confusion and stress.

Categorizing Teaching Scholars' Expectations

The expectations of Teaching Scholars can be grouped into three different categories:

Time Expectations: Time is the most difficult of all expectations. Most of the participating schools required that Teaching Scholars put in approximately five hours per week, which included preparation and planning time, classroom time, and seminar time. Teaching Scholars can expect to spend a minimum of one hour a week planning a project or lesson. This may increase as the presentation of a lesson or lab nears. The Teaching Scholar can expect to spend two to four hours a week in the classroom, and one hour a week in meetings reflecting on and discussing their projects, lessons, and classroom experiences. In addition to the hours listed above, the Teaching Scholar must also figure in travel time to and from the schools. For example, North Central College's partnership schools were considerable distances from the college. Since students were required to provide their own transportation, North Central College provided them with a monetary allotment to compensate for mileage accumulated from the

commute. Furthermore, since the Teaching Scholars will spend two to four hours in the classroom a week, they need to have a block of time free in their schedules. This will allow them the flexibility needed to match their time with that of a K-12 teacher. Central Methodist University originally thought the Teaching Scholars could spend ten hours per week in the classroom. However, because of scheduling difficulties with the cooperating schools, the Teaching Scholars spent closer to four hours per week in the classroom, and this proved to be an adequate amount of time.

Classroom Expectations: The main classroom expectation is to have the Teaching Scholar develop lessons or labs and present them to the classroom, although the number of lessons required may vary. Saint Joseph's College found that two lessons per semester worked well. While developing lessons, the Teaching Scholar can be expected to do any necessary research, communicate with the K-12 teacher, order materials needed for a project or lab, and develop and grade an assessment. Finally, while presenting the lesson, the Teaching Scholar is expected to supervise and manage the classroom. At Central Methodist University, the Teaching Scholars were asked to devise activities in conjunction with public school teachers, set up lab activities and serve as lab assistants, teach lessons, and promote the use of technology.

Classroom expectations can vary depending on the needs and grade level of the class. Central Methodist University encountered a situation that illustrates how classroom expectations may develop. Since a high school science teacher left on maternity leave, the Teaching Scholars assigned to this classroom assisted the substitute by setting up and running labs and helping students with ques-

tions the substitute could not answer. This is very different than the expectations for a Teaching Scholar in an elementary classroom. At that level, Teaching Scholars' main duties were to be a second set of eyes and an "extra pair of hands" during the science and math lessons. The Teaching Scholars could also share their expertise with the teacher, which proved especially useful.

Product Expectations: Teaching Scholars should be required to keep a weekly or bi-weekly journal that can be used to document their activities and time spent on projects. Drury University also required Teaching Scholars to record personal reflections in their journals. These journals can be used to include attendance logs, time sheets, and a record of activities. Journals may be kept in a notebook, posted on an electronic bulletin board or website, or e-mailed to the mentor. St. Edward's University required their Teaching Scholars to prepare a team power point presentation describing their activities and projects during the semester. In addition to journals, Teaching Scholars can be prepared to create bulletin boards, provide samples of their work for evaluation by internal or external evaluators, and give presentations at conferences.

As stated before, the most important aspect of setting expectations for the Teaching Scholars is to communicate all expectations before the Teaching Scholar accepts the position. Saint Joseph's College had their Scholars sign an agreement detailing the Teaching Scholars' responsibilities and the dismissal policy. In addition to this type of agreement, all participating colleges and universities held an organizational meeting involving all participants (mentors, Teaching Scholars, and K-12 teachers) in order to communicate expectations and for training purposes.

ORIENTATION AND TRAINING PROGRAMS

The primary purpose of an orientation and training program is to prepare the Teaching Scholars to achieve the goals of the program (to enhance math and science literacy, assist classroom teachers with inquiry-model learning activities, attract science and math majors to consider teaching as a profession, and provide professional development opportunities for K-12 teachers), as well as meet the needs of the cooperating K-12 schools, teachers, and students.

