Beyond the Vanishing Point: Using Future Self Theory and Student-Alumni Interviews to Expand Student Perspectives on Engineering Education and Engineering Work

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Abstract

This paper discusses a co-curricular video project, Vision Venture, consisting of student-alumni interviews and student reflections on those exchanges, which are edited and curated into short thematic clips to be posted online. In essence, the interviews and curated videos are a narrative project—connecting the past, present, and future through storytelling and shared cultural (in this case engineering education) touch points. The paper presents two main findings from the interviews and the students' reflections. First, there is an increasing recognition that personal subjectivities are intertwined with professional identities, whereas they were previously regarded as more distinct and segregated from each other. Second, there is a shift in understanding the nature of professional identities from a structured and permanent one to a more flexible one that embraces change. Vision Venture's primary purposes are to demystify life after graduation for engineering students and to empower them to imagine multiple versions of their future selves.

Introduction

In art, the convergence of lines where a road, for instance, disappears into the horizon, is known as a vanishing point. In education, it is known as graduation.

While each student will have their own unique professional future, hearing stories of those who have traveled the same educational path can inspire and motivate them. Indeed, in the midst of their educational journey, students may not realize the life transformative nature of their education. This paper will discuss a co-curricular project, Vision Venture, that pairs current engineering students with recent alumni for video recorded interviews, in which alumni reflect upon their educational paths and discuss their transitions to the professional world. The interviews are thematically edited and curated as a narrative project available online. Storytelling and shared cultural (in this case engineering education) touch points enable students to imagine their future selves; in turn, they can view their current educational journey from a future perspective–in essence, they imaginatively create a vantage point located in the future from which to reflect upon their current self. This co-curricular experience facilitates students' exploration of their engineering identities in terms of character, agency, and purpose, and it contextualizes the technical competencies achieved through traditional coursework. Through broadening their perspective, students gain self-awareness of their professional identities and are empowered with a clearer sense of their future selves. Vision Venture's overarching goal is to help engineering students imagine life after graduation, beyond the vanishing point.

Of course, students are not stepping into a complete abyss upon graduation—they harbor expectations based on varied personal, educational, and co-curricular experiences. While these

experiences are highly individualized, undergirding them is a shared web of cultural conversations and assumptions about work, success, and even finding the "perfect" job. This paper will present recurrent themes from the student interviews of alumni as well as from videos of students' reflections after the interviews. Vision Venture is a highly contextualized, multi-layered narrative project, and to convey the richness of the results this paper's approach is qualitative and emic. To contextualize not only the qualitative data but also the larger social environment of the transition from engineering student to engineering professional, as background this paper will discuss the following: current notions of "misalignment" between engineering education and industry needs; pervasive assumptions about work in the United States; and psychological studies on the value of being able to imagine one's future self.

Building on this contextual work, the paper presents two main findings from the interviews and the students' reflections on the interviews. First, there is an increasing recognition of how personal subjectivities are intertwined with professional identities, which were previously regarded as more distinct and segregated from each other. Second, there is a shift in attitudes towards the nature of professional identities from one that is structured and permanent to one that is more flexible and embraces change. Through the process of interviewing alumni, students were able to envision their future more vividly and more holistically.

Vision Venture Background

Context of Project

While this project is connected to a single large R1 university on the west coast, its premise would resonate in other engineering education institutions: at heart, the project aims to help students better understand, and hence be better prepared for, their post-graduation futures. Lack of student preparation in all dimensions needed to succeed in the engineering environment–a "misalignment" between engineering education and practice has long been noted, and many engineering graduates still endure a challenging transition to the workforce [1], [2]. To address this need, engineering educators have incorporated project-based learning in the curriculum [3], [4], [5], including capstones [6] and design projects [7]. [7] proposes more broadly that "curriculum developers and instructors should employ an integrative approach where students can connect their use of professional skills directly to their technical work and the engineering objectives they pursue." [2] argues for a notion of "engineering expertise" that reflects the entwined and ultimately context-dependent nature of technical and professional skills, with professional skills being "both integrated and integrating, in that it is an integrated skill set with a context-dependent composition that in turn integrates technical knowledge with other practice dimensions." In short, engineering educators must understand the need for an interdisciplinary [8] and high-context approach to engineering education to prepare graduates for the multi-dimensional nature of work. As a co-curricular endeavor, Vision Venture complements this effort by having recent alumni draw connections between their educational experiences and their current professional lives in a vivid and relatable way. Furthermore, this project shifts the discussion about the education-practice misalignment beyond a critique of graduates' lack of professional skills: it should also be regarded as problematic when there is a gap between fresh graduates' and employers' expectations.

