Introduction

Hidden curriculum (HC) consist of the particular assumptions that are held by individuals about schooling that are manifested in practice (Smith, 2014). These assumptions can be recognized through socio-cultural interactions, experiences with their physical surroundings, or exposure to virtual environments (The Glossary of Education Reform, 2017; Killick, 2016; Margolis, 2001; Smith, 2014). HC has been explored widely in fields such as education, psychology, business, and medicine (Baird, Bracken, & Grierson 2016; Borges, Ferreira, Borges de Oliveira, Macini, Cândida, 2017; Cotton, Winter, & Bailey, 2013; Joughin, 2010; Margolis, 2001; Rabah, 2012; Smith, 2014) but is relatively unaddressed in engineering (Erickson, 2007; Villanueva et al., 2018) and more specifically neither the positive or negative implications of HC in engineering have been explored. This study sought to use a mixed-method approach to understand the mechanisms behind HC recognition (via emotions and self-efficacy) for engineering students and faculty nationwide.

Research Questions and Design

The underlying research questions for this study were:
1. In what ways are emotions self-reported by engineering faculty, graduates, and undergraduates when evaluating hidden curriculum?
2. In what ways are self-efficacy by engineering faculty, graduates, and undergraduates when evaluating hidden curriculum?

Participants

As part of a larger study (Villanueva, Di Stefano, Smith, Tull, Lord, Benson, Hunt, & Riley, 2018; Villanueva, Campbell, Raikes, Jones, & Putney, 2018), two hundred and forty-eight engineering participants (55 faculty, 54 graduate students, and 139 undergraduates) were recruited electronically via email and through social media to complete a custom-created survey around hidden curriculum, emotions, and self-efficacy. All procedures were compliant with Institutional Review Board policies.

Data Collection

Participants were asked to view a video vignette (Table 1) representing what the engineering education literature suggests are common issues of hidden curriculum, particularly around issues of social equity and inclusion (Margolis, 2001; Erickson, 2007; Tonso, 2006; 2014). Soon after, they were presented with a definition of hidden curriculum (The Glossary of Education Reform, 2017; Killick, 2016; Margolis, 2001; Smith, 2014) and some example statements (Table 2) of hidden curriculum identified in the higher education literature (Margolis, 2001; Smith, 2014).

Data Analysis

The qualitative questions were collected and holistic and thematic analysis of the responses were conducted. To compare group responses, magnitude coding was also conducted to consider the instances where emotions and self-efficacy were self-reported; additionally, negative and positive emotions were tabulated among the participants.

Results

Summary of Results:
1. The results demonstrate an overall difficulty by all participants to recognize hidden curriculum in engineering.
2. Interestingly, when looking at the demographics of the participants, those participants from minority groups expressed higher levels of hidden curriculum awareness compared to their majority counterparts. Issues of inequities of access, resources, and respect were highlighted among these groups.

Table 3 & 4. Frequency Count of Self-Reported Emotions

Table 5. Frequency Count of Self-Reported Self-Efficacy

Sample Quotes:
1. The resources available to the students. Students that come with a high income group have greater access to resources and family members that are able to provide any learning assistance. Undergraduate student, 3rd year or greater, Male, Caucasian, American Indian (Quechua).
2. Some professors don’t really care about culture and such. [...] This is hidden because colleges like to boast about how their staff is very open to culture but for the most part, professors care more about the topic they’re teaching. In addition, some professors care more about their research than actually teaching because that’s not their area of interest. Undergraduate student (2nd year), no gender (prefer not to say), Gossip.
3. As a woman in engineering, I often find that I need to be much more assertive and hardworking than my male peers in order to get the same attention and credit from male professors. Undergraduate student, 5th year, Female, U.S. Italian (modal).
4. I see the way the student and other professor talked to Prof. Garcia as very gendered. The student especially was discrediting. I saw this all the time. In an effort to be professional and polite there are times that I let it slide and regret it later. - Associate professor, female, U.S. (Shaw).

Discussion

Together, the data suggests that amongst engineering faculty, graduates, and undergraduates, there is an overall lack of awareness of hidden curriculum, and more predominantly among the majority populations. One interesting finding was that each group responded differently to the emotions and self-efficacy self-reports to each HC assumption statement. Undergraduates expressed the highest incidences of negative emotions and highest levels of self-efficacy. Graduate students reported disparate levels of negative and positive emotions with the lowest levels of self-efficacy. Faculty expressed high levels of negative emotions (e.g., frustration) with the lowest levels of self-efficacy across the statements. It is possible that experience and exposure to some of the HC present at their institutions may provide a different lens to how they handle these assumptions. Perhaps, faculty provide responses that are more in tune to the realities at their institutions. Graduate students may be at a transitional point in their careers and may be less certain on how to handle hidden curriculum at their institution. Undergraduates may have a more idealistic perspective of handling hidden curriculum despite experiencing negative emotions. These finding suggests a need to customize hidden curriculum strategies to identify and mitigate the potential negative influences that hidden curriculum may be playing in their engineering education and future careers. Future work will explore the effectiveness of customized interventions and strategies, via emotions and self-efficacy for each population.

Significance

This work presents the frameworks to explore the mechanisms behind hidden curriculum in engineering via emotions and self-efficacy. Identification of hidden curriculum is central to an individual’s successful navigation of their education and future careers. The findings from this work can inform future mentoring, advising, and advocacy methods that can be used amongst colleges of engineering to ensure equitable success of all individuals at all stages in this field.

References

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