1. Introduction

Those who know me well could tell you that I was preparing to be a college professor as early as high school. Aside from helping peers with homework throughout my education, my first “real” teaching experience took place during my senior year of high school. I had the opportunity to be a student-teacher for a geometry class. In that capacity, I taught once per week and circulated among the students during work time every class session. I enjoyed helping students understand geometry and construct proofs; I fell in love with a career in teaching.

My passion to become a college professor was underscored during my years as an undergraduate at Gustavus Adolphus College. My college professors showed concern for their students, taught their subjects well, and created a respectful community of faculty and students. Now that I am a professor, I strive to emulate the mentorship, kindness, and respect that my college professors gave me.

During my graduate education, I sought opportunities to teach so my teaching skills could improve alongside my research skills. I taught two courses as an instructor and took two graduate courses on teaching. One course focused on active learning in engineering education and the other focused on reflective teaching. I even asked consultants at the Center for Instructional Development & Research at the University of Washington to observe my courses and solicit students’ anonymous opinions.

When I looked for open positions at the end of my graduate education, I applied only to teaching-oriented colleges and universities. When University of Portland offered me a faculty position, I knew that I had found a great community of colleagues and students. Now that I am in my third year of teaching, I am continually thankful to be part of the University of Portland community.

Following the introduction, this narrative contains sections describing my responsibilities as a faculty member: teaching, scholarship, and service. This narrative concludes with reflections about my personal attributes.
function? After deciding course outcomes, I then design course elements (homework, projects, exams, lectures, presentations, examples) to assist in developing skills to meet target outcomes. This activity is similar to selecting materials and defining process in product design. After teaching a course for the first time, I reflect upon what went well and what could be improved. This is similar to iteration in quality assurance in product design.

Having participated in two faculty searches, I often asked the candidates, “Who is your ideal student?” If I had to answer this question, I would say “the student who may struggle with the material, but puts forth effort”. To me, these are the students that make teaching a rewarding career. I often have my best “teaching moments” during office hours when I get to work one-on-one or one-on-two with students. Teasing out what students already understand reminds me of detective work – I need to ask the right questions, try to understand the students’ framework for learning, and then build upon that framework. I relate most to the learning theory of constructivism, where students come into the classroom with models for how things work and it is my job to extend and refine those models with new concepts [3, 4, 5]. The course evaluations show that I am helpful outside of class, positive, care about students’ learning, and care about students as people.

I believe students learn in a variety of ways; some learn best from a presentation and others learn best by doing. Therefore, I try to present material in a variety of ways during class time: lectures, demos, in-class problem-solving sessions, group work, and role-playing. The in-class activities give me a chance to “watch” learning in progress, helping me to better understand how students make sense of concepts and observe any misunderstandings [1, 2, 6]. The course evaluations indicate that the classroom activities and my teaching style are effective for learning.

I believe good teaching requires organization, preparation, and planning. I take my responsibility as a teacher very seriously and usually have all student work planned prior to the first day of class. I believe students need fair warning for all graded tasks, so they can prioritize their time. The course evaluations show that I am organized, the course materials are helpful, and most student work is valuable for learning.

2.2 Students’ Perspectives

Course evaluations provide insight into students’ perspectives on my abilities as a teacher. Students rate five categories numerically: 1. course materials and course work, 2. classroom activities, 3. instructor concern, 4. learning objectives met, and 5. overall assessment of instructor of the course. My average numerical ratings usually exceed 3.0, indicating that these five metrics of a course are rated better than “acceptable” (2.0). Of all 25 average semester ratings, 12 ratings exceeded the School of Engineering averages. I am proud that students rate my courses highly, especially since I am a “young” teacher among a talented set of engineering faculty. The ratings for “instructor concern” are usually my highest scores.
In addition to quantitative measures, students qualitatively evaluate courses with answers to open-ended questions. The majority of written comments about my courses are positive. Students describe me as organized, effective, concerned, caring, and helpful. Having students view me as a mentor is one of the highest compliments I could receive. Most of the course work is reasonable; some course work is even fun. Almost all students stated that my grading was fair and clear. The few negative comments relate to the textbook, length of exams (too long), difficulty of project(s), “dry” topics, and the amount of material covered (in CS201).

