AC 2012-3517: IN SEARCH OF MEANING AND IDENTITY: AN AUTOETHNOGRAPHY OF A GRADUATE STUDENT NAVIGATING THE FIELD OF ENGINEERING EDUCATION

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In Search of Meaning and Identity: An Autoethnography of a Graduate Student Navigating the Field of Engineering Education

Introduction

Institutions of higher education strive to develop students into self-directed, lifelong learners. To support this mission and create high quality learning experiences, it is important to consider how students’ learning experiences influence their development. As a graduate student navigating the field of engineering education, what experience can I offer to support fellow students in their personal development as self-directed, lifelong learners? This paper is about my formative experiences as a second year Master’s Candidate conducting research in engineering design education.

For me, navigating the field of engineering education has been a challenge in navigating the unknown. I use the term ‘unknown’ to describe my situation at the start of my graduate studies. I was driven to make the most of my experience, but I did not know what I was looking for or what my path would look like. I present this autoethnography as an account of my experience in the cultural phenomenon of navigating the unknown: searching to make the most out of my graduate experience in a field that was unfamiliar to me.

I define this work as autoethnography because I use myself as the primary data source, recalling my memories and using my documented personal reflections, to explore how the cultural phenomenon of navigating the unknown has shaped who I am. As Chang\textsuperscript{1} states, “autoethnography is not about focusing on self alone, but about searching for understanding of others (culture/society) through self” (p. 48-49). Chang\textsuperscript{1} further explains that “the writing process evokes self-reflection and self-analysis through which self-discovery becomes a possibility. The study of other self-narratives helps readers compare and contrast their lives with those of self-narrators” (p. 41). I inquire into my journey as a graduate student in engineering education so that other students and educators may find meaning from my experience.

My Critical Perspectives

My story begins in my undergraduate years of study where I started to form critical perspectives towards my education. I started my undergraduate studies in engineering directly after high school because it was the next thing to do. My attitude at the time was simply to go to University and get a degree, which would then serve as the springboard for my career. Despite seemingly limited options, I was not challenged after graduating from high school to be critical of my career path. Upon graduating from University, I became aware of the choice of options before me: I could work in engineering industry, I could pursue my entrepreneurial dreams, I could pursue graduate research in engineering, I could pursue graduate work in another area of interest. Faced with these decisions, I started to be critical of my career and my goals for further education. I started to question how graduate studies would benefit me in the future. My critical perspectives started in undergraduate studies and have been strengthened and developed throughout my graduate program. These critical perspectives challenged my assumptions and
caused me to question the purpose of my actions. Through analysis of my personal memories and reflection entries, I have organized my critical perspectives into four categories:

1. Challenges in Undergraduate Engineering
2. Other Opportunities
3. My Graduate Degree Program
4. Benefit for Employers, Benefit for Myself

**Challenges in Undergraduate Engineering**

I realize that during my undergraduate years, I was a passive stakeholder in my education—I allowed the curriculum of the school to act on me. A personal reflection made during my graduate studies captures my frustration in my learning during my undergraduate years:

I didn’t really take responsibility for my learning because I never really figured out what my learning should look like, I didn’t know what I really wanted out of my education…so four years came and went…I had closed my eyes and did whatever I had to do just to finish undergrad. (Personal reflection, May 2011)

Perhaps my passive attitude towards my education was not challenged during my undergraduate years because I was overwhelmed with trying to survive in engineering—I did not have the time or energy to step back and consider what I was doing. Undergraduate engineering was an academically challenging program for me. I was highly driven by my academic performance and the workload of engineering kept me very busy. My personal reflection quote above points to this survival mode: “I had closed my eyes and did whatever I had to do …”. Although my undergraduate experience was rich with learning, and prepared me well to advance my career, I did not embrace self-directed learning to the fullest extent. I never challenged myself to identify the need for what I was learning. I passively accepted a third party—the engineering school—to set my educational curriculum, and so I did not have time to explore my other interests. Although I was able to choose course electives to customize my program, I did not establish the underlying need for my studies that would make my coursework meaningful for me.