Orientation

In general, orientation programs for Teaching Scholars, K-12 teachers, mentors, and college faculty were used to coordinate schedules, collect and distribute participant contact information, go over program components and responsibilities (such as distributing responsibility codes, contracts, course syllabi, internship workbooks or notebooks, attendance logs, expected products, grading rubrics, and other relevant information), and other items such as criminal background checks, TB testing, and transportation logistics.

Since Drury University's program was conducted in an after-school setting, they conducted a separate orientation for public school students at the school site. Components of this unique orientation included an explanation of the calendar of activities and expectations for K-12 student participants. Students were given different forms (permission forms for participation in the project, field trip permission forms, and lab safety agreements) to be signed by the parents and students.

Training

Training sessions occurred throughout the program (in some cases weekly or bi-weekly, in other instances as needed). In general, the occurrence of training sessions was determined by the continuous dialogue of participants, but particularly by the identified needs of the Teaching Scholars. Each school-site or project presented unique situations for which the Teaching Scholars had to be pre-

pared to be effective. Hence, various types of formal and informal training were provided to the Teaching Scholars during the course of the program. Some examples include the following:

- ❖ Training in classroom management and instructional methods, such as cooperative learning, inquiry and discovery methods, problem solving, discussion leading, lesson planning, field trip guidelines, the preparing and conducting of hands-on experiential classroom activities, differentiating instruction, learning strategies for motivating students, and implementing constructivist models of teaching;
- ❖ Project-based training such as helping K-12 students conduct research leading to science fair projects, how to conduct a science fair, how to judge a science fair, and how to conduct internet research;
- ❖ Technical training such as preparing classroom presentations that incorporate technology, conducting laboratory demonstrations, and implementing laboratory safety procedures;
- ❖ Familiarization with school rules such as discipline procedures, attendance, classroom rules, dress code, identification tags, school protocol (such as reporting to the office, signing in and out, punctuality, and absence procedures);
- ❖ Development in the role of professional teacher through professional demeanor, mutual respect, class preparation (including conducting trial runs of experiments and demonstrations prior to presentation in the classroom), conflict resolution, working cooperatively with the K-12 men-

Carroll College

Waukesha, WI

Program Director: Catherine Cullen

Success: Pairs of students, one science major and one education major, worked together to strengthen the pedagogy and the content levels for both students.

tor teacher (such as reviewing lesson plans), and establishing positive relationships with parents and other school faculty;

- ❖ Training to facilitate developmentally appropriate instruction to all students, including special needs populations such as gifted and talented students, learning disabled students, ESL students, special education students, and students with behavioral problems; and
- ❖ Training to facilitate communication among participants by utilizing electronic bulletin boards, websites, letters, online journaling, and by other means.

Some schools included weekly seminar meetings with Teaching Scholars; other sites met bi-weekly or on a regular schedule. For example, each week at Drury University, Teaching Scholars spent about 30 minutes reflecting and problem-solving, and the next 30 minutes or so on training to address identified issues. At St. Edward's University, Teaching Scholars met bi-weekly, including several full-hour training sessions facilitated by outside presenters (college faculty, graduate students, and K-12

teachers). At Widener University, Teaching Scholars met one-on-one with the project director to review project goals and objectives and to continue development and implementation of an action plan.

Celebration

Social events were also an important component of many programs. For example, Drury University conducted a pizza party as an orientation to the program, and held a final celebration luncheon where certificates were awarded to participants and others who were important to the program, including school administrators and curriculum supervisors. The end-of-term dinner at St. Edward's University included a program evaluation with the external evaluator. At Saint Joseph's College, the final dinner incorporated end-of-term project summaries presented by the Teaching Scholars to all project participants.

Evaluation and Outcomes for K-12 Students

Pre- and Post-Assessments on Attitudes: A number of schools use pre-assessment and post-assessment activities, some of which measured attitudes towards mathematics and science. For example, the attitudes of first- and fourth-grade students involved in the TSP program showed an increase in interest in the science classes throughout the year as compared to those uninvolved (North Central College). Other Teaching Scholars developed individual pre- and post-questionnaires to measure attitudes towards mathematics. Some students reported an increase in their understanding of how math directly applies to their lives (Saint Joseph's College). Other student responses showed increased interest in pursuing higher education among minority students (St. Edward's University).