Teaching at the University of Portland is a rewarding career. I am proud of the following comments on course evaluation sheets:

- “Tammy is an absolute amazing professor to have as a freshman. She definitely made me feel welcome.” (EGR110 Fall 2007)
- “Very good instructor, patient and understanding and helped with the transition to college.” (EGR110 Fall 2007)
- “Encouraged students to enjoy their work and be successful.” (EGR110 Fall 2007)
- “She is a great instructor and cares a lot about our success as students.” (EGR110 Fall 2006)
- “Course materials well thought out and should be taught again.” (EE111 Spring 2007)
- “Helpful outside class.” (CS201 Fall 2006)
- “Worked very well, all the in-class activities and demos were helpful.” (CS203 Fall 2007)
- “Knowledgeable, helpful, communicated material effectively.” (CS203 Fall 2007)
- “This was a useful class, I learned a lot, and VanDeGrift did a great job teaching it.” (CS203 Fall 2007)
- “This was a very fun class. I’m actually sad it is over.” (CS203 Fall 2007)
- “Awesome – very helpful and eager to help you learn, great job in trying to keep all students interested in subject while allowing them to learn at their own pace in lab.” (CS273 Spring 2006)
- “Good style, very neat on chalkboard, liked the interactment with class.” (CS445 Spring 2007)
- “Challenging but fun and informative” (CS445 Spring 2007)
- “Her method of introducing each new idea step by step was awesome.” (CS451 Fall 2007)
- “Very helpful and concerned about our well-being.” (CS451 Fall 2007)

2.3 Course Information

I have taught seven different courses from Fall 2005 through Fall 2007. My course set has been somewhat unique in comparison to my Computer Science colleagues. I have taught several courses for non-CS majors with a course load mostly at the introductory level. I have actually taught more non-CS students than CS students; this presented the challenge of making CS material interesting and relevant to a potentially uninterested student. I enjoyed taking on this challenge and getting to know ME, EE, math, physics,
and engineering management students. The introductory courses I have taught include EGR110 (Introduction to Engineering), EE111 (Introduction to Multimedia Processing), CS201 (Introduction to Scientific Programming), CS203 (Computer Science I), and CS273 (Computer Science I Lab).

I am proud of my development of two new courses at the University of Portland: CS201 (Introduction to Scientific Programming) and EE111 (Introduction to Multimedia Processing). CS201 is a 1-credit course exposing Mechanical Engineering students to programming concepts. Because the course meets just 55 minutes per week, filtering all possible topics to a core set of material posed a major challenge. In the second offering of the course, I revised all course materials to work with teaching in a computer lab. The lectures included presentations, demos, and in-class programming activities. The EE111 course was developed as a freshmen-level course for electrical engineering majors to learn basics of signal processing and MATLAB. Dr. Joseph Hoffbeck and I chose the textbook, topics, and laboratory activities. I wrote the lectures and labs for the first offering of the course. The major challenge for me was developing a course with material outside my immediate area of expertise and setting appropriate difficulty and pace for a 2-credit introductory course.

One of my favorite courses to teach is EGR110, Introduction to Engineering, taken by all first-year engineering and computer science students during their first semester at the University of Portland. I enjoy teaching this course because I get to help students transition to all aspects of college life, introduce several exciting careers in engineering and computer science, and witness them grow into independent thinkers. I believe I can be a better teacher by observing great teachers. Hence, I observed Dr. Jim Male’s EGR110 section a year before I taught my own section of EGR110. Observing his class was a valuable tool for preparing to teach the course. I also had the opportunity to take a leadership role with this course. During Spring and Summer 2007, I prepared the common course materials for all six sections of the course during Fall 2007. My contributions included gathering ideas for a design project, selecting the project and materials, writing the project description, and preparing the course syllabus and calendar. I also coordinated the needs of EGR110 students with lab technician Rick Severs.

