Using Shadowing to Improve New Faculty Acclimation

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Abstract

A shadowing program for assisting new faculty members in becoming successful educators at their new institution is described. This program aims to foster a dialogue between new faculty and seasoned colleagues, providing opportunities for sharing lessons learned through experience. At the beginning, a new faculty member observes lectures delivered by a colleague teaching another section of their course, providing practical examples of how the institution's expectations translate into practice, as well as pedagogical ideas for effective instruction. Reciprocal observation by the seasoned faculty member provides early feedback to the new faculty member that is valuable in getting off to a good start. Details of the structure of the shadowing program are presented. Five case studies are offered by faculty who went through the program. They share their experiences in how the program was effective for them and in how it could be improved.

Background

It is widely accepted that new faculty should be trained to teach.[1,2] The structure of the engineering professoriate evolved over the 20th century to favor training in research for early PhDs.[3] This does not mean that there are no efforts to improve the teaching ability of engineering faculty members. Numerous programs to address faculty teaching skills are spelled out in the literature.[4, 5, 6, 7, 8] A variety of programs for preparing faculty to teach are detailed by Stice.[9] These include taking graduate courses on teaching, attending teaching workshops and seminars, mentorships, networking, consulting with on-campus teaching experts, and self-study.

In their article on faculty mentoring, Bullard and Felder offered their experiences in a mentoring partnership in which each taught a section of the same course.[10] The two instructors, one experienced and one new to teaching, sat in on each other's classes and met for debriefing sessions. Their article presented reflections on what they did, what they learned, and what lessons the experience might hold for other mentor-mentee pairs. This paper extends Bullard and Felder by presenting cases for five new faculty members who have a wide range of backgrounds and perspectives.

Shadowing Program Details

Milwaukee School of Engineering is a private university with about 1900 undergraduate engineering students. There are eight academic departments including Electrical Engineering and Computer Science (EECS). The EECS department offers ABET-accredited undergraduate programs in biomedical engineering, computer engineering, electrical engineering, and software engineering. The department has 32 full-time faculty members and about 800 undergraduate students.

In fall 2013, five new full-time faculty members joined the EECS department. One is in computer engineering, two are in electrical engineering, and two are in software engineering. This was the highest number of new faculty ever to be hired at once into the department. To help

with assimilating the new faculty, a shadowing program was created with similarities to the program described by Bullard and Felder.

The new faculty members were each assigned to teach two courses. In all but one case, each course was being taught with at least two sections where one section was taught by an experienced faculty member and one section was taught by a new faculty member. The EECS department chair asked the new faculty members to complete the following tasks:

- attend at least one week of the experienced faculty member's course,
- invite the experienced faculty member to then attend at least one or two lectures of the new faculty member's course, and
- have at least one de-briefing session between the new and experienced faculty members.

Different constructs for reporting on and evaluating mentoring case studies have been presented. Sherwood, et al offered a mentoring case study construct in four areas: Motivation, Course Preparation, Class Lectures, and Additional Assistance.[2] Chism and Szabó proposed that evaluation of an instructional development program can be performed at three levels: 1. How satisfied were the participants with the program? 2. What was the impact of the program on the participants' teaching knowledge, skills, attitudes, and practices? (To those measures might be added their evaluations by students and peers.) and 3. What was the impact of the program on the participants' students' learning (knowledge, skills, and attitudes)?[11]

The remainder of this paper presents the shadowing experiences of each of the five new full-time faculty members including:

- personal background
- prior expectations, including motivation
- preparation for the program (clear expectations/requirements?)
- what happened - in program and out
- post-analysis

Computer Engineering New Faculty Case

I spent three years working as a software consultant before returning to teaching in my chosen field of Computer Engineering. While I had some experience teaching several labs and coordinating a full course as a graduate student, I have found working as a full-time assistant professor a whole different animal. I was able to leverage prior experience in the instruction of a digital logic course, though it had been six years since teaching the course. I was also able to leverage some of my industry experience as a software consultant to teaching a course in the design of operating systems. Where I found I needed extra advice and assistance was in the preparation of course materials, different ways to deliver lectures, and writing and administering quizzes, labs, and exams. I also sought assistance in managing my time and the occasional student problem. I hoped to get information addressing each of these issues through the shadowing program. I felt the instructions for the shadowing program were very clear and straightforward. I teamed up with two different associate professors that were teaching the other sections of my two courses. From each of them I picked up some very valuable information.

