What's your purpose? Redefining the being and becoming of future engineers through Professional Purpose

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STRUCTURED ABSTRACT

CONTEXT
There are a multitude of ways to support learners in self-development and their journey in being and becoming (e.g., Dall'Alba 2009) engineers. The Engineering Practice Academy is using a new construct called Professional Purpose. Professional Purpose is a mindset and mechanism for the development and articulation of an individual's career aspirations and is conceptually built from the construct of 'purpose in life' where individuals actively build meaningful life aims (e.g., Bronk 2011; Bronk and Mangan, 2016). In practice, we ask learners to write a descriptive statement on who they will be, personally and professionally, as future engineers (>5 years) at the commencement of their degree. They revisited this statement on a quarterly basis and updated it when their values and aspirations change. An advantage to this mechanism is that we can help learners reflect on all that they are - their whole-self – rather than a historically and socially pre-defined professional identity and call on them to diversify their vision of themselves and all engineers.

PURPOSE
The purpose of this study was to characterise the first-year learners' description of themselves as a future engineer.

APPROACH
This paper reports on first year students (n=24) personal and professional goals emerging from conventional thematic analysis of a series of written statements. It is snapshot and baseline at the start of a semi-longitudinal qualitative study to understand the being and becoming of future engineering professionals within our course.

RESULTS
Analysis of the statements revealed that the majority of students included a highly unique and wide range of aspired goals, outcomes, capabilities and attributes with a preference towards the personal and professional aspects. Across the cohort, learners focused on nonconventional areas such as lifestyle, travel, wellbeing, society and family as well as impacts to society and community (noted in Bronk 2011) and include generic, and somewhat idealised, aspirational statements like 'work hard' and 'achieve my goals'. There is a noticeable lack of focus on technical, design and analytical skills, on engineering, more broadly, and within a specialist engineering sector of interest.

CONCLUSIONS
Through this process, individuals can use their Professional Purpose to engage in personally meaningful goals and in supporting them motivationally through their journey in the degree and onwards into their career. At a fundamental level, this allows us to know who the learners are, as people and professionals. At a higher level, it allows us to structure the degree program around the aspirations and capabilities that our cohort possess – creating a unique learning experience supporting them as individuals – and supporting future engineers to push the boundaries of what engineering is.

KEYWORDS
Professional purpose, engineering identities, being and becoming, aspirations, career identity

Introduction

Professional Purpose is a mindset developed by Swinburne University and is core to their Transforming Learning Strategy. The Engineering Practice Academy (a.k.a., Academy) has piloted Professional Purpose activities within the Bachelor of Engineering Practice (Honours) degree program to support our learners' career development. The motivation for this initiative, and this research, is to widen the currently normative and socialised view of what an engineer does and who they define themselves to be. We are challenging the historically and socially pre-defined engineering identities and developing a cohort of broader, interdisciplinary and eclectic future engineers. Additionally, we embrace the likelihood that the future of work will mean that employees will likely have less predictable career paths, higher likelihood of cross-sector employment, and greater mobility, requiring individuals to possess and maintain self-defined career identity (Fugate et. al., 2004).

Our research aims to characterise the first set of Professional Purpose assignments (PPA; n=24) that include brief, descriptive statements on who the learners voiced they will be, personally and professionally five years into the future, as a baseline for future semi-longitudinal research into the being and becoming of engineering graduates throughout the degree. We ask: What career identities and professional purposes do learners bring with them? Three relevant bodies of work support this research: purpose in life, career identity, and being and becoming of professionals.

Supporting literature

Professional Purpose is conceptually built from the construct of 'purpose in life' where individuals actively build meaningful life aims (e.g., Bronk 2011; Bronk and Mangan, 2016). Bronk (2011) defines purpose as consisting of three key elements: Purpose as… 1) a personally meaningful life aim; the thing an individual is working towards, 2) a commitment of time, energy, knowledge, and resources to the pursuit of the purpose; in other words, active commitment, and 3) a central desire to pursue a larger cause or act in the world beyond the self; to have an impact beyond the self. To develop a purpose, researchers suggest personal development experiences that consist of goal setting, reflection and social learning (Bronk and Mangan, 2016; Kashdan and McKnight, 2009). Therefore, we are using Professional Purpose to ask learners about their personal, professional and broader social aims and career goals.

