Effectiveness of the Woodruff School Doctoral Teaching Intern Program

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Abstract

This article discusses a unique teaching internship program that has been in place in the Woodruff School of Mechanical Engineering at Georgia Institute of Technology since 1990. The objective of the program is to provide doctoral students who are considering an academic career an opportunity to gain teaching experience under the tutelage of a faculty member. Interns participate in all aspects of conducting an actual course and receive extensive feedback from the faculty mentor.

Most of the data for this article was obtained from a survey of all former student and faculty participants and from evaluations of students in the courses taught jointly by the doctoral student and faculty mentor. Additional information about the effectiveness of the program was obtained from a survey of department chairs at universities where former interns are currently teaching.

This article summarizes the major findings from the surveys and discusses the apparent need and benefit of such a doctoral teaching intern program. Benefits and drawbacks of participation are discussed from the intern, faculty mentor, and student points of view. Conclusions are drawn about the overall effectiveness of the program and recommendations are made for implementing a successful teaching internship program.

Introduction

"It has been said that college teaching is the only profession for which there is no professional training, and it is commonly argued that this is because our graduate schools train scholars and scientists rather than teachers. We are more concerned with the discovery of knowledge than with its dissemination." (B.F. Skinner, date unknown)

Indeed, while a college professor's primary role is as a teacher, rarely are professors taught to teach. A Ph.D. is usually considered sufficient "experience" to be hired as a teacher, and this requires the assumption that knowledge of a subject guarantees the ability to teach the subject. It is ironic that when
being hired into academia no record of demonstrated pedagogic competence is necessary, yet the ability to 
disseminate knowledge is the most useful skill of a teacher. As pointed out by Johnson, "One cannot be an 
outstanding teacher without thorough knowledge of subject matter, but to possess that knowledge does not 
guarantee the ability to communicate it to a student. And this ability is by no means easy to acquire. ...And 
just as an artist or scientist needs to master necessary skills, so a teacher must do the same."1

A great number of articles and texts have been written on the subjects of teaching for both seasoned 
and new faculty.2-12 For the most part, these references provide information on both the theory and 
applications of effective teaching skills. However, it is difficult to learn most material from simply reading a 
text on the subject and we feel that this holds true for the art of teaching as well. As stated by Broadwell, 
there is a lot to be learned from observing a good teacher, however, there is a limit to how much can be 
learned from observation. "What the new instructor doesn't know is that the experienced instructor is doing a 
number of subtle things that aren't apparent to the casual observer. ...Observation doesn't reveal the reasons 
why good instructors do what they do. It may even give wrong impressions."6 We feel that it is very 
important that the necessary skills for disseminating knowledge be shared with new teachers. We must make 
certain that new instructors begin their careers practicing good techniques, else they will develop and perfect 
ineffective teaching skills which will remain with them throughout their career.

As Lowman pointed out, "A comprehensive program of teacher training involving preparatory and 
consultative experiences can go far to prevent ineffective college teaching and to start those with talent and 
determination on the road to excellence."8 This article looks at the effectiveness of one such training 
program by presenting the results of a survey of participants. Major findings are reported herein which may 
help other universities in implementing a teaching intern program for Ph.D. students.

Woodruff School Doctoral Teaching Intern Program

The teaching intern program in the George W. Woodruff School of Mechanical Engineering at 
Georgia Tech was implemented in the Summer of 1990. The objective of the program is to provide doctoral 
students who are considering an academic career an opportunity to gain teaching experience under the 
tutelage of a faculty member. The students participating in the program are teaching interns for one quarter-
long course late in their doctoral studies. Interns are responsible for finding a faculty member who is willing 
to team-teach an undergraduate course with them. The internship provides exposure to all aspects of 
conducting a course, including syllabus, homework, and exam preparation, conducting recitations, 
maintaining class records, and establishing course grades. In addition, the intern conducts one- 
two-thirds of the classes for the quarter, with the faculty mentor present for at least half of the intern's 
lectures to provide feedback. Interns are expected to commit at least 20 hours per week to the program and participants 
are compensated through the Woodruff School Endowment Fund at a rate of up to $5000 for the quarter in 
which they participate. Participation is limited to three doctoral students per quarter and each student may 
participate for only one quarter.