For the digital logic class, I sat in on two classes early in the quarter. From these observations I picked up many tricks to ensure my classes had the correct pacing. This was of great importance

to me as I came from the semester system and the quarter system had a considerably faster pace. Another aspect of instruction I picked up was the high degree of interaction with students the professor I observed had. He would continually poll individual students by name to drive the class forward. Also, he had implemented an additional mechanism to get anonymous feedback from the students over the quarter. From the observation of my class I gained the information that my pacing and delivery of my lecture was good, but that I should work to get more direct class interaction from the students which I have since made an effort to increase.

For my operating systems class I sat in on the first week of classes. This was very helpful since I had the opportunity to observe some of the process for setting course policies and delivering lectures on reviewed material. The instructor I observed had a very conversational style. It was also clear that he had established a strong relationship with many of the students as the class mainly consisted of juniors. Unfortunately, due to some unforeseen events, the times we set for the observation of my lecture fell through.

I feel I pulled good information from my observation of other professors during the shadowing program. I also got some good feedback on what I was doing well and some improvements I could make through my lectures. The one caveat for this program is that I would likely have sat in on others classes and did seek assistance from many individuals throughout our department in addition to those I was shadowing. I am not one to shy away from asking questions from those more experienced when I feel that there is any possibility that I could gain some valuable insight. Since I was working with other professors that were teaching the same courses I was, we met frequently to discuss where I was in the material, course policy, and construction of course materials and exams. As for possible improvements to the program I had the following suggestions. More organized pre-observation and post-observation meetings would have helped with setting up expectation and facilitating discussions. Also, I would have liked to have spread out my observation over the quarter, maybe when different types of materials were being presented. Giving this a bit more fore-thought may have increased the array of possible techniques which could be observed.

Electrical Engineering New Faculty Case 1

I followed a less conventional route into academics. After twenty-one years of working in industry designing embedded microcontroller-based systems, I returned to graduate school and earned a Ph.D. in Electrical Engineering. During this time, I gained some teaching experience as a teaching assistant, in addition to teaching two courses for another university as a lecturer. After graduating, I had the advantage of spending a year at another university as a visiting professor before coming to Milwaukee School of Engineering. These experiences gave me opportunities to develop some infrastructure necessary for preparing and teaching a course, as well as practice. I also was fortunate to be able to attend the National Effective Teaching Institute (NETI) in January of 2013, which gave me many good resources for improving my teaching.

For my situation, the shadowing program was attractive not as much for the potential feedback and suggestions for improvement (which I was interested in), but more for the possibility of getting a better idea of what the policies and expectations were for this institution and department. I also was hoping to get some ideas and materials that could shorten my course development and preparation time. Finally, I was interested in keeping my section close to the

others in terms of expectations and coverage, to avoid any large disparity between sections.

I was responsible for one section of an Embedded Systems course, with three other professors teaching other sections. During the first week of class, I attended two lectures and one lab session of the seasoned professor's section. I felt that gave me a sufficient amount of information, so the third lecture session was skipped. A couple of weeks later, he attended one of my lecture sessions. We then met to discuss. I also asked him to review my first exam for the course. There were additional informal discussions about the course during the quarter.