In addition to this education-practice misalignment, similar tensions have been observed between personal goals and professional realities in both academic (e.g. [9]) and public media (e.g. [10]), especially when students (in fact, people in general) feel the need to weigh their job options between those that are meaningful to them and those that are not (but which may be more attractive for financial and other practical reasons). Such anecdotes reveal a clash between social and economic value, an emerging topic in the Anthropology of Work. Ethnographers [11] and [12] offer a more optimistic approach as they challenge the perceived antagonism between the social and the economic and suggest that such relationships can, in fact, be symbiotic. In other words, with proper guidance on how to negotiate the social-personal with the economic-professional, engineering students can gain more clarity in envisioning how they can make a meaningful impact on society, especially upon entering the workforce. To this end, Vision Venture addresses a holistic - integrated and integrative - vision of life after graduation through multiple aspects, including short-term versus long-term thinking and expectation versus reality narratives.

Future Self Theory

The project's theoretical underpinning is the concept of the future self. [13] reviews research on "multiple selves models," noting that "people think about their current selves and their future selves as if they are different people," and both [13] and [14] cite substantial scholarship that the more distant in time the future self, the less connectedness one feels to the present self. On the other hand, future selves imbued with positivity, realism, and vividness can influence long-term choices and promote short-term sacrifices for potential long-term benefits [14]. [15] notes that the motivational power of the future self is context-sensitive as well as temporally influenced. Additionally, the concept of future self has been developed specifically in the context of the workplace as the future work self: this type of future self is "explicitly future focused, positive, and specific to work" [16]. Because it is framed from a positive perspective, a future work self can begin a feedback loop of career exploration and adaptation leading to positive reinforcement of the future work self [16], [17]. A salient future work self grows from realism and vividness [16], like the more general future self. The concept of future work selves was initially researched within the workplace, and it was found that observation of role models can help strengthen the salience of a future work self [16], but the connection between role models and future work selves of current students has not been researched. In the context of graduating students entering the workforce, a mutually reinforcing and reciprocal relationship has been found between a salient future work self and career adaptability and career exploration [17]. Vision Venture includes interviews of multiple alumni–providing role model examples of positive, realistic, and vivid potential future work selves, and the alumni discuss a wide range of work/life topics: this approach offers current students multiple starting points for imagining their own future selves.

Methods

Particularly in engineering education, most quantitative (and arguably qualitative) methods are designed to prioritize the research's statistical significance through aspects such as random sampling and variables. While this is a small-scale pilot project that continues to be refined, it is

understandable to dismiss its locality and subjective anecdotes because of their lack of representativeness and generalizability. Indeed, we should not overgeneralize. Still, ethnographers such as [18] argue that "we should [also] not be afraid to point to phenomena that are likely to have broader implications," and that "random samples or large-scale projects are not the only approaches available to researchers [of holistic phenomena]." This is especially the case when analyzing a group as subjectively complex as engineering students and alumni. Since this paper investigates people's attitudes (from casual to moral beliefs), the parameters for scoping its claims are based on the participants' contextual specificity, including how their social and institutional environment shape their perspectives. In this sense, although the project's sample is statistically neither random nor representative, the findings are situated in an emic understanding of how the participants relate to the wider context of engineering education.

Participants

Alumni participants were recent graduates (3-8 years ago), so they would present vivid examples of future selves to the student participants. All three alumni were female. Student participants were juniors and seniors, one male and two female, each with different majors. Student self-reflexivity was promoted through assigned texts and interactions with each other and project leaders in a workshop environment. The assigned texts opened up discussions of student expectations about entering the professional world; students were also taught fundamental interview techniques and given the opportunity to practice them with each other. This dual focus—philosophical and practical—was intended to enrich students' ability to thoughtfully interview the alumni and promote self-efficacy. Each student met with project leaders three times: for an introductory meeting to explain the concept of Vision Venture and to learn about the students' personal goals for their participation; for a workshop discussion of assigned readings and a lesson on semi-structured interview skills; and for a one-on-one debrief to hear each of their reflections on the experience of the readings, workshop, and interview.