Programs At Other Universities

Many colleges and universities have some sort of training program for graduate teaching assistants 
(GTAs). These programs are greatly varied in both length and breadth of material covered. Torvi presented 
a survey describing GTA training programs at universities in Canada and the northwestern United States.13
Additionally, there are a number of other articles and several books on GTA training techniques and program implementation. However, there are few programs which prepare doctoral students for careers in academia. Wankat and Oreovicz began offering a course on "...the philosophy and techniques of teaching chemical engineering" at Purdue University in the Spring of 1983. In 1990, the course "Educational Methods for Engineers" was implemented to include all engineering disciplines. The course was developed to address the challenges doctoral students face when beginning a career in academia. In a textbook developed for the course, Wankat and Oreovicz state that "...new faculty are entering the university well prepared and well mentored in doing research, but almost totally at sea when it comes to the day-to-day requirements of teaching."

At the University of Texas at Austin, every department offers a supervised teaching course and a "How to Teach" course has been offered regularly since 1972 by engineering faculty. At Carnegie-Mellon University (CMU), programs for GTAs, incoming faculty, and faculty development seemed to leave out the preparation needed by doctoral students entering academia. Seminars are now offered in Civil Engineering at CMU which address many aspects of academic careers, including teaching skills.

Survey

Most of the data for this article was obtained from a survey of all former student and faculty participants and from evaluations of students in the courses taught jointly by the doctoral student and faculty mentor. Additional information about the effectiveness of the program was obtained from a survey of department chairs at universities where former interns are currently teaching.

Survey forms were developed for the following four groups: faculty mentors, former interns, recent Georgia Tech alumni who are now in academia but did not participate in the internship program, and department chairs at universities where former interns are currently teaching. A total of 29 students have participated in the intern program since its inception the summer of 1990. Of these 29 former interns, survey responses were received from 17. Responses were received from all nine former interns who are now in academia. Two responses were received from Georgia Tech alumni who are now teaching but who did not participate in the internship program. Of the nine department chairs at universities where former interns are currently teaching, responses were received from five. Finally, a total of 20 Georgia Tech professors have participated in the program as mentors and responses were received from 14.

Responses of Faculty Mentors

As would be expected, the experiences varied with the mentor and the course taught, pairing of intern and mentor, and experience of mentor all being important variables. However, some general conclusions can be drawn.

While half of the surveyed faculty mentors at Georgia Tech reported no drawbacks from participation in the intern program, others cited lower student evaluations, discontinuity in lecture style, a feeling of some loss of control, resentment of loss of lecture time, and increased time demands as drawbacks of participation. All the mentors who responded to the survey indicated that, if asked, they would participate in the internship program again and that they would encourage their own students considering a career in academia to
participate. The large majority of mentors reported that their student evaluations were unaffected by having the intern and that they felt the students both liked and benefited from having the intern.

When asked the most important things learned from acting as a mentor, many faculty noted the benefit of being forced to view the presentation through the student's eyes. One respondent noted increased self-awareness, stating, "Teaching with someone else always throws one's own style into contrast and makes one think more clearly about the process of teaching." When asked if working with an intern helped them to refine their own teaching styles, some mentors responded no because they were too set in their ways. However, most responded positively, noting that participation led to the re-examination of some of their teaching methods. One respondent noted, "As they say, you only really learn something when you teach it and that applies to teaching 'teaching' as well."

While most of the surveyed mentors said they could suggest no changes or improvements to the Woodruff Internship Program, a few commented that a more careful selection process for mentors would be an improvement. It was noted that, "Some faculty are better for this." One respondent also suggested expanding the program and making it a requirement for students interested in academic careers. Finally, when given the opportunity to make general comments about the Woodruff Internship, several of the surveyed mentors took the opportunity to extol the virtues of the program and one responded, "I wish that I had this opportunity when I was a student!"