The other course I taught was Logic Systems course using VHDL. This course was for students newly transferred from two-year schools, and was mostly taught in the evening. I had sole responsibility for this course, with one lecture section and two lab sections. There was no seasoned professor also teaching it, but I did have the course coordinator as a resource. Aside from informal discussions and emails about the course content and operation with him, there were no interactions with seasoned faculty like those involved with the shadowing program. If I had felt the need for some input and feedback, I could have asked to have someone visit, but I did not feel a strong need for that. The program director for the transfer program provided some general help in terms of how to best work with the transfer students, many of whom are non-traditional students.

In the second quarter, I am teaching a Systems Interfacing course with two seasoned professors. We have a combined lecture sections which we take turns handling, and separate lab sections. This arrangement provides some similar benefits as the shadowing program via the built-in observation of experienced faculty and the feedback from them on my lectures. The other course is another transfer student course where I am the sole teacher.

I felt the program met my expectations. The seasoned professor was generous in supplying previous materials, which helped give me a starting point for my preparation, and occasionally, when time for preparation was not there, a good backup plan. He was also a valuable resource for questions about departmental requirements and expectations. Visiting his class also helped me get a better sense of how the course had been taught, helping me to keep my section similar in terms of content and emphasis. The feedback on my lecture was not as helpful, as he did not see any major areas for improvement. The previous teaching experience I had certainly helped in that regard. One area where I struggled was finding a balance in difficulty level. The embedded systems course at this institution falls in the first quarter of the sophomore year. Other places where I have been involved in this type of course, it has been in the junior year. This was a difference I did not really process at the start and ended up learning the hard way what knowledge they did not have exposure to yet.

Electrical Engineering New Faculty Case 2

This past fall I joined the department as an assistant professor in electrical engineering, with two years of post-graduate school experience in industrial/government research and development. This is my first formal classroom teaching experience.

Given my background, I was enthusiastic about the shadow program but was also a bit intimidated. On one hand, it was exciting to have the opportunity to see how experienced colleagues teach their sections, and further to be their mentee as I find my bearings in the

classroom. On the other hand it was a bit intimidating to know these experienced colleagues would be sitting in on my lectures—thankfully this feeling quickly vanished as the program began and a collaborative rapport was established.

I taught two courses in the fall under this program: a sophomore-level Embedded Systems course (a second course in a three course sequence) and a new junior-level Circuits and Signals course. For each I was paired with an experienced colleague teaching another section concurrently. While the program structure was provided, the practical logistics and ultimately the outcomes were left up to us to determine. Prior to the start of the fall term, I met with each colleague to schedule observations and to discuss the overall course structure, how it fits into the curriculum, and an overview of how they typically run their own section. In addition, each colleague provided a course note set and lab materials to further acclimate myself. It was emphasized that I was not required to run my section the same way they run theirs, nor that I should feel constrained by the notes – rather these materials were to serve as a reference point from which I was free (and in fact encouraged) to find my own voice and adjust to my preference.

Once the fall term began, I staggered the shadowing lectures (and labs) over the first two weeks, with Embedded Systems the first week, and Circuits and Signals the second week. These observations were extremely helpful, as I quickly developed a feel for each course and was able to gauge the appropriate student expectations for each course level and student demographic. For example, the sophomore-level Embedded Systems course is the second course in a three-course sequence and introduces the students to a new IDE and register-level control of peripherals, and it is critical that students make this skill transition in order to be successful. The Circuits and Signals course is primarily comprised of non-traditional transfer students, thus a key to student success is helping them identify and fill in skill gaps to ease their transition into the Electrical Engineering program. In each course, seeing appropriately targeted teaching techniques demonstrated by my colleagues prepared me much more quickly and effectively than what would have been possible via discussion alone–seeing truly is believing!