**Other Opportunities**

At the start of my program, I was very aware that pursuing graduate work would require me to stay in school for another two years, when my friends would be moving on to other opportunities and life experiences. I was aware that graduate work would be a significant financial commitment. Because I also had many opportunities presented to me after graduation, I questioned how my career may have unfolded, had I gone down a different path. However, since the path to pursue graduate work was one that I actively chose, I was determined and inspired to make my experience meaningful. How could I validate my graduate work to myself, to prove that my time and energy was worthwhile? At the end of my program, I wanted to be able to identify my personal growth for myself.
My Graduate Degree Program

I started my graduate degree program directly after my undergraduate engineering studies, and I am now in my second year as a Master of Applied Science Candidate registered in the Department of Mechanical and Materials Engineering. Although my institution does not currently have a formal engineering education research program, my master’s thesis research is in engineering design education. My research is not technical engineering work in traditional engineering science areas. I do not model fluid dynamics in wind tunnels. I do not measure the tensile strength on metal alloys used in nuclear reactors. I am conducting qualitative research to understand undergraduate engineering students’ perspectives of their engineering design education. Because my degree program is a Master’s of Applied Science but my research is in engineering education, I struggled with an internal conflict over the nature of my degree. How do my colleagues in engineering value my program since I am not conducting traditional engineering science research? Do my colleagues in education judge the legitimacy of my program because it is different and unique? With this struggle over the nature of my degree, I challenged myself with self-reflective questions to make sense of my career path: Who am I as an engineer? Who am I as an educator? Where do I fit in engineering education? How is this shaping me into the person I wish to become?

Benefit for Employers, Benefit for Myself

Pursuing graduate studies provides the opportunity to enhance one’s credentials to be more competitive in the job market. Although an advanced degree may be attractive to potential employers, this was not a heavily weighted factor in my decision to pursue graduate work. Nonetheless, the economic pressure to secure a job had an impact on my attitude to make my graduate education meaningful. How can I best position myself to be marketable to potential employers? How can I market myself as an engineer when my Master’s degree is not in a technical engineering field? If I continued to pursue education, what will I teach? If I pursued engineering work after graduate studies, what artifact will I design in industry? Am I pursuing an advanced degree by building off of my undergraduate studies, or am I starting all over again in a new field completely?

More importantly, beyond thinking about potential employers, I started to think critically about my education to find the real benefit for myself. Beyond the knowledge and skills employers may find attractive, what knowledge and skills do I want to develop for myself as an individual?

The stories and questions captured in these four categories formulate my critical perspectives towards my education. These critical perspectives motivated me to make the most out of my graduate experience and reveal my personal questions as I attempt to make sense of my decisions and behaviour.

My Search for Meaning and Identity

My critical perspectives reveal an overarching theme that I identify as “my search for meaning and identity”. I was driven to make my graduate experiences meaningful and my critical perspectives show why finding meaning in my graduate work was important to me. My search
for identity is captured through my struggle to situate myself as an engineering student studying education at the graduate level, while conducting applied educational research.

By being critical about my education and challenging my assumptions about my career path, I have repositioned myself as an engineer, researcher, and educator. I have found meaning in my work through an interdisciplinary understanding\(^2\) that serves to integrate my various positions. Mansilla, Miller, and Gardner\(^2\) state that individuals show an interdisciplinary understanding when “they integrate knowledge and modes of thinking from two or more disciplines in order to create products, solve problems, and offer explanations of the world around them” (p. 18). Mansilla, Miller, and Gardner\(^2\) explain that “with an interdisciplinary understanding disciplines are not simply juxtaposed. Rather, they are purposefully intertwined. Concepts and modes of thinking in one discipline enrich students’ understanding in another discipline” (p. 29). I have embraced an interdisciplinary understanding to balance the triadic tension I felt between my identities as an engineer, researcher, and educator.

Stevens, O’Connor, Garrison, Jocuns, and Amos\(^3\) describe identity as “a double-sided process of positioning ourselves and being positioned by others” (p. 357). My sense of identity refers to the way I see myself and the way others see me, in the engineering education context. Applying an interdisciplinary understanding to position myself both within engineering and education, I identify myself as an educational engineer\(^4,5,6\): designing products, processes and systems to optimize student learning. Finding my sense of identity as an educational engineer has led me to new growth and understanding in my engineering education research and practice. I am able to situate myself in my work as an engineer, researcher and educator.

**Discussion - New Questions, New Insights**

At the start of my graduate program, I did not set out to find personal meaning and identity. I was driven to make the most of my experience, but I did not know what I was looking for or what my path would look like. In navigating the field of engineering education, my search for meaning and identity emerged as the process and the product of my growth. As a process, my search for meaning and identity provides two insights: 1) it is how I have come to understand my growth in the field of engineering education and 2) it is how I have come to make meaning out of my critical perspectives that challenged me at the beginning of my graduate work. As a product, I now identify myself as an educational engineer with an interdisciplinary understanding. The following two sections will discuss how I have applied this understanding to make sense of my experiences.