Responses from Former Interns Currently in Academia

Responses to the surveys from former interns who now hold academic positions revealed that a majority of the time spent on the program was for development and presentation of lectures. Consistent with the goals of the intern program, former interns indicated that they gave between 40 and 85% of the lectures for the course they team-taught. Grading, making up exams, quizzes, and homework, and tutoring students all required lesser amounts of time.

As put forth in the expectations of mentors in the program, all interns received feedback on their lecturing. This feedback was positive and often given as constructive criticism. In addition, none of the interns felt that their mentor forced his teaching style on them, they all felt free to develop their own teaching style.

Former interns gained or enhanced a variety of skills from participation in the program. Many of the respondents commented that they were able to develop confidence in the classroom in an environment that felt much safer than being in the classroom alone. Interns also improved their lecturing abilities and organization and time management skills. Several interns stated that their participation in the program reinforced their desire to pursue a career in academia.

When asked if there were any drawbacks to participating in the program, all of the respondents commented that the program was time-consuming. The time required for participation was, in some cases, an additional stress during a time when dissertation research and writing was nearing completion. However, balancing teaching and research commitments as a student provides good exposure to the expectations that all new faculty face.
As mentioned in the description of the intern program, students receive financial compensation for participating. For all respondents, financial compensation was either not a factor or was not a primary influence in their decision to participate.

All instructors at Georgia Tech are evaluated by the students at the end of the quarter. When asked to comment on the evaluations for their team-taught course, most respondents felt that their evaluations were very good. Comments from students in the team-taught courses indicated that the students related better to the intern due to the proximity in age and/or experience. A small number of students felt that they were not being provided with the experience of a faculty member. However, there were also students who preferred the intern to the professor. And others enjoyed having both the intern and the mentor in the classroom to provide different perspectives on the course material. All former participants, both in and out of academia, responded that they felt respected and accepted by the students in the class.

A majority of interns felt that participation in the program was helpful in obtaining a job after completion of their degree. Former interns felt they had a number of advantages over their peers who had not participated in a similar program. These advantages included knowledge of teaching demands, lecture experience, and presentation skills.

All participants responding to the survey, including those who are not currently in academic positions, replied that they would participate in the program again. And, if their current department were to offer a similar program, all former interns currently in academia would encourage their students interested in academic careers to participate.

A number of comments and suggestions were offered by former interns now in academia.

- Since the experience in the program is highly dependent on the intern-faculty match, experiences with the program might improve overall if interns had the opportunity to interact with more than one faculty member during the internship.

- Though none of the respondents complained of feeling like a glorified GTA, one respondent felt that a clearer definition of intern responsibilities would prevent this from occurring.

- Several participants suggested that the program should be made available to a larger number of doctoral students. This has been partially addressed in that the School of Mechanical Engineering now requires all Ph.D. students to take a Teaching Practicum course for two quarters. This course requires the student to select a faculty mentor who helps them prepare two or three lectures. The mentor then attends the class lectures and offers constructive criticism. The student also assists their mentor with course planning and a small amount of grading. This course is designed to be a teaching apprenticeship.

- The requirement that participants in the program interact with other interns and faculty mentors in regularly scheduled seminars would offer additional viewpoints on teaching styles and philosophies. In addition, it may be helpful for former interns to participate in the seminars to offer their perspectives and experiences to the current interns. These issues have been partially addressed in the new Teaching Practicum course which requires students to meet regularly for seminars with faculty to discuss various aspects of teaching. This course also requires reading assignments which cover a variety of issues related to teaching.
Responses of Department Chairmen

The majority of department chairs at universities where former interns are teaching report that participation in the intern program was a factor which favorably influenced the department's hiring decision. The majority also report that course evaluations for the former interns are better than average. Specifically, the department chairs report that former participants are more prepared to begin teaching than the average new professor, and that they have more self-confidence. All the surveyed chairs also report the lack of teacher development programs at their respective institutions.

Responses Tech Alumni Currently in Academia Who Did Not Participate

The two non-participants who are presently in academia state they wish they had participated in the intern program. They would also encourage their own students considering academic careers to participate in a similar program if one were available. Furthermore, they both report the lack of teacher development programs at their institutions.