Pre- and Post-Assessments on Process Skills and Content: Pre- and post-assessment activities were used to measure mathematics and science skills. The evaluation of quizzes given after each classroom visit showed that students participating in the TSP program had an increased understanding of science content and process. When comparing the initial and final quizzes, one can see the growth of process skills and content acquisition of varying ethnic groups (North Central College).

Student Written Responses: Some qualitative results can be seen in written comments from the students, as noted below:

- ❖ The Teaching Scholar served as an extra teacher in the classroom, providing one-on-one attention, and serving as a role model. To quote one of the elementary teachers participating in the Central Methodist University program: "Her students did everything from simple experiments in science to detailed charts and graphs in math. It gave these students such self-confidence to think that they were working with 'college' students. They would go home and tell their parents that they were doing college stuff."
- ❖ Students reported that they had a stronger connection between mathematics, science, and applications to their world.

- ❖ Students gained experience in laboratory work and using the scientific method.

Evaluation and Outcomes for K-12 Teachers

Pre- and Post-Assessments of Attitudes: Pre- and post-questionnaires were used to assess the changes in attitudes toward math and science. For example, the attitudes of first- and fourth-grade teachers involved in the TSP program showed an increased interest in teaching science throughout the year as compared to those uninvolved (North Central College). A pre- and post-evaluation was given to teachers to assess the stages of concern of the TSP (Widener University). Mid-term and end-of-year surveys were used to assess the teachers' attitudes toward working with Teaching Scholars. Surveys showed that teachers involved with the TSP enjoyed the experience of gaining an effective teaching tool (St. Edward's University). Teachers are able to learn about and continue using these new methods and technological tools as they are interwoven with the curriculum (North Central College, St. Edward's University, Saint Joseph's College).

Joint Assessment Meetings: Joint assessment meetings were held with teachers, mentors, and Teaching Scholars. These meetings were given at the end of the term and were used by most schools. At these meetings, useful dialogue and written statements resulted in plans for strengthening the program (Central Methodist University).

Evaluation and Outcomes for Teaching Scholars

Pre- and Post-Assessment of Attitudes: A pre- and post-evaluation was given to Teaching Scholars to evaluate the program (Widener University). The use of mid-term and end-of-year surveys completed by K-12 teachers were used to assess the classroom development of the Teaching Scholars. Surveys showed Teaching Scholars had an increased comfort level in teaching (St. Edward's University).

Millikin University

Decatur, IL

Program Director: Ray Boehmer

Success: Teaching Scholars enriched a local school system that had lost 40 teachers in one year, as a result of drastic budget cuts.

Assessment of Teaching Scholars: The means for evaluating Teaching Scholars in terms of successful classroom management were measured by:

- ❖ Reflective journals (North Central College, Saint Joseph's College, St. Edward's University, Widener University, Central Methodist University, West Virginia Wesleyan College);
- ❖ Regular group and individual meetings with mentors and teachers (North Central College, Saint Joseph's College, St. Edward's University, Widener University, Central Methodist University, West Virginia Wesleyan College);
- ❖ Term or year-end assessment meetings (North Central College, Saint Joseph's College, St. Edward's University, Widener University, Central Methodist University);
- ❖ Classroom observations by mentors or other outside personnel, including in some cases, representatives of private sources of funding (St. Edward's University, North Central College, Saint Joseph's College);
- ❖ Written evaluations by teachers and mentors (North Central College, Saint Joseph's College, St. Edward's University, Widener University, Central Methodist University);
- ❖ Video or audio taped interviews used in some cases by outside evaluators (Widener University, Saint Joseph's College);
- ❖ Final summaries submitted by the Teaching Scholars (North Central College, Saint Joseph's College, St. Edward's University, Widener University, Central Methodist University, West Virginia Wesleyan College); and

- ❖ Campus visitations by CIC Project Director Hutch Bearce (Central Methodist University, Drury University, Millikin University, North Central College, Saint Joseph's College, St. Edward's University, Widener University, West Virginia Wesleyan College).