Assigned Texts

The assigned texts were selected to help students understand multiple ways of envisioning their future professional lives by considering short-term and long-term perspectives as well as the alignment of personal and professional values. To foster the atmosphere of a book club discussion instead of a class assignment, the readings were selected from best-selling books rather than academic articles. A chapter from Simon Sinek's book *The Infinite Game* [19] and a podcast episode [20] with Dorie Clark, author of *The Long Game: How to be a Long-Term Thinker in a Short-Term World* prepared students to contribute to a conversation about short-term versus long-term thinking. A reading about persistence from Elizabeth Gilbert's book *Big Magic* [21] and multiple chapters underscoring agency and autonomy from Bill Burnett and Dave Evan's book *Designing Your Life* [10] provided a starting point for a discussion about the alignment of personal and professional values. The discussion of the readings primed the students to have more flexible understandings of the future and their future selves, opening them to thoughtfully engage in conversations with the alumni about education, work, and life after graduation.

Coding

Full interviews between students and alumni were recorded, and the debriefs of individual students by one of the researchers were also recorded. These recordings were watched multiple times and transcripts were reviewed by both researchers for the initial project-based purpose of editing and curating shorter topic-driven videos for posting online. This process entailed a thematic approach with inductive coding to identify granular topics [22], [23], [24]. Twelve distinct topics of alumni advice and seven distinct topics of student takeaways emerged; they will be presented and discussed in the next two sections.

Results

The three student participants, Roopal, Isabel and Chris, interviewed the respective alumni: Willa, Ashley and Avery. Alumni advice ranged from broad observations to specific tips. Student takeaways expressed in their debriefing interviews were influenced by both the alumni advice and the readings. The students most directly referenced two of the readings, *Big Magic* [21] and *Designing Your Life* [10]. Figure 1 below demonstrates that student takeaways were influenced by both the alumni advice and the preparatory readings; it also demonstrates that the alumni advice often reflected key concepts from the readings.
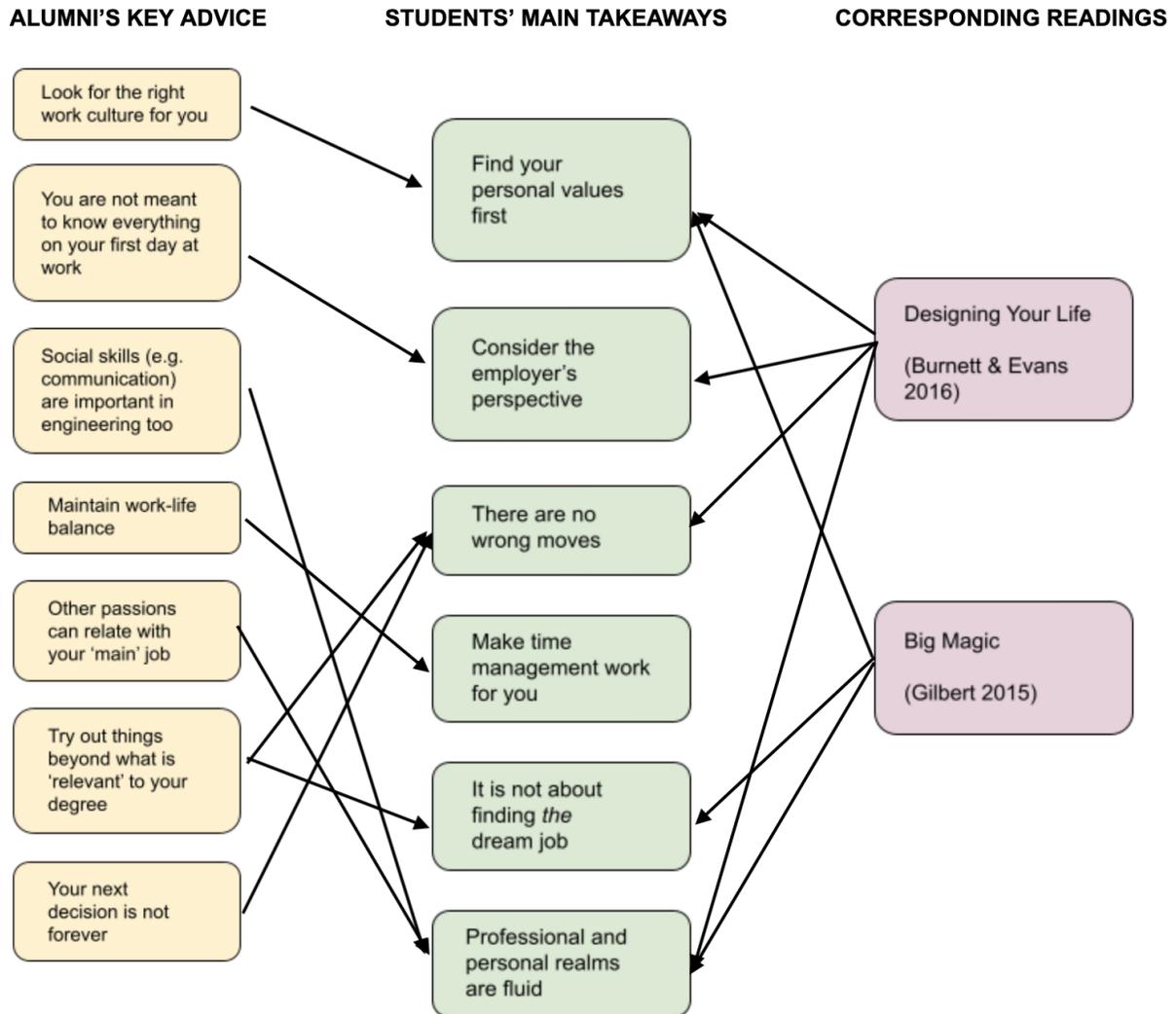
ALUMNI'S KEY ADVICE　　　　**STUDENTS' MAIN TAKEAWAYS**　　　　**CORRESPONDING READINGS**