It was then my turn to be observed. In week 3 of the term, my Embedded Systems colleague sat in on my section and afterwards we met to debrief. This discussion included some basic nuts and bolts items, e.g. board work tips and ideas on an insightful diagram, but focus was placed on general items such as delivery style and interactions with the students, identifying what was working and what needed improvement. For example, my approach in lecture is to ask broadly scoped questions to try and guide students through a development in order to encourage them to actively reason and think during lecture, and discussing my colleague's feedback substantially improved this aspect of my teaching. I noted previously that having an experienced colleague sit in on my lecture initially seemed intimidating, but in practice I found this to be very relaxed and extraordinarily helpful. Moreover, I expected the technical benefits, but I did not expect the confidence boost it provided, namely that I had classroom feedback from a "pro" that my overall approach was on target. For a new teacher, this is extraordinarily helpful feedback to have early in the term in order to address any issues in real-time instead of waiting for the end-of-course evaluations (this is especially beneficial to the students). Also, early on this experience initiated an invaluable dialogue with my colleague, with whom I brainstormed ideas, discussed approaches of presenting difficult topics, and discussed philosophies on how to best improve student learning.

Due to scheduling conflicts, my Circuits and Signals colleague was not able to sit in on my section until the quarter was nearly ended. Our debriefing was more informal since our sections were run in lockstep (this course was running for the first time) and we met throughout the term to coordinate the course. My colleague provided very detailed play-by-play notes on my lecture, which ran the gamut from nuts and bolts to more general items. To take one example, my discussion questions were effective but my colleague noted that at times I let a few students dominate the discussion, something I did not realize was happening. Even near the end of the term, the feedback and discussion showed me numerous ways to improve my teaching and again was a confidence boost that affirmed my overall teaching approach was on the right track.

Looking back, as a new faculty member teaching for the first time, this program has helped me get up to speed very quickly in the classroom, and has helped me avoid various "new teacher" pitfalls. When I did encounter issues, I never felt lost, as I had already established open and cooperative dialogues with my new colleagues early in the term. The program has had a lasting effect on my teaching and on the department culture—during the fall term I approached two receptive professors in the department who welcomed me to sit in on one of their lectures, which provided additional examples of techniques and opened up additional helpful dialogues. Despite the benefits, a challenge for faculty members is the program's time commitment and the scheduling conflicts encountered, which may make some faculty weary to participate. However, careful planning can make the time commitment manageable and time spent on this program pays big dividends. In fact, I regret not allocating more time to repeat the full round of observations and feedback beyond the initial prescribed guidelines. Time-permitting, beyond the initial program structure new faculty would greatly benefit from follow-up rounds of observations conducted biweekly or perhaps at the middle and conclusion of the term. Overall, I benefited tremendously from this program and in the future I plan to sit in on other colleague's lectures to look for new ideas and to help inspire and refine my always on-going teaching development.

Software Engineering New Faculty Case 1

This was my first time teaching a college class. Although throughout my doctoral studies and postdoc years I had many opportunities for teaching-related enrichment, I had not taught an entire class with responsibility for all elements – leading classroom lectures and activities multiple times a week, and grading quizzes, exams, and laboratories.

When I first learned about this program, I was glad that I would be participating in it. New instructor training is generally minimal, and I anticipated this program would give me good ideas for my first days of teaching. The requirement to spend three or four hours spread over the first week or two of classes was a small time-commitment.

In the first class, I attended three lectures given by an experienced professor teaching another section of the same course and he attended one of mine. Attending another experienced professors' class for a week was definitely helpful. I picked up several teaching techniques, including a technique for drawing memory-map diagrams. Because I attended multiple classes, I picked up further techniques that made the meaning of the diagrams clearer. Later in the quarter, I went back to the senior professor and asked him how to diagram further concepts as well. At

the end of the quarter, a student commented on the instructor evaluations, "The visual models on the board are usually very well done." I doubt I would have received this positive feedback if I had not gotten these ideas from an experienced professor.

I also sat in on a section of a class I was not teaching -- computer networking. In this class, I attended all classes and labs throughout the ten-week term and helped answer questions.

