

Effects of Participating in a GK-12 Program on the Graduate Students' Programs of Study

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Abstract

The NSF Graduate Teaching Fellows in K-12 Education program at the University of South Carolina supports engineering and computer science graduate students to serve as content resources in local schools. This paper analyzes how participation in the GK-12 program affected the Fellows' university research and program of study. Qualitative and quantitative assessment data were collected from the Fellows and from the Fellow's advisors, evaluated and used to identify intended as well as unintended effects. The time commitment for many of the Fellows often exceeded what was expected or required. However, the majority of Fellows and advisors did not report that participating delayed their graduation. In many cases, participation enhanced their ability to conduct research and present the results. The results indicate that the benefits to the Fellows of participating in the program outweighed any negative consequences.

Introduction

The Graduate Teaching Fellows in K-12 Education (GK-12) program at the University of South Carolina seeks to develop the technical communication and teaching skills of participating graduate students (Fellows), foster STEM content gain and professional development among participating teachers, and enrich grades 3-8 students' learning of STEM concepts and applications. The graduate students spend at least ten hours each week working with a teacher partner in the classroom, and an additional five to ten hours each week planning for their in-school activities. The Fellows enhance science and mathematics instruction with engineering-related lessons and activities. In addition, each cohort of Fellows plans and implements a 3-day summer workshop for teachers from across the state. To help prepare the graduate students for these activities, they are required to enroll in a 3-credit, graduate-level course (EDTE 701 – Special Topics in Teaching Science) during the Fall semester, and attend weekly GK-12 seminars during the Spring and Summer. At the same time, each Fellow is expected to adequately progress in his/her university program of study and complete their thesis research.

From August 2001 through July 2004, three cohorts Fellows each were partnered with teachers in local public elementary and middle schools. The 2001 cohort of Fellows included 9 graduate students and 2 undergraduate seniors. The 2002 cohort of Fellows included 10 graduate students and one undergraduate senior. The 2003 cohort consisted of 13 graduate students.

Assessment Procedures

Multiple assessment procedures were used to analyze the effect of the GK-12 program on the Fellows' research and program of study. These included: Fellow Focus Groups, Post-Participation Interviews of Fellows, Post-Participation Follow-up Fellow Surveys, and Post-

Participation Interviews with the Fellows' advisors. This section describes these procedures and protocols.

Fellow Focus Groups. Two focus groups were conducted with each of the three cohorts of Fellows. The first focus group took place during the fall semester, about three months after the Fellows began the program. The second focus group was conducted in the summer following the Summer Institute for Teachers. Each focus group required about one and one-half hours to complete. The primary purpose of the focus groups was to determine the Fellows' perceptions of the GK-12 program. Fellows were specifically asked in what ways participation in GK-12 impacted them personally and how they felt this experience affected his/her University responsibilities.

Follow-up Fellow Survey. Fellows in each of the three cohorts who had participated in the GK-12 project were surveyed following the spring semester of 2004. The purpose of this survey was to determine the Fellows' perceptions of the overall effect the Gk-12 experience had on them. Fellows were specifically asked to respond whether they strongly disagreed, disagreed, agreed, or strongly agreed that his/her participation had slowed their progress at the University. They were also asked to respond in the same manner to the prompt "Benefits of participating in the GK-12 program outweigh any consequences."

Fellow Post-Participation Interviews. Fellows in the 2003 cohort were individually interviewed following their participation in the program. They were asked specifically "What weaknesses did the GK-12 experience improve" and "How has participation affected your program of study and impacted progress toward graduation?"

Advisor Interviews. Advisors for Fellows in each of the three cohorts were interviewed. One purpose for the interviews was to elicit information concerning the advisors' perceptions of the impact of the GK-12 program on the Fellows. The advisors were asked about their advisees' progress and the affect of the GK-12 program on the Fellow's communication skills.