**Integrated Thinking**

I remember one Professor encouraging me that if I was serious about engineering education, I should first work towards my Ph.D. in a technical engineering field. After this achievement, he said, I would then be able to pursue my interests in engineering education. I am reminded of this conversation as I question my own engineering education values to make sense of my experiences.
Do I hold technical engineering as my primary strength and education as secondary? Am I a mechanical engineer first and interested in education second? Are my interests in education independent to my knowledge, skills, and attitude as an engineer? How do engineering educators view the research field of engineering education in relationship to their own discipline specific technical research? How do engineering educators position themselves in an interdisciplinary framework?

With my sense of identity as an educational engineer, I am better prepared to tackle and unpack these challenging questions. I have broadened my scope of what engineering means to me to encompass a holistic definition. With an interdisciplinary understanding, my engineering and education experience both support and elevate one another to higher levels of thinking. I no longer have to choose between engineering or education. Instead, I can pursue both my passions under one framework of integrated thinking—that of an interdisciplinary educational engineer.

**Designing My Path**

The technical knowledge of math and science that are engrained in undergraduate engineering studies are only a few of an engineer’s tools for design. As an educational engineer, the technical tools that I apply for design are different to the analytical tools of math and science common to traditional engineering fields. Although I have not studied technical engineering science at the graduate level, I have been able to build and strengthen my technical skills in engineering design. For me, my degree is an advanced degree because—compared to my thinking after undergraduate studies—I have developed a higher, more sophisticated, holistic, level of thinking and attitude towards learning.

From the beginning of undergraduate studies until now, I have realized that my education has followed an iterative process of divergence-convergence-divergence-convergence—an outward-inward movement to find my true passion and calling. The first stage of divergence occurred during the early years of undergraduate studies where I was exploring all the fields of engineering and had not chosen my engineering discipline. My junior and senior years mark the first phase of convergence where within the broad field of mechanical engineering, I had converged my interests on materials engineering. The first year of my master’s program marks the second phase of divergence, where I branched out to explore the field of engineering education. Now, in my final year of my Master’s program, I am converging onto the area of engineering education that interests me.

Adopting the same time scale and applying the divergence-convergence model, my engineering colleague’s paths may look more like divergence-convergence-convergence. After the first phases of divergence and convergence similar to my experience, they continued to converge further into an area of specialty within their chosen engineering discipline. This area has now become their specific research topic and area of expertise.

My graduate program afforded me the time to develop my knowledge and skills as a self-directed, lifelong learner. As I sought to extend my learning beyond the institution’s curriculum, I embraced the opportunity to take ownership for my education. Each student’s story is unique and meaningful, and the struggle to find my identity has helped me make sense of my story.
With my sense of identity as an educational engineer, I know that the path I am on is the path that I have designed for myself—and I am prepared to create meaningful experiences as I traverse new pathways.

**Conclusion and Recommendations**

I have presented my experiences and perspectives in finding meaning and identity as a graduate student in the field of engineering education. I have discussed how these experiences have shaped me into a self-directed, lifelong learner. Although my autoethnography offers an account of my experiences and perspectives that are unique to me, the overarching theme for this work has been about a search for meaning and identity. I offer the following recommendations to students and educators in their search for meaning and identity.

*For Students*

Being critical about my education led me to find meaning in my graduate program and has strengthened my experience as a graduate student. Are students critical of their school experience? Do students question how their educational curriculum, encompassing activities guided by the school and themselves, influences their learning and growth? My autoethnography strives to challenge students to think critically about their education and find their own sense of meaning and identity in their school experience.

*For Educators*

There is a resounding call in academia for interdisciplinary research and practice to drive innovation. My autoethnography presents my enculturation of an interdisciplinary understanding within engineering education. For educators who may be interested in growing graduate programs in engineering education, it is recommended that the development of new program structures, resources, and strategies consider the role of meaning and identity on students’ learning and growth.

As students and educators navigate the field of engineering education for themselves, they will formulate unique identities and stories. Capturing and making meaning out of these stories will continue to provide insight into the culture of engineering education, to ultimately create high quality learning experiences.

**References**