This second class was taught "flipped" – students watched videos of traditional lecture material before attending class and spent class time on more interactive class activities instead. Watching a class taught "flipped" encouraged me to teach the class flipped myself; I saw clearly the potential to increase classroom effectiveness and became comfortable with the basic mechanics. It also gave me a first-hand perspective on how challenging flipping a classroom can be, and to be forewarned is to be forearmed! (I hear there will be at least two years before a flipped classroom's benefits will be clear to all. After that, students are said to love flipped classrooms and want all their classes to be flipped.)

This program has made it clear that not only is attending another professor's lectures permitted at Milwaukee School of Engineering, it is encouraged. I believe that professors' visiting each other's classrooms is beneficial. For the amount of time invested in it, it led to good ideas that were unlikely to occur in spontaneous conversation among professors.

Software Engineering New Faculty Case 2

Before coming to Milwaukee School of Engineering, I taught computer science and software engineering courses at a public institution for 17 years. Because I have mentored faculty and have been deeply involved in peer reviews, I had few questions about the basics of teaching and the mentoring process. However, I welcomed the shadowing program because I did have questions about how I would need to adjust my teaching style to fit the expectations of a private institution with a more selective student body.

With all of the new things to learn at the beginning of a school year at a new institution, I found it difficult to keep track of the specific requirements for the shadowing program. I think spending a week observing other faculty members would have had quickly diminishing returns. However, I was able to attend lectures for two faculty members, one for each course I was teaching. I did extend the offer to these two faculty members to observe me, but I did not press the issue and they did not attend any of my lectures. I have not inquired as to why.

My first observation was of a faculty member who had been teaching at Milwaukee School of Engineering for 16 years. He was introducing loops in a first-semester course on Java programming. He sets a very high bar for educators everywhere. He has a very entertaining delivery style, but manages to stay very focused on the principles being covered. From my vantage point, it appeared that all students in the classroom were fully engaged at a remarkably high level. For the end of the lecture he challenged the students to write their own solution to a simple problem and then gently critiqued a half dozen solutions that were written on the board. It was interesting to observe the competition among the students to be able to write their answers on the board – I was anticipating that college students would have to be goaded into doing this.

I picked a lecture on loops to observe because this is traditionally a topic which stumps many students. In addition to the basic benefits of observing another faculty member, I hoped to get ideas on how to improve my coverage of the topic. My lecture was an hour later, so I used the intervening time to modify my planned lecture to use the new ideas. It did not work: my coverage of the same material did not "click" with the students, and only a few students were willing to write their code on the board. I was successful later in the semester with having students write code on the board, but I had to find my own way of doing it. I learned a lot from my observation, but I also learned what may be obvious to the reader: incorporating new teaching methods into a course cannot be done in an hour.

My second observation was of a faculty member who had been teaching for approximately seven years. He was covering creating JAR files in a sophomore-level software engineering class, and he invited me to observe both for the shadowing experience and so that I could learn the specifics of how he approached the topic. This was useful to me as it allowed me to see how he wove together a story about delivering software products with a discussion of different methods to deliver those products. In this case, because the faculty member's style was very similar to my own, I had a much easier time incorporating his ideas into my own lecture, and so the practical benefit was more one of knowledge transfer than improvement in instruction. However, there was a broader benefit: confidence that my instructional technique would fit the needs of students.

I would highly recommend shadowing programs, even for experienced faculty moving to a new institution. While few faculty would object to being visited by colleagues, having the structure of a program increases the likelihood that such observations will take place. To me, the real benefit of the program is not about learning specific instructional techniques, but about establishing an environment in which I feel free to experiment with new methods.

Conclusions

The experiences of the five new faculty members profiled in this article tend to indicate that their shadowing was a benefit to helping them acclimate to their new positions. Among the junior faculty members in the case studies, shadowing seemed to provide an easier entry to productive dialogue concerning their learning to teach. The structure of the program was useful in providing the context and the impetus for visiting other classes and meeting with other faculty members. However, some of the new faculty members indicated that the structure could be improved. Providing more guidance and better instructions before the start of shadowing will occur in future programs.

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