Results

This section contains the findings for each of the assessment methods. It begins with the findings associated with the Fellow Focus Groups, progresses to the Fellow Post-Participation Surveys, the Fellow Post-Participation Interviews, and concludes with the findings associated with the Advisor Interviews.

Fellow Focus Groups. When asked in what ways participation in GK-12 had impacted them personally and his/her University responsibilities or program of study, most responses were positive across the three cohorts. The areas most often cited as improving were his/her communication and planning skills.

Fellows from all three cohorts indicated that the GK-12 experience in the schools had improved his/her communication skills in terms of what they do as a part of his/her program of study at the University. One Fellow said, "I think I have become a little bit sharper as far as describing what my research is and what they need to know for them to understand. Before I just, we've all seen presentations from people that just assume you know everything. Even if it's your field, you

may not understand.” Another Fellow indicated, “It’s helped me communicate a lot more effectively. I think to begin with I was going in there and trying to explain at the college level and now I can get down to their level where it is something they can understand.” A third Fellow stated, “My experience in the program has taught me to think before I talk about something and figure out how to say it.”

Another area often cited by the Fellows was the effect his/her program experiences have had on his/her University research and program of study. One Fellow said, “The communication and people skills I’ve taken away. But another thing is the new perspective on my research. I have different questions and more fundamental questions. The kids always ask why, what are you doing, what is this? So, I’m asking the same kinds of questions when I make decisions. I analyze things at a more fundamental level.” Another Fellow indicated, “I try to write out more of what I think the problems might be in my research. Writing down my thought processes helps me see where I’ve been and in what direction I need to go. A third Fellow said, “I think it has definitely helped me figure out what my next step should be and my goals.”

Focus group data suggests that negative impacts on Fellows program of study appear to have been limited to the first cohort. There were five Fellows that made statements in the focus groups for that cohort that indicated participation in the GK-12 program had negatively affected his/her program of study course work or progress on their dissertation. No such statements were found in the focus group data for the other two cohorts of Fellows.

Follow-up Fellow Survey. A majority of the responding Fellows (67%) either strongly disagreed or disagreed that his/her participation in the GK-12 program had slowed his/her progress in his/her program of study. Analysis revealed that there were four Fellows in the first cohort and one in the second cohort that agreed their participation in the GK-12 program had slowed their progress. However, all of the responding Fellows (100%) agreed or strongly agreed that the benefits associated with participation in the program outweighed any consequences.

Fellow Post-Participation Interviews. When asked about the impact of the program on their communication skills, all of the Fellows in the third cohort indicated the experience had strengthened his/her communication skills. One Fellow stated “the ability to realistically and truly communicate a concept, I found lacking initially. I definitely feel that has improved and I think that’s become a much stronger point in me than it ever has been before.” Another Fellow said, “Yes, it’s (communication ability) definitely improved, improved a lot.” A third Fellow stated, “Communicating by being me in front of a large group of people, trying to communicate ideas, has improved just by trying to do it.”

Most of the Fellows, when asked individually if the experience had influenced or altered his/her program of study, indicated the experiences of the GK-12 program did not adversely affect their program of study. One Fellow said, “No. It hasn’t influenced my program of study.” Another Fellow stated, “It hasn’t affected my studies at all.” However, one Fellow did say, “Definitely. Last semester, and this semester, there was a course I would have taken but didn’t, because of the amount of time I have to put into the Fellowship. I wouldn’t have been able to do the work well. If I hadn’t done the Fellowship, I probably would have graduated last December. So, it’s taking me an extra semester to finish school.” None of the other Fellows interviewed indicated

participation in the GK-12 program had slowed his/her progress toward graduation. One typical response was, “It hasn’t been good or bad as far as affecting it (progress toward graduation).” Another Fellow stated, “It certainly hasn’t deterred it (progress). I wouldn’t say that being in the program sped up my progress, but it certainly hasn’t slowed it.”