Results from the assessment tools used above show that most Teaching Scholars gained experience in motivating students, managing time, and maintaining control of a classroom. They acquired the ability to develop motivating math and science lesson plans. More importantly, Teaching Scholars strengthened their communication skills and created professional working relationships. As a result of their experience, a number of Teaching Scholars changed their major to education. Those not completely changing career goals indicated teaching as a minor or as a secondary career option. Still others showed an interest in using this teaching experience in their career work. In other words, they would like to visit classrooms and share the knowledge they have in their fields (North Central College, Saint Joseph's College, St. Edward's University, Widener University, Central Methodist University, West Virginia Wesleyan College, Drury University).

Evaluation and Outcomes for College Mentors

The outcomes were assessed through questionnaires for the mentors; informal dialogue and dialogue from regularly scheduled as well as term and year-end assessment meetings between Teaching Scholars, teachers, and mentors; outside evaluators and other non-mentoring faculty at the institution; and presentations given by mentors at professional and community meetings.

Results indicate an overall satisfaction with the success of the TSP project. Stronger relationships with K-12 teachers were established. In several instances, the methodologies and projects developed for K-12 students are also being used in college classrooms (North Central College, Saint Joseph's College, St. Edward's University, Widener University, Central Methodist University, Drury University).

Evaluation and Outcomes for K-12 Institutions

The outcomes for K-12 schools include a better understanding and appreciation of the teaching of mathematics and science by administrators and school boards, parents, and the community at large. Improved learning environments for the schools were noted as well.

Evaluation and Outcomes for Institutions of Higher Education

The outcomes for higher education include the development of community outreach activities as well as the general improvement of science and education programs.

SUSTAINING THE PROGRAM

Distributing Costs

Most of the college participants are pursuing some preliminary methods for sustaining the TSP program for the future, using some of the following as a substitute for the NSF grant:

- ❖ Internship program (Saint Joseph's College, North Central College, St. Edward's University, Widener University);
- ❖ Outside funding including state and federal government grants, private industry and foundations, institutional funding, and college donors (Drury University, Saint Joseph's College, St. Edward's University, North Central College, Widener University as part of a larger consortium grant);

- ❖ Work-study (Drury University, Central Methodist University);
- ❖ Service-learning credit (Drury University); and
- ❖ Long-term relationships between K-12 and higher education (Widener University through its Professional Development School, Saint Joseph's College, North Central College).

Rewards

Rewards included use of student stipends, direct college credit, building connections to further education careers and opportunities, and indirect college credit by including curriculum activities into college classes.

SUCCESSFUL CONTINUATIONS

Several of the CIC pilot projects have devised means to continue their TSP programs using the ideas noted in the Sustaining the Program section. Although these field reports are preliminary, it is clear that projects are continuing in the absence of the grant funds that initiated the program.

Central Methodist University: We have tried to continue the TSP program with very limited success using some of the work-study funds earmarked for public service. Four of the TSP Scholars have done some work in the public school similar to what they did when we had the grant but not with the same regularity. We probably would have had

better results had we recruited new Scholars, but that would have meant training them, which might or might not have been successful with limited funds. The students who have been TSP Scholars are all leaders in the science department and most have become very involved in their own research, in preparing for the pre-professional exams, or in looking for jobs. Without the expectations we placed on them through the grant, other obligations seem to have taken precedence.

Drury University: We have continued the TSP project on a small scale, at the Pipkin Middle School. We have used Drury students taking

Elementary Science Methods, to help middle school students work on their “Science Fair Projects.”

North Central College: We have started a small internship program based on our experiences during the CIC-TSP grant. Last term, two students began designing demonstration-experiment activities (the foundation of our methodology). They will be taking these activities into one of the elementary schools with which we worked during the grant period. We are also beginning to recruit possible interns for next year.