2.4 Teaching Decisions

Teaching requires a series of decisions. I would like to highlight some of my own teaching decisions here.

First, I believe students need and appreciate timely feedback about their achievement in a course. This gives me time to help a student or set of students who are misunderstanding topics. Timely feedback is especially valuable in technical courses, where the material continues to build. If students are not made aware of misunderstandings early during the semester, then learning more complex topics later in the semester may prove impossible. Therefore, I grade and return exams within one week (usually by the next class period). I also return homework assignments within one week of submission.
Second, I believe engineering and computer science students need to practice communication skills in addition to technical skills. I include a technical writing and/or technical speaking component in all my courses. For example, in EGR110 students write and speak about their design projects. In CS203, students write 2-page summary reports documenting the software they write for homework assignments. In CS445, students read a current research article and present the research results to their peers.

I believe students learn the most by what they do and not what they see me doing. Therefore, I put much of my time into developing homework and projects that challenge students and apply topics presented in class. I also tried to make the CS203 and EE111 homework assignments fun and provide opportunities for students to be creative. For example, students in CS203 designed their own adventure game, a madlib puzzle, and an image filter. EE111 students “synthesized” their own music by creating signals. The CS203 course evaluations suggest that students find the assignments “fun” and “worth doing”. In CS445 students built protocols for a virtual network and could see how their protocols worked with other students’ versions.

As mentioned earlier, I believe students learn in a variety of ways. Therefore, my teaching style includes several types of activities: presentations, software demos, in-class exercises, student presentations, and role-playing. For example, in CS203 I have students “sort” themselves following different algorithms: selection sort, insertion sort, merge sort. In CS445, students represent nodes in a token ring network and pass a ball around representing the token. These role-playing sessions come after a more traditional presentation of the associated concepts.

Finally, quality teaching requires reflection. I do my best to evaluate strengths and weaknesses in my courses and improve weaknesses in future offerings. For example, in CS203, I took students’ advice and taught the most recent offering of the course in a computer-equipped classroom. I revised the virtual networking project in CS445 the second time I taught the course, since I had set expectations too high for undergraduates. I revised all lecture materials in CS201 the second time I taught the course to take advantage of teaching in a computer lab.

### 2.5 Teaching as Mentoring

I became a teacher because my undergraduate professors did a great job mentoring me and preparing me for my career. I try to do the same for my students. I advised 20 students in Fall 2007 and 14 students (6 general engineering students decided to major in something other than CS) in Spring 2008. In addition to helping students select courses, I do my best to get to know them and their aspirations. I also advise an Indian university student through MentorNet, an on-line mentoring program for students in science and engineering.

Another mentoring opportunity that I have enjoyed is leading senior design project teams. I co-advised a team of three CS students with Dr. Steven Vegdahl in 2005 – 2006. I

Mentoring to me means creating opportunities for professional and personal growth. I also believe students learn from each other. In order to create a community among my students, I invited students in my courses to my house for a party. Students could get to know other students in different courses, different majors, and different years in school, while eating, playing games, and playing ping pong.

3 Scholarship

The School of Engineering document on scholarship describes four types of scholarship: discovery, integration, application and teaching. I have tried to balance my responsibilities to allow time to pursue scholarly activities. These activities include data analysis, writing scholarly papers, attending professional conferences, and presenting research results at professional meetings. In the remainder of this section, I describe my research interests, published work, and my participation in professional meetings.

3.1 Research and Published Work

My research interests include media-on-demand systems, media processing, educational technology, human computer interaction, computer science education, and computer science theory. I have investigated topics in several threads of inquiry, resulting in 24 published articles (all double-blind peer-reviewed). Of the 24, 10 were published while I was a faculty member at the University of Portland.