Look for the right work culture for you

You are not meant to know everything on your first day at work

Social skills (e.g. communication) are important in engineering too

Maintain work-life balance

Other passions can relate with your 'main' job

Try out things beyond what is 'relevant' to your degree

Your next decision is not forever

Find your personal values first

Consider the employer's perspective

There are no wrong moves

Make time management work for you

It is not about finding *the* dream job

Professional and personal realms are fluid

Designing Your Life (Burnett & Evans 2016)

Big Magic (Gilbert 2015)

Figure 1. How the alumni's advice and the assigned readings contribute to the students' main takeaways.

The student takeaways represent trajectories of development from their pre-project, less informed perspective on life after graduation. Although students were not surveyed about their views at the start of the project, in the debriefings they clearly expressed a number of takeaways as either more fully developed or entirely new perspectives discovered through the readings and the interview. Seven distinct topics emerged in the debriefings. These topics of student takeaways fall into two distinct themes: 1) students expressing a new or deepened awareness of the synergy between personal subjectivities and professional identities; and 2) students expressing an evolution in their perspective on life after graduation from a structured to a fluid model. Figure 2 below categorizes the student takeaways into the two themes, and it includes representative quotations for each student takeaway.

THEME	STUDENT TAKEAWAY	REPRESENTATIVE QUOTE
Synergy between personal subjectivities and professional identities	Find your personal values first	"What [Ashley] showed me is that, by doing things that better you as a person and that you enjoy and *that make you you* is also…in her terms it was a form of service that's probably super attractive to a company." (Isabel)
	Consider the employer's perspective	"When you're looking for a job, there's this idea of like [*sic*], 'you need to cater your skills to find the perfect job *for you*.' But instead, it's more about the people who are hiring you [need] to *find the right person*." (Roopal)
	Make time management work for you	"[Ashley] said, in college, she was super involved with a lot of things but she would pick one thing a week that she devoted all of her time to, and I thought that was a really unique strategy."(Isabel)
	Professional and personal realms are fluid	"The engineering *world* is much cooler to think about than the engineering *company* individually. If you frame it in your own head, …'I need to find a job, *singular*,' then you kind of forget the scope of the engineering [world]...and how much we actually need to get done." (Chris)
Evolution from a structured to a more fluid perspective about life after education	There are no wrong moves	"Reframing the mindset from this rigid like [*sic*], 'these are the steps you have to take,' and then turning that

		into…make *what works for you* happen…making it kind of fluid." (Roopal)
	It is not about finding *the* dream job	"What ['The Shit Sandwich' reading] resonated with me is that…finding your passion isn't necessarily finding *this dream job*, but it's about finding what you're passionate *enough* about to endure *all* the aspects that you don't enjoy." (Isabel)
	Cross-confirmation of mindsets towards life after graduation	"[The idea that nothing is set in stone] was also advice that my dad has given me in the past, so that was also kind of nice - to *see* that *confirmed* in a book." (Roopal)