The Professional Purpose concept overlaps significantly with how people often describe career. The Academy embrace a broader view of career that "… includes life roles, leisure activities, learning and work" (Australian Blueprint for Career Development, 2010, p. 78). Career identity is 'who you are' including a composite of "goals, hopes, and fears; personality traits; values, beliefs, and norms; interaction styles; time horizons" (Fugate et. al., 2004, p. 20). However, we do not construct our career (e.g., Savickas 2005) in isolation; instead, during construction of our career identity the people, places and things in our environment influence us in this process.

Career identities tell "how the self of yesterday became the self of today and will become the self of tomorrow" (Savickas 2005) meaning that our career identities can change and adapt through time. Further, temporality is an essential feature of career identity because our career identities are the "stories people create to frame and give meaning and continuity to past, present, and future career related experiences" (Fugate et al., 2004, p. 20). Through Professional Purpose, the Academy allows learners to conceptualise their future, delineating multiple "possible selves" (Fugate et. al., 2004, p. 20) and aim to help them construct diverse career identities (Meijers and Lengelle, 2012) and become unique engineers of the future.

Becoming is an emergent process of identify formation (Vu and Dall'Alba, 2011) and is facilitated through professional education (i.e., university and other post-secondary opportunities). Dall'Alba states, "learning to become a professional involves not only what we know and can do, but also who we are (becoming). It involves integration of knowing, acting, and being in the form of professional ways of being that unfold over time" (2009, p.1). In this way, being and becoming a 'professional' in the twenty-first century is more than the acquisition of a collection of skills and facts that makes one career-ready (Vu and Dall'Alba, 2011). We embrace Dall'Alba's notion of being and becoming within engineering, and use Professional Purpose to allow learners to move beyond codified knowledge and standard professional skills. For us, it is about values, norms, interests, and relationships that makes us who we are: wholly unique individuals.

These bodies of work help to ground our understanding of Professional Purpose as a mechanism for uncovering existing learners personal and professional identities at the start of their degree, to allow us to observe changes in whether their experiences in the degree program are promoting or inhibiting diversity.

Methods

Our research was grounded in an interpretive paradigm (e.g., Creswell 2008) and focused on the individual subjective views of the self and the world. Here, we describe the results of a qualitative analysis study of 24 written Professional Purpose Assignments (PPA), which is the first dataset in a semi-longitudinal study. We will use the semi-longitudinal study to evaluate the series of learners' PPAs throughout their degree program allowing us to examine individual learner trajectories of being and becoming professionals in the Academy. Dohaney led the analysis of the data and used conventional content analysis (Hsieh and Shannon, 2005) that uses an inductive process where findings emerge from the data. In summary, we wanted to view Professional Purpose through the learners' eyes, their worldview, rather than ours.

The Professional Purpose Assignment (PPA)

The PPA was part of a series of scaffolded activities on professional identity and career development that we delivered during the first two weeks of the learners' first year of university. Activities included: a) guided reflections on career and life style, b) writing a 'letter to self' with the focus being themselves as a graduate, c) brainstorming personal, professional and social characteristics of self, d) construction of self-portraits (present and future), and e) construction of a blueprint from present to future self. These activities were core to the learners' transition into the degree program and the focus was as much on personal development, as on the development of professional and technical skills.

The PPA consisted of a brief written statement (<100 words) that learners submitted. Learners were asked to describe {their} **personal** identity (i.e., who are you as a person (i.e., citizen, learner)?)**, professional** identity (i.e., who are you as an engineer?) and **career** goals (i.e., what do you want to achieve in your career, into the future?). We asked learners to submit statements written in the first person, singular, future tense (i.e., "I will...") and asked that they use writing that is clear, coherent and easy to read by others. The PPA was a minor component (worth 1% of their final grade) of a larger assessment called the Individual Development Plan, that is a personalised learning assignment and worth up to 100% of the learner's grade in the first unit.