First, in the category of “discovery” research, I have investigated algorithms for efficient delivery of media-on-demand. In “Windows Scheduling of Arbitrary Lengths on Parallel Machines”, my collaborators and I describe optimal delivery of media segments for a given number of server machines. In “Stream Merging for Live Continuous Broadcast with Time-Shifting”, my collaborators and I present and experimentally validate the scheduling of media delivery for continuous broadcasts. This is in contrast to classic media-on-demand systems where media has a finite duration.

Second, in the category of “discovery” research, I have studied the design processes of novice software engineers. I was also awarded a Butine Faculty Development Grant during Summer 2007 to investigate design processes of novice software engineers. Four of my published papers relate to novice software engineers’ recognition of ambiguity in software specifications.

In the category of “integration” research, I have studied students’ views in hiring software professionals, the role of gender in the computing profession, and the role of diversity in engineering. This line of research combines ethics and computing. “Using Diversity Statements to Promote Engagement with Diversity and Teaching” presents research results about how future engineering educators view diversity in education and engineering. “Uncovering Student Values for Hiring in the Software Industry” describes
criteria students use in hiring; these criteria give insight into the skills students think are most valuable to develop in a computer science program. A paper regarding gender and hiring software professionals will appear in the proceedings of Innovation and Technology in Computer Science Education 2008.

In the category of “application” research, I have studied the use and effectiveness of technology in regular classrooms and distance learning environments. In particular, I helped develop and assess a classroom presentation system utilizing the TabletPC, where instructors and students can annotate electronic slides. Five of my published papers relate to educational technology, or more generally, communication technology.

In the “teaching” thread, I have contributed resources and studied the use of learning materials. My work has focused on creative assignments for CS1 (ASEE 2007), active learning, and classroom assessment techniques. Six of my published papers provide educational resources for CS professionals.

Finally, in the “teaching” thread I have shared materials for outreach activities to interest pre-college students in computer science. I have also shared materials for graduate students interested in a teaching-oriented career. I presented a special session at the ACM SIGCSE conference 2008 to provide a workshop model for engaging students with disabilities in computer science. The paper “The Journey to a Teaching-Oriented Faculty Position: A Handbook of Advice for Graduate Students” presents useful information for graduate students and is used as a resource at some universities. The paper “The Game of Life Workshop – Reaching Out to High School Students” received a best paper award at the American Society for Engineering Education 2006 Conference. Even more rewarding than a cash award was working with a University of Portland undergraduate as a co-author on the award-winning paper.

3.2 Grants

I have applied for two National Science Foundation (NSF) grants and applied for one Butine Faculty Development grant. In 2005 I applied for a NSF grant titled “Media-on-Demand at Anytime, to Anyone, Anywhere” in the DDDAS-TMRP Collaborative Research Division. Unfortunately, this grant proposal was denied funding. I applied for and was awarded a Butine development grant for Summer 2007. I applied for a CCLI Phase 1 NSF grant with several collaborators in May 2007 and the proposal is currently under review.

3.4 Professional Development

Because much of my research is published in conference proceedings, I have had several opportunities to attend and present results at professional meetings. In the field of Computer Science, publishing in conference proceedings is a common activity. In fact, many conferences are more competitive than journals. Since starting my teaching appointment at the University of Portland, I have attended eight professional workshops or conferences. I presented research results at six of those meetings.
I furthered my knowledge by attending a statistics boot camp for computer science researchers in Atlanta, Georgia in September 2007. The workshop was limited in participation. I was one of approximately 20 faculty members who were accepted to participate in the workshop. I also attended a symposium about diversity in the sciences in October 2006; I was one of four people selected to represent the University of Portland.

3.5 Professional Service

I am a member of the Association for Computing Machinery (ACM), the Institute for Electrical and Electronics Engineers (IEEE), the American Society for Engineering Education (ASEE), and Sigma Xi. I serve these organizations as a peer reviewer. I have reviewed for the ACM SIGCSE Conference, the ACM ITiCSE Conference, the ACM ICER workshop, and the CCSC-NW Conference. I have reviewed articles for the following journals: ACM JERIC, Journal of Systems Architecture, Handbook of Computer Networks, and Computer Science Education.