Figure 2. The seven topics categorized thematically with representative quotes

Discussion

Theme 1: Synergy between personal subjectivities and professional identities

Students expressed four main takeaways from the readings and their conversations with the alumni that involved an awareness of a synergy between personal subjectivities and professional identities. The first takeaway from this theme is to find their personal values before pursuing their professional identities. Isabel cited Ashley's emphasis on not disregarding experiences that seem irrelevant to one's professional goals, explaining that developing and portraying oneself with a well-rounded personality with unique pursuits outside of work is, in fact, attractive to employers in many instances. Chris was inspired by a similar sentiment from both the [10] and [21] readings, but focused on the need to be mindful of one's own values before helping the rest of the world in a professional setting. The second takeaway is to consider the employer's perspective when job-hunting. Through the [10] reading, Isabel gained more insight into the mind frame behind job descriptions (e.g. job posts that specifically describe an ideal candidate who is more qualified than the last person who had that position). From her interview with Willa, Roopal realized the importance of recognizing that the employment process goes both ways, as opposed to her prior perception that the candidates needed the employer more. The third takeaway is to adapt time management to one's specific lifestyle and workload. Isabel was inspired by Ashley's advice of prioritizing one thing per week, especially for people who take on many commitments at a time, and Isabel considered trying this technique to maintain her personal and professional commitments. This observation hints at the final takeaway in this

theme, which is to acknowledge the fluidity between professional and personal life. In addition to the readings, the researchers also showed a video interview with Gilbert [25] explaining the differences between jobs, careers, hobbies and vocations, which often are confused and conflated with each other. Roopal found this distinction liberating: while she previously thought she could only focus on one professional commitment that would take over many other aspects of her life, she now realized that she has more agency to do more. Furthermore, Chris expressed that, after participating in the overall project, he started viewing personal and professional realms as more fluid and that this fluidity enabled him to perceive life after graduation in a holistic way. In his attempt to look and traverse beyond the vanishing point, he began to see engineering as a *world*, rather than just individual engineering companies to potentially work for.

Theme 2: Evolution from a structured to a more fluid perspective about life after education

Students expressed three key takeaways that reflect an evolution from a structured to a more fluid perspective about life after education. The first takeaway of this theme is that there are no wrong moves in deciding what steps to take after graduation. The statistic that "[t]hree-quarters of all college grads don't end up working in a career related to their majors" from [10] resonated with Roopal in terms of emphasizing the plasticity of life decisions in relation to one's careers. Moreover, she appreciated that Willa demonstrated a similar sentiment, by teaching figure skating while pursuing a career in fintech. The second takeaway is to realize that finding one's professional path is not about finding an idealized dream job. Chris and Isabel found the notion of 'the shit sandwich' in the [21] reading enlightening as it urged them to re-evaluate the public discourse on passion: "So the question is not so much 'What are you passionate about?' The question is: 'What are you passionate *enough* about that you can endure the most disagreeable aspects of the work?'" [21]. Rather than trying to find a job that would not fall short of any of their expectations, they came to accept the reality that no job is 'perfect' and to see that as a source of integrity rather than negativity. Finally, this discussion strongly points towards the last student takeaway, which is that the students could see connections and draw confirmation between advice and the readings (as shown in Figure 1). For instance, Roopal previously heard from her dad the advice that there were no wrong moves in making career decisions, but she appreciated the confirmation of seeing it written in a book. In this way, not only is student growth demonstrated by a movement from a structured to a more fluid perspective on life after graduation, but it is also seen in the way they process and synthesize advice.

Cultural Context

The alumni interviews and students' responses demonstrate that a large part of decision making involves not only how one relates to society but also how societal 'norms' affect that process. Anthropologist [9] interviews people from all over the world who have worked or are currently working jobs that pay very well, but they are unhappy because they feel their roles do not benefit society in any meaningful way. While this argument focuses on critiquing the structures of contemporary work culture, it points out a public misconception about human motivation that stems from classical economic theory, which is that "everyone, left to his own devices, will choose the course of action that provides the most of what he wants for the least expenditure of resources and effort" [9]. This theory is only half true: yes, people like to minimize costs and

maximize benefits; however, such costs and benefits should also include factors beyond monetary assets (e.g. social status, expectations, personality, personal relationships, cultural and personal values) that significantly affect one's happiness or sense of fulfillment [9].