The PPA is primarily a formative assessment used by the instructor to promote identity formation and reflective practice throughout the degree. For this reason, it is assigned low assessment weighing to avoid superficial responses (aimed to please instructors) and instead for the learner to engage meaningfully in their personal development. Further, the PPA being a minor component of assessment also means increased trustworthiness in authenticity of the data for the purposes of the research presented in this paper.

Data collection and analysis

We invited all learners of the Bachelor of Engineering Practice (Honours) degree to participate in the research and there were no exclusion criteria. We were granted approval for this research from the Human Research Ethics Committee at Swinburne University of Technology. Learners submitted the first set of PPAs in February of this calendar year. We told them that participation in the research was voluntary, they could opt-out at any time, and that no identifying information would ever be shared during data analysis and in reporting of the results. We did not want to include any identifying information, including demographics, because the longitudinal nature of the research is about individual learners' development trajectories rather than comparative or cohort-level analysis. There is an inherent power relationship between the researchers (instructors) and the participants (learners) so to increase privacy and confidentiality of the data, the PPAs were sent to a research assistant, for de-identification (using an assigned code). This allowed Dohaney to analyse the data without knowledge of the participant's identity. Additionally, we assessed the data only after the grades were convened so that there was no influence on learners' grades.

The raw data were imported and analysed using ATLAS.ti qualitative coding software (Friese and Ringmayr, 2018). First, Dohaney read the PPAs several times at a 'surface-level' to obtain a sense of the breadth of topics covered across the dataset. This was followed by a second pass to read the data in greater detail, and record the first impressions of the data. Dohaney then began to generate *in vivo*

codes in the language used by the learners. *In vivo* codes were viewed in Network View (i.e., allowing many codes to be viewed spatially, at the same time) allowing her to group the codes into broader themes. Throughout this process, some codes were renamed, for clarity, some were split into separate codes, and while others were merged, (when they conveyed the same meaning and language). Once the data had been coded, Dohaney examined all data within each theme to check for consistency and coherence.

Dohaney undertook content analysis of the PPAs on the dataset obtained at the start of the learner's degree, so that we could characterise the cohort's breadth of Professional Purpose and engineering interests. Further, this acts as a baseline for our semi-longitudinal research and can show the changes of individual's Professional Purpose throughout the program. As a cohort, we looked for commonalities and differences in language and concepts that we grouped together into themes. Due to the PPA activity instructions (detailed above), Dohaney did not look at tense switching and usage, voice (first vs. third person), and the variable time span of the statements (i.e., 5-yr goals vs. 10-yr goals) or immediacy of the goals. We will examine this through further and semi-longitudinal research.

Results and discussion

We found several key emergent themes from the learner's description of their Professional Purpose that included: a) the things they want to achieve (i.e., goals and outcomes), b) the things they will be able to do (i.e., capabilities and skills), and c) who they want to be (i.e., personal attributes). We identified 278 unique statements and ideas (i.e., codes) with very little overlap in language use between participants (n=24). All major themes are included in Table 1 and Table 2 with accompanying representative excerpts.

Theme 1. Goals and outcomes

Many learners included their aspirational goals (136 unique codes) and the outcomes of their goals (40 unique codes) across a range of personal and professional aspects. The frequency of this theme is not surprising as the instructions of the activity specifically asked for their career goals. One important finding was that being goal-focussed can be one important ingredient to a learners' journey to developing a purpose (Bronk and Mangan, 2016; Kashdan and McKnight, 2009), but it can also be limiting and potentially narrow opportunities. We reflected on whether we should focus on aims rather than goals ("as a *life aim*, a purpose cannot be achieved. Instead, there are continual targets for efforts to be devoted" (Kashdan and McKnight, 2009, p. 304)). Shifting the language to *aims* would provide more freedom to the learners to focus less on achievement, and more on the learning journey.