Advisor Interviews. Advisors for Fellows in all of the cohorts either had no opportunity to observe their Fellow’s communication skills or they felt the Fellow’s participation in the program had improved his/her communication skills. The distribution seemed to be about half and half. One advisor stated, “He teaches and subs for me in class. He’s able to communicate better with the students because of this program.” More typical responses from two advisors were, “Yes, I think it is helping” and “Definitely improved.”

When asked how the progress of their advisee had been affected as a result of participating in the GK-12 program there was a difference in the types of responses for advisees in the first cohort and advisees in the other cohorts. Two advisors of students from the first cohort indicated, “It takes away time for him to do the research requirements” and “It’s probably taking away from his research.” Other advisors indicated, “I think it’s slowed my advisee down somewhat” and “I think it has slowed my student’s progress considerably.” Such responses were not seen in the data for the advisors of students in the other cohorts. Typical advisor comments concerning their advisees’ progress were, “I don’t think it’s really affecting his progress,” “It does not seem to impede the level of progress,” and “He’s right on track for graduation.”

Another theme, related to progress, emerged from the advisor interviews and was somewhat implicitly seen in the Fellows’ focus group data, was a maturing effect on the Fellow. One advisor stated, “I think it has helped the student mature much more quickly as a thinker. In other words, the student has been put in very real life situations, faced with trying to teach concepts. The whole thing about forming mental models and so forth.” Another advisor said, “He’s a lot more mature. He seems to have an understanding of education’s importance – his own education as well as the education of others. That translates over to his work with me. When I ask him to do something, he understands that he needs a certain background, and he goes off and learns it, finds ways to deal with that so he can do a better job of educating himself and solving problems.”

Discussion

Evidence indicated adverse affects for the Fellows program of study were limited primarily to the first cohort of Fellows. The first cohort probably had a more unsettling experience than the other two cohorts had because the program was new. Documentation and procedures to delineate program goals and objectives were not well developed initially, and as a result, the first year teacher partners and schools were unclear as to what the Fellows should be doing and the Fellows did not really know what they were getting into. Additionally, the first cohort switched schools for the second semester. Having to work with a completely new set of teachers who did not fully understand what the graduate students had to offer likely contributed to the problems seen for the first cohort.

Program managers recognized that there were problems during the first year and implemented changes. The second and third year cohorts participated in a pre-experience planning session

with the teacher partners. Expectations for the Fellows and teacher partners were made clear. The Fellows also had an opportunity to talk with Fellows from the prior year's cohort during these sessions. This gave the new cohort a better idea of what to expect during the upcoming year. Additionally, it was decided to keep the Fellows in the same school for the entire year. This resulted in more continuity for the experience of Fellows in the year two and three cohorts.

As the program evolved the negative impact on their program of study became less of a problem. The evidence suggested that as the program developed across the cohorts of Fellows the impact on Fellows' program of study was positive. As the Fellows thinking, planning, and problem solving skills evolved, their progress in the area of research improved. The negative impact for progress toward graduation also seemed to be mediated as the GK-12 program developed and adapted. The one incidence of potential slowing of progress for a year three Fellow might be seen as a student demonstrating higher order thinking skills. The student made a decision based on knowledge of themselves and their limitations. This may have been an indication of improvement in thinking, planning, and decision making on the part of the student.

Conclusion

In general, the overall impacts of the GK-12 program on the graduate students' programs of study and progress toward graduation appear to be mostly positive. The Fellows' communication, thinking, planning, and decision making skills appear to have improved as a result of their participation in the GK-12 Graduate Fellows Program. Analyses of the various sources of data indicated the intended outcome for the GK-12 program of improved communication skills in the engineering Fellows appear to have been achieved. The evidence indicated that communication skills of the Fellows have been enhanced not only in terms of classroom presentation but also in terms of other audiences. They have developed the ability to communicate difficult concepts to diverse audiences in understandable ways.

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