Pfeiffer University: We have extended our program by requiring that students who receive the top science scholarships (five are given each year) work for five hours each week for one year in one of two local high schools, doing TSP style activities: tutoring students who need assistance in science, developing demonstration projects and laboratories for science classes, and working with high school science students in labs on two Saturdays per term. The teachers and the students at the high schools respond very favorably to this program. Due to lack of transportation funds, two high schools near the campus are being used, rather than the heavily minority-student school used previously. There are no funds to pay stipends to the high school science teachers to work with college science students, so there is less interaction among the high school teachers, faculty members, and college students than with the grant.

St. Edward’s University: St. Edward’s University has institutionalized the TSP program as an internship.

BIOL/CHEM/MATH 4152: Teaching Internship in Biology/Chemistry/Mathematics. This course is

designed for students in the Teaching Scholar Partnerships program. Students assist middle school and high school teachers to plan, coordinate, and facilitate hands-on activities in science and math. Students commit five hours per week to the project, including a regular training and supervision seminar and on-site school and classroom involvement. Students are required to keep a log of teaching activities at the cooperating school site. Requires a minimum of 60 hours per semester. Prerequisite: Sophomore standing and consent of instructor.

We are able to continue the student stipend (\$1,000 per semester posted to student financial aid account) through financial support from corporate sponsors (such as the 3M Corporation, BankOne, and others).

Widener University: Widener University was recently awarded \$279,822 to continue the work started by the TSP program. This amount is to be used over the next five years to help local school districts revamp curriculum, provide a solid support system, and train middle and secondary teachers in varied content areas. We are now part of the Math Science Partnership of Greater Philadelphia (LaSalle University) that was recently awarded a sum of more than \$12 million to build unique relationships between institutions of higher education and middle and secondary schools. More than 60 institutions are involved in the effort. Specific focus areas for the Widener program are pre-service teacher education, recruiting exceptional science students into teaching, directing career change students in the classroom, and mentoring district classroom teachers.

CONCLUSION

Pilot programs, by design and intent, are experimental and are expected to have some successes and some failures. The Teaching Scholar Partnerships program has been marked by many successes and virtually no failures. It has also been characterized by the willingness of all concerned to share their ideas about what works and exchange their stories about the effect these efforts have had on the lives of college and K-12 students.

This report is an attempt to share the lessons of the TSP project with the wider Council of Independent Colleges membership. A list of the participant CIC member colleges and project directors is listed in Appendix I and II. The reader is encouraged to contact any of those persons for additional details. The colleges and universities selected to participate by AACC and ICO are included in Appendix III.

APPENDIX I

COUNCIL OF INDEPENDENT COLLEGES PARTICIPATING INSTITUTIONS

Carroll College
100 N. East Avenue
Waukesha, WI 53186
Program Director: Catherine Cullen
E-mail: ccullen@cc.edu

Central Methodist University
411 CMC Square
Fayette, MO 65248
Program Director: Linda Lembke
E-mail: llemcke@cmu.edu

Drury University
900 North Benton
Springfield, MO 65802
Program Director: Protima Roy
E-mail: proy@drury.edu

Millikin University
1184 West Main Street
Decatur, IL 62522
Program Director: Ray Boehmer
E-mail: rboehmer@millikin.edu

North Central College
30 North Brainard Street
Naperville, IL 60540
Program Director: John Zenchak
E-mail: jjz@noctrl.edu

Pfeiffer University
PO Box 960
Misenheimer, NC 28109
Program Director: Bettie Starr
E-mail: bstarr@pfeiffer.edu

Saint Joseph's College
PO Box 874
Rensselaer, IN 47978
Program Director: Karen Donnelly
E-mail: karend@saintjoe.edu

St. Edward's University
3001 South Congress Avenue
Austin, TX 78704
Program Director: John Paige
E-mail: johnp2@admin.stedwards.edu

West Virginia Wesleyan College
59 College Avenue
Buckhannon, WV 26201
Program Director: Thomas Williams
E-mail: Williams@wvwc.edu

Widener University
One University Place
Chester, PA 19013
Program Director: Stephen Madigosky
E-mail: madigosky@pop1.science.widener.edu

PROGRAM SYNOPSES

Carroll College: Teams consisted of one college faculty member, one high school mentor teacher, and two Teaching Scholars (one declared major in science or math, and one secondary minor planning to teach science or math). The team was organized to assist the high school teacher in classroom instruction as well as to provide enrichment activities for the high school students.

