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A Collection of Stories of Engineering Faculty's Pedagogical Journeys

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### **Transformative Teaching**

#### A Collection of Stories of

**Engineering Faculty's Pedagogical Journeys** 

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SYNTHESIS LECTURES ON ENGINEERING #35

#### ABSTRACT

The journey to becoming an exemplary engineering educator is one that is rarely simple and straightforward. Simply being exposed to active learning strategies or innovative pedagogies rarely leads to a transformation of one's own teaching. In this book, we present a collection of stories from exemplary engineering educators that are told in their own voices. These stories are shared to enable readers to immerse themselves in first-person recollections of transformation, involving engineering educators who changed their teaching strategies from the ways that they were taught as engineering undergraduate students to ways that more effectively fostered a conducive learning atmosphere for all students. It is our hope that providing stories of successful engineering educators might stimulate thoughtful and productive self-reflection on ways that we can each change our own teaching. These stories are not simple, linear stories of transformation. Instead, they highlight the complexities and nuances inherent to transforming the way that engineering faculty teach. Through our strategy of narrative storytelling, we hope to inspire future and current engineering educators to embark on their own journeys of teaching transformations. We conclude the book with some lessons that we learned during our readings of these stories, and invite readers to extract lessons of their own.

#### **KEYWORDS**

engineering teaching journeys, engineering teaching stories, innovative engineering teaching, engineering active learning, narrative interviews of engineering faculty, exemplary engineering teachers, exemplary engineering educators, innovative engineering teachers, innovative engineering educators, innovation in engineering education, engineering teaching inspiration, engineering educator inspiration, engineering faculty teaching stories

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### Preface

When I was interviewing for my first engineering tenure-track faculty position in 2006, the department head asked me which classes I could teach in the program. Confidently, I responded that I could teach anything I had taken. A few months later, in the summer before I started, I learned I would be teaching something I had never taken before—a computational engineering methods class for first-year engineering students. After talking to a few people, I understood that the undergraduate program coordinator wanted to get someone into the classroom who was nice to first-year students. The current teacher, an Associate Professor, had structured the entire class around programming and was known to get frustrated with the students with rumors of him throwing chalk at students. I could be nice, I thought, but I'm not sure about teaching the course with my degrees in mechanical engineering. I managed to get by through changing the course to focus on learning programming structures (through storytelling using Alice), learning relative and absolute referencing in Microsoft Excel, learning html to create websites, and learning basic programming using MatLAB. I ended up teaching a few sections of this class for two years and eventually became comfortable teaching computational engineering methods to first-year students. I even ended up having some fun with the class with a challenge at the end of the course for the students to use MatLAB to create artwork for an art exhibit. Students created music, edited photographs, created fractals, and created stop motion animations. During the art exhibit, I overheard one of my senior colleagues make a comment to the students saying that this was not engineering and seemed like a waste of time to him. This was my first experience teaching as an engineering faculty member.

After that first semester teaching my own class, I quickly realized how difficult and complicated teaching could be. While I had read many books preparing me to be a teacher, it was hard to truly prepare for experiences like this. I did not expect to be asked to teach something that I had not learned myself as a student. I also expected that senior faculty members in the department would be supportive of a junior faculty member. In hindsight, I was a bit naïve and probably should not have been surprised to experience some pushback for my alternative ways of teaching. I was, after all, the second woman faculty in our department of around 50 faculty members. In addition, I was the youngest faculty. The composition of our faculty was about to change, but when I first joined it was pretty homogeneous.

Because the teaching books that I read did not seem to be helping prepare me for the realities of teaching, I sought out additional opportunities to develop my teaching skills. These included workshops such as the National Effective Teaching Institute (NETI) that Rich Felder and Rebecca Brent hosted before the American Society for Engineering Education (ASEE) conference. However, in spite of these intensive experiences to help me as a teacher, it felt difficult

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to reconcile the actual experience of teaching with what I was learning from the experts. I would learn helpful strategies for teaching, but some of the difficulties I faced were not addressed in these workshops. In this book, we are going to share the messy and sometimes complicated stories of faculty as they embark on journeys to become better teachers. I hope that, through immersing yourself in these stories, that you will learn more about the journeys that faculty take to become better teachers and feel better prepared as you embark on your own journey.

Nadia Kellam April 2019

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