In addition to maintaining scholarly habits through peer review of articles, I also served as a National Science Foundation CCLI panel reviewer to review grant proposals in March 2007. I served the ACM SIGCSE community as the local arrangements chair of the 2008 ACM SIGCSE conference.

3.6 Summary

I believe my activities show a continued habit of scholarship. First, I have designed research studies, analyzed data, and prepared articles for publication. All published articles were peer-reviewed in a double-blind manner and the venues had acceptance rates ranging from 15% to 62%. Second, I continue to attend meetings to present research findings and gather contemporary information. Third, I hope to continue my collaborations with research colleagues from around the world.

4 Service

Because I am teaching in the context of a community at the University of Portland, I believe serving the School of Engineering and the University is necessary and important.

I have served on the School of Engineering Computer Committee since Spring 2007. The purpose of the committee is to coordinate computing needs of the engineering faculty and students with Information Services. I also serve as the MSDNAA (Microsoft Developer Network Academic Alliance) representative for the School of Engineering. This role requires trouble-shooting software downloads, maintaining software for download, and administering user accounts. In Spring 2008, along with Dr. Matthew Kuhn, I created and analyzed a survey about technology for students, faculty, and staff in the School of Engineering. During the creation of the new engineering web pages, I took the lead in creating content for pages associated with the Computer Science program.
I have served on the School of Engineering Space Utilization Committee since Fall 2006. The purpose of the committee is to make recommendations and decisions about space usage in the Engineering Building. Due to the construction of Shiley Hall, the committee is now focused on transitioning smoothly to the new building.

I participated in two faculty searches for Computer Science positions. One search spanned Fall 2006 – Spring 2007 and the other spanned Fall 2007 – Spring 2008. Both searches required review of applications, telephone interviews, and on-campus interviews. We successfully hired candidates in both searches.

I have served the School of Engineering with my contribution to the EGR110 course. I prepared common course materials (syllabus, calendar, design project) for the Fall 2007 offering. In addition to my teaching duties in the course, I served as the EGR110 webmaster, prepared the scoring sheets for the design competition, prepared and led the Computer Science workshops, and helped prepare and lead the Computer Science program information session.

I have served the wider University of Portland community by volunteering my time to sing for Opening Masses and Baccalaureate Masses. I also led a team of first-year students on the Serving to Learn day in September 2007. I volunteered my time as a blackjack dealer for the Residents Hall Association casino nights in 2006 and 2007.

Service to the wider Computer Science community is important to me as a teacher. In addition to serving as the ACM SIGCSE 2008 conference local arrangements chair (mentioned earlier), I have led outreach workshops to introduce students with disabilities to image processing and computer programming. I also spoke at a Computing & Technology Trends workshop for high school students and their parents. I mentor a university student in India through the on-line MentorNet program.

5 Personal Attributes

Teaching in a successful program, school, and university requires a community of colleagues. I hope my colleagues view me as a true colleague, one who wants what is best for our students and the academic community. My students describe me as “helpful”, “positive”, “caring”, and “enthusiastic”. I view students, staff, faculty and administration as part of a single community; therefore, I try to treat all people with respect. In my opinion, my personal strengths are being organized, showing patience, being approachable, and being a team player.

I am dedicated to excellence in teaching and being a supportive member of the University of Portland. In addition to my “work” hours, I try to involve myself in campus events. For example, I have season tickets to the men’s basketball games and try to attend as many soccer games as possible. I also attend choir concerts, orchestra concerts, and theater performances. Making my residence in the University Park neighborhood affords me access to several University of Portland events.
I will defer to my colleagues regarding their views of my personal attributes and thank them for their careful evaluations of my contribution to the university. I am grateful to be a member of the University of Portland community.

References