Lifestyle

The most common goals and outcomes were concerned with lifestyle. The most frequently mentioned item of the whole data set was travel (12/24 participants) including other items such as wanting to experience the world and live overseas. Other idealised lifestyle aims included work/life balance, and spending time with family. Many of these lifestyle goals are analogous to career rewards, social identity and others outlined in Jawitz and Case (1998). It is important to note that lifestyle outweighed many of the other key themes including roles, capabilities and skills. This may be due to the types of learners that are attracted to and signed up for the Bachelor of Engineering Practice (Honours).

Non-specific aspirations

The next most common goals and outcomes included by the learners were non-specific and somewhat generic aspirational statements. Aspirations are idealised values (Marjoribanks 1998) or hopes for the future (Gorard et. al., 2012). De Ruyter and Conroy (2002) discusses the importance of aspirations in the formation of a sense of self where aspirations allow us to clarify what kind of person we wish to be and interrogate how you might achieve an 'ideal identity'. However, the aspirations identified in the dataset were not concrete or specific and often highly idealised, which raises the question do these statements build expectations for the future that an engineering degree or career may not deliver? Future analysis of PPA through time will allow us to track inclusion of aspirational statements, from the vague to the specific.

Roles and projects

One of the most striking findings from this work is the lack of the term engineering throughout the PPA data. Only 14/24 participants mentioned the words engineer (i.e., (be an) engineer (8/24) or engineering (i.e., (work in) engineering (8/24)) resulting in 42% of the participants not mentioning

engineers or engineering at all. Four participants include careers outside of engineering within the arts, community, service, and business sectors. There are many reasons that leaners may not (yet) see themselves as engineers. Formation of an identity takes time and individuals are continually crafting and re-crafting career identities and narratives throughout their life (LaPointe 2010). As the majority of the participants are just recently graduated from high school, it may be that the learners who did not use the term engineer still see themselves as a 'student' over a relatively new identity as an 'engineer', even when projecting five years into the future. Alternatively, they may be studying engineering as something that they enjoy but not as a decided career path yet (i.e., not committing to their future as an engineer). Lastly, an additional contributing factor may be the nature of recruitment and induction programme, which we use in the degree that openly discusses multiple career pathways for the graduates of the program into project management or other sectors.

Learning

Self-development was a key part of the PPA dataset, including the learning subtheme that consisted of skills and knowledge that learners would learn, into the future. As the learners are currently studying towards a degree, it is no surprise that they would include and focus on what they will learn between the present and the near future (>5 years). It is worth noting that the topics and skills they want to learn are not engineering-specific.

Society and community

The last subtheme within goals and outcomes was concerned with how the learners would work with and make an impact on society and their communities. The language choices in this subtheme are important. Some used language like 'bettering', while others said 'supporting'. Grandiose statements like "save the world" and "save the environment" were also included. These subtle differences pick up on the contrast between cosmopolitan vs. post-cosmopolitan views (e.g., Dobson 2003) of how engineering can make a positive impact to society. The increased interest in global development in engineering has led to initiatives that cause deeper inequalities (Nieusma and Riley, 2010). This finding is important for our teaching, as we can address their thinking and values approaching local and global development engineering initiatives and investigate what their goals and outcomes are, and what they want to achieve to ensure sustainable and equity-focussed efforts rather than self-aggrandising experiences.

