Work In Progress: Life after National Science Foundation Fellowships: The Implications for a Graduate Students' Professional Endeavors

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Abstract – **Each year hundreds of Fellows participate in National Science Foundations (NSF) GK-12 grants throughout the country. These Fellowship opportunities provide professional training for university students in order to improve their communication skills, teaching proficiency, team building skills, and expand their interest in community outreach efforts within K-16 education. Over the course of the past four years, Project STEP (Science and Technology Enhancement Program) has funded 18 graduate and undergraduate Fellows. This study examines the long term impact of participation in an NSF Fellowship and impact that it has on their educational and professional choices once Fellows leave the program. The theoretical framework surrounding this study is framed around Preparing Future Faculty Literature, sociocultural cognition, and other GK-12 projects. Interviews, historical tracking documents, and attitude surveys are being used in order to ascertain themes that will be further studied as the Work in Progress develops. The expected date of completion is December of 2006.**

Index Terms – Fellowships, NSF GK-12, Sociocultural cognition, Teaching and learning.

INTRODUCTION

Each year hundreds of Fellows participate in NSF GK-12 grants throughout the country. These Fellowships provide students in "science, technology, engineering and mathematics disciplines to acquire additional skills that will broadly prepare them for professional and scientific careers in the 21st Century" [1]. Along with professional training, financial support for tuition and books is also provided for the students in order to encourage academic success.

The professional training in each GK-12 program focuses on improving communication skills, teaching expertise, team building skills, and expanding personal interest in community outreach efforts with K-16 education. In its eighth year as a Congressional Budget Line Item, NSF has funneled millions of dollars into 114 universities throughout the country and Puerto Rico in order to provide "institutions of higher education an opportunity to make a permanent change in their graduate programs by including partnerships with K-12 schools in a manner that is of mutual benefit to their faculties and their students" [1]. The University of Cincinnati's program Project STEP is one such project.

During the first three years of Project STEP's implementation, 7 University of Cincinnati faculty partnered with 18 Fellows (graduate and undergraduate students), 32 teachers; 7 greater Cincinnati schools, a technology web designer; a grant coordinator, an evaluation Fellow, and an Oversite Committee in order to achieve two primary goals: "The primary goal is to produce scientists, engineers, and secondary science and mathematics educators who are experienced in developing and implementing authentic educational practices into current secondary science and mathematics curricula" [2]. "The secondary goal is to design, develop and implement hands-on activities and technology driven inquiry based projects, which relate to the students' community issues, as vehicles to authentically teach STEM (science, technology, engineering and math) skills" [2].

Fellows participated in seminars focused on educational theory and practice and its implementation into science and math classrooms [3]-[8]. Fellows designed, developed and implemented authentic inquiry based lessons focusing on classroom management, urban school culture, and national and state standards. These concepts were further personified by the Fellows spending an average of 10 hours in the classroom working with 7-12th grade math and science teachers and their students as well as spending an average of 10 hours a week researching and developing lessons. Along with education pedagogy training, the Fellows also engaged in a technology course designed to train individuals on the use of technology in the classroom and personal portfolio development.

RATIONAL

GK-12 programs throughout the country have documented increased communication skills, honing leadership skills, expansion of team building skills and organizational capabilities in the Fellows [9]. However there has been no assessment of the long term effects these skills have had on the Fellows due to participating in this type of outreach, either nationally or within Project STEP. The STEP evaluation team has not focused on long term impact that this type of training has had professional and academic career choices once they have left the project [10]. It is the hope of these researchers to uncover how working in teams affected the sharpening of

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1-4244-0257-3/06/$20.00 © 2006 IEEE **October 28 – 31, 2006, San Diego, CA**
36th ASEE/IEEE Frontiers in Education Conference

these types of professional skills and how this impacts Fellow career decisions after leaving the project.

LITERATURE REVIEW

This study is focused on three main bodies of research, Preparing Future Faculty (PFF) literature; teaching and learning literature, specifically sociocultural cognition; and previous GK-12 literature. PFF literature focuses on the importance of graduate students developing more that just research skills. There has been a drastic change in skills universities find necessary to become a successful faculty member [11]. Therefore it is imperative that future faculty develop skills in teaching and learning as well as communication and team building skills in order to find rewarding employment.

Through specific learning environments students can learn to develop the work skills necessary in order to be gainfully employed. Sociocultural cognition provides the theoretical framework in which to study the skill development of the Fellows. Sociocultural cognition emphasizes "the socially negotiated quality of meaning and the interested, concerned character of thought and action of persons engaged in the activity" [12]. Typically these occurrences are found in communities of practice, which Machles [13] defines as "any social group whose members share a mutual engagement, negotiate a joint enterprise and have developed a shared repertoire." This theoretical framework is critical because it not only emphasizes the social aspects of learning but also the culture of the individuals in which communities of learners are participating, the context in which learning takes place and the reflection process necessary to ensue deep understanding. This process of enculturation within a community starts at a very early age and continues throughout a person's life, whether it is consciously or unconsciously adopted. Through observation and verbal communication, individual's monitor behavior in any given situation and tend to conform toward the accepted practice [14]-[15]. Therefore Fellows placed in particular classrooms will develop certain behaviors based upon the culture of that community. It is important to note that in all of the previous GK-12 literature to date there are not any studies that try to determine where learning takes place and how this affects the Fellows once they have left the program.

METHODOLOGY

This qualitative grounded theory research design will utilize two-hour, in-depth, open-ended interviews along with historical tracking documents, and previously completed attitude surveys. The interview questions focus on what skills were developed and the environment in which they learned and practiced these skills. Of the eighteen previous Fellows, twelve completed the full year contract, maintained a positive attitude, and completed all the requirements of the grant and of these six will be interviewed based on choosing participants from each of the categories listed below in Table 1. The themes that emerge from the qualitative data collection will be then be categorized and analyzed and discussed at length in future publications. Fellow interviews and analysis of the attitude surveys are expected to begin by the middle of June and are expected to be completed by the beginning of August.

TABLE I
FELLOWS PARTICIPATING IN STEP 2002-2004

	Occupation	Undergrad	Grad
Males	Industry		A or B
	Other	C, D or E	F or G
Females	Industry	H	
	Other	I or J	K or L

ACKNOWLEDGMENT

Funded by the National Science Foundation # 0139312 and matching funds from the University of Cincinnati.

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