Furthermore, [11] contends that the relationship between the social and the economic plays a significant role in the process of identity formation: "The search [for identity] entails specific modes of acting and being that have particular subject effects," and people's identities "emerge *through* their engagement" in work, especially in the field of social work. The field of engineering not only solves technical problems but social ones as well. As such, it is important for engineering students to shape their identities by mindfully engaging with social and personal values in order to effectively take part in a professional industry that aims to solve social issues through designing and building in their respective disciplines.

However, [26] notes that a shift into prioritizing personal goals has led to a fetishization of passion in popular media. In a *New York Times* article, she writes: "As a psychologist who studies world-class achievers, I can say the reality of following your passion is not very romantic. It takes time to develop a direction that feels so in-the-bones right that you never want to veer from it. Thus, my advice to young graduates is not to 'follow your passion' but rather, to '*foster* your passion'" [26]. To this end, engineering educators can look for curricular and co-curricular ways to help students adjust their expectations and increase their patience as they search for a productive and healthy alignment between their personal and professional identities. This resulting alignment will add value to society in a holistic and meaningful way.

Implications

While Vision Venture's primary purpose is to demystify life after graduation for engineering students, by empowering students to imagine their future selves it can potentially increase student social engagement during their education and promote both retention in the major and persistence in the field after graduation. It is hoped that the project's online presence will increase the scale of its impact beyond the student participants. For instance, role model videos have been used to support positive awareness of STEM in a high school setting in a more scalable way than in-person presentations from STEM professionals [27]. Within a university context, the positive effect of role-model videos on under-represented minority student retention in STEM has been studied with the suggestive finding that "[h]igh-impact role model profiles… included more direct descriptions around transitions, both to college and then subsequently to the workforce, than their low-impact counterparts" [28]. Students will have spent their entire lives in a structured educational environment, so graduation will be a dramatic life shift: Vision Venture videos are intended to provide positive, realistic, and vivid examples of transitioning into the work environment.

Persistence refers to remaining in STEM across phases, such as from graduation to a job and from one job to another [29]. Today's engineering students recognize that they have a multitude of career options upon graduation and even more options once in the workforce [30]. In terms of career persistence, a study of working engineers who had participated in service learning as students found that those "whose expectations were not met were more likely to leave the

profession": the level of satisfaction was not alone a predictor of retention, but the relationship between expectation and satisfaction [31]. Comments from both alumni and students suggest that the structure an educational environment gives to (and enforces on) students for the majority of their lives can lead to a deep-rooted mindset that there is always a template for decision-making; in fact, this template disappears after the vanishing point as students find work and build professional identities. By presenting alumni's multiple perspectives and diverse life paths, Vision Venture can help engineering students have more informed expectations about life after graduation and understand more vividly the flexible and wide range of options open to them with their engineering degree.

[32] found a disheartening decrease in engineering students' engagement with public welfare during the course of their studies, attributed it to "three underlying ideological pillars: depoliticization, the technical/social dualism, and meritocracy," and used quantitative measures to make a strong case for these connections. However, the concept of the future self can add a qualitative dimension to this data. For instance, even students who enter engineering majors with a strong desire to improve the world through engineering may lose sight of that motivation while focusing on near-term demands of coursework–operating in "triage time" based on the pressing needs of their assignments and looming due dates [33]. Conscious and intentional alignment between personal goals and future career realities, in particular foregrounding a sense of meaningfulness through "helping people and society through their jobs" [34], might reinforce student public welfare engagement: viewing the recordings of alumni interviews may revitalize students' aspirations and help them nurture salient future work selves. As Vision Venture develops, this merits further investigation.

Conclusion

A limitation of this pilot study is its small sample size. The next phase of Vision Venture intends to increase both the number of interviews and the diversity of the participants. Growing in scale and scope will likely bring in new themes and extend existing themes, so the current inductive coding and thematic analysis will be revisited in future research. Additionally, following up with current student interviewers after they have been in the workplace for a few years could yield insight about the project's value. Ultimately, these videos will be shared online and potentially watched by many students; however, the project's full impact will remain unquantifiable. Given the nature of the project–it is at heart a qualitative and emic endeavor which may be widely shared on the internet, neither quantitative nor qualitative methods can fully capture its impact. Nonetheless, its animating principle fills a fundamental need in engineering education: educators should consider the empowering potential of future selves and the significant role personal subjectivities and social nuances play in shaping identities–in engineering and beyond.

Acknowledgments

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