Central Methodist University: Teaching Scholars in science and math were assigned to one or more K-12 teachers. College faculty members served as mentors and resource persons. Teaching Scholars helped develop and present laboratories, lessons, and activities. They taught large and small group sessions and were available for one-on-one support when needed.

Drury University: Teaching Scholars, with support from a university mentor faculty member, were assigned to be advisors to middle and high school students during selection of and preparation for a science fair project. Teaching Scholars assisted students to find projects of interest to them as well as to help them understand the project in sufficient depth for the student to make independent presentations.

Millikin University: Teaching Scholars in biology, chemistry, and math worked with K-12 classroom teachers to introduce inquiry-based activities into the K-12 curriculum. Teaching Scholars were particularly effective as role models for minority students.

North Central College: Teaching Scholars took demonstrations and experiments into three elementary schools to promote inquiry-based science education. Materials and methodology were developed over several years at the college and have been extremely successful in leading elementary students to an understanding of difficult science concepts.

Pfeiffer University: Teaching Scholars in biology and chemistry worked closely with area high school science teachers to provide alternative teaching materials and demonstrations, research experiences, and tutoring for students needing help to master difficult concepts.

Saint Joseph's College: Teaching Scholars developed and implemented projects specifically designed for area middle and high schools. Several of the projects involved data acquisition using hand-held calculators and appropriate probes, analyzing results mathematically, and creating mathematical models of the observed phenomena.

St. Edward's University: Teaching Scholars worked with students in grades 6, 7, 8, and 11, to create projects in math and science. Presentations were then made to a forum of all participants on the University campus, providing opportunity for the students to see the campus laboratory facilities as well as make presentations of their own work.

West Virginia Wesleyan College: Teaching Scholars provided support for high school teachers, prepared and graded lab experiments, tutored individual students on difficult concepts, graded papers, and served as role models for high school students considering college.

Widener University: Teaching Scholars worked with teachers in the Ridley School District to implement inquiry-based science instruction, recently approved by the district for the elementary and middle school science curriculum. Teaching Scholars were also able to develop and offer enrichment activities.

AACC AND ICO PARTICIPATING INSTITUTIONS

American Association of Community Colleges
Lynn Barnett, Vice President for Academic,
Student, and Community Development
Faith San Felice, Coordinator, Teacher Preparation
One Dupont Circle NW
Suite 410
Washington, DC 20036
Phone: (202) 728-0200
www.aacc.nche.edu

Independent Colleges Office
Jeanne Narum, Executive Director
1730 Rhode Island Avenue NW
Suite 803
Washington, DC 20036
Phone: (202) 323-1300
www.ico-dc.com

Participating Institutions: Asnuntuck Community College (CT); Central Florida Community College (FL); Cerritos College (CA); Delta College (MI); Ivy Tech State College-Bloomington (IN); Lansing Community College (MI); Northwestern Connecticut Community College; Orange Coast College (CA); South Mountain Community College (AZ); Waycross College (GA)

Participating Institutions: Allegheny College (PA); Augsburg College (MN); Calvin College (MI); Illinois Wesleyan University; Kalamazoo College (MI); Macalester College (MN); St. Lawrence University (NY); Wheaton College (MA)



**THE COUNCIL OF
INDEPENDENT COLLEGES**

One Dupont Circle ♦ Suite 320
Washington, D.C. 20036
Tel: (202) 466-7230 ♦ Fax: (202) 466-7238
E-mail: cic@cic.nche.edu ♦ www.cic.edu