Student Evaluations

While the survey responses offer perhaps a skewed view of how the internship program affected the teaching in the courses which involved interns, several sets of student evaluations were available for courses taught with interns. The following comments offered by students lend some insight into the effectiveness of the program from the students point of view.

"[The intern] understood a student's needs better, while [the mentor] proposed questions/ideas to ponder."

"[The mentor], though personable seemed to push students toward getting help from the TA instead of him."

"[The intern] helped in bringing some of the material down to our level. It was great having two instructors to help clarify what the other said if there was a little fogginess in understanding."

"[The intern's] lectures were of higher quality than those of many professors at Tech."

"I feel somewhat cheated by the doctoral fellow teaching program. I pay my money to get the benefits of the years of experience of the professors. ... I am not sure who this program is meant to benefit. Perhaps the professors, relieving some of their duties, perhaps [the intern], I am sure this will look good on his resume, but I can see no way in which I have benefited from this program. This is not a slight to [the intern], rather a questioning of the motives behind the fellow program."

"Because of these two teachers I have a new confidence and possibly a specialization area!"

"[The intern] was more than a TA, he was like a second professor and I definitely learned from him. The department should give more graduate students an opportunity to teach in this manner because I feel it benefits both sides, the students and teacher."

These direct quotes provide the general spirit of the student evaluations. As indicated, a few students resented having a "GTA" teach part of the class. We believe that in classes where the intern's role and the teaching program were well-explained at the beginning of the course, the students were receptive to the
intern and looked upon his/her presence as a benefit. This is reflected by student comments which refer to the teaching intern as a "TA", obviously, the role of the intern was not fully explained.

Long-Term Effect

The Woodruff Internship Program is too young to make any conclusive statements about the long-term effect of such a program. However, the Gahanna-Jefferson City Internship Program established in 1973, which is an internship program for college seniors majoring in education, is reviewed by Denner and Kirchhoff.\textsuperscript{24} They found, "Observations, field notes, questionnaires, and interviews have supplied data validating the effectiveness of the internship program." "Perhaps most important, preliminary follow-up studies suggest that interns remain in education longer than comparable graduates who did not go through the program, experience less 'burnout,' and are more satisfied with teaching as a career." These results suggest many long-term benefits of a program such as the Woodruff Internship Program.

Conclusions

A teaching internship program implemented in 1990 at Georgia Tech has been described and several observations have been offered. The survey results indicate the program is very effective, and we believe will be even more effective now that the requirement for the seminar portion has been added to the Ph.D. curriculum. We feel, and the surveys support the idea, that Ph.D. students who participate in such a program can begin their careers as better teachers and spend less time on their teaching. This means that they have more time to spend on research and will thus be able to do a better job at both teaching and research during those all important initial review years.

We recommend that a how to teach course be a mandatory Ph.D. requirement. However, the opportunity to intern and to actually team-teach a course for an entire semester (quarter), should be just that, an opportunity--not a requirement. Clearly the skills learned from a seminar on teaching skills (communication skills, learning psychology, and planning skills, to name only a few) would be important and marketable skills for all graduates, whether continuing in academia or not. However, if students not interested in developing teaching skills were forced into a classroom for an entire semester, the students in the class would likely sense the resentment and the results could be disastrous.

It should be noted that implementation of an internship program requires the support of a majority of the faculty, and ideally, financial support for the Ph.D. student. This financial compensation ensures that students who rely on a stipend (usually in the form of a GRA or a GTA) may still participate in the program and have the necessary income to survive. Additionally, if the participant's research advisor were to pay the participant their regular stipend, while the student clearly had less available time to devote to research, the advisor may resent participation in the program.

The literature survey and survey responses showed that very little attention is given to continued development of teaching skills for professors. We suggest that any department/school which emphasizes the importance of teaching by requiring participation in an intern program or teaching seminar, ought to undergird this with support for developing teaching skills within the faculty ranks. This support may come through seminar series, teaching awards, or teaching evaluations by fellow faculty, just to name a few.
As one survey respondent offered, "Too often engineering academia focuses on scientific research and not enough on the human side of learning about how to communicate what we know (or think we know) to the world at large. Apparently, we need better teachers."

References


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