Table 1: Goals and Outcomes Subthemes

Subthemes (*unique codes)*	**Representative excerpts** **"I will…"**
Lifestyle *(75):* Goals and outcomes related to the way in which people live and work, consisting of:	
a. travel *(12),* b. outdoors activities *(5)*, c. physical health *(4)*, d. wellbeing *(6),* e. social life *(5),* f. family *(8),* g. career lifestyle *(12)*, h. financial wellness *(7).*	a. "travel around Australia." b. "spend time in the bush." c. "spend time on my health and fitness." *d.* "have work/life balance." *(4)* e. "increase the diversity of my social circles." f. "spend time with family." *(4)* g. "have a fulfilling career." or "overall job satisfaction." h. "have financial stability."
Non-specific Aspirations *(31)*: Non-specific aspirational goals and outcomes:	
a. ways of working *(9),* b. prominence *(5)*, c. recognition *(4).*	a. "achieve my goals." *(4)* or "work hard." *(3)* or "choose my field." *(3) or* "be challenged every day." b. "be influential in my field." or "be ahead of others." c. "be loved." or "be accepted."
Roles and Projects *(26):* Goals and outcomes related to:	
a. job roles *(14),* b. sectors *(5),* c. projects *(7).*	a. "be an engineer." or "be a project manager." b. "work in the hydraulics industry." c. "work on government and grassroots projects."
Learning *(24)*: Goals and outcomes related to:	
a. knowledge *(7),* b. skills *(7),* c. personal interests *(3).*	a. "improve my breadth and depth of knowledge." b. "learn new skills." or "improve my people skills." c. "find tasks that genuinely interest me."
Society and Community *(19)*: Goals and outcomes related to:	
a. community, b. society and 'the world'	a. "help people in my community." b. "make the world a better place."

Theme 2. Capabilities and skills

The second major theme of the PPA data, which we identified, are capabilities and skills *(72)* (Table 2). We defined capabilities and skills as what learners are able to do in the future. Complementing the themes above, we found that there was very little focus on what might be considered, by some, as engineering skills (i.e., technical- and discipline-based). There is much more focus on self, extracurricular and work-related skills, namely time management and teamwork.

Table 2: Capabilities and Skills Subthemes

Subthemes *(unique codes)*	**Representative excerpts** **"I will be able to…"**
Work *(25):* related to professional skills such as:	
a. time management *(9),* *b.* teamwork *(8).*	a. "complete tasks in a punctual manner." b. "contribute to a team." or "become a better team leader."
Extracurricular *(20):* related to extracurricular activities such as:	
a. sports *(8)*, b. arts and crafts *(6),* *c.* social activities *(5)*	a. "play cricket." b. "get good at the guitar." c. "enjoy activities with friends"
Self *(21):* related to self-development areas such as:	
a. personal development, b. reflective practice, c. self-regulated learning.	a. "continue to develop myself as an individual." b. "help {the} community around me." c. "see where I have been and where I can go."
Thinking *(5):* related to having the ability to use thinking approaches to improve judgements and decision-making processes.	
	"ask more questions and seek assistance." or "contribute well-thought through ideas."
Process *(4):* related to processes needed for engineering, such as research, design, making, and operating	
	"construct objects from scratch." or "design environmentally sustainable engineering solutions."
Discipline *(3):* related to core engineering skills and knowledge (e.g., physics, maths, or coding).	
	"understand the mechanics of objects." or "be more competent in maths."

Theme 3. Personal attributes

The last, and least frequent, theme we found was personal attributes (28) that we defined as adjectives and language people used to describe themselves. Examples include: {In the future, I will be} "a resourceful team member" or {I will be} "an adventurous person". These statements speak directly to 'who they are' and could help the learners to define a personal and career identity. Three participants had personal attributes as the majority of the themes and subthemes in their statements, one of whom focused on how others would describe them: "I will be reliable … helpful for colleagues … supportive of others … a pleasant person to work with". Here, they are explicitly describing their future self – who they aspire to be which provides us with a glimpse into their early process of being and becoming.

Conclusion

We analysed 24 learners PPAs and showed that learners in the Bachelor of Engineering Practice (Honours) program entered with broad, unique and diverse aspirations of their future self that were primarily focused on personal and professional development, rather than engineering-specific goals, skills and attributes. The findings here are relatively context-specific. However, similar approaches maybe be used in other engineering programs to promote identity development and encourage diversity of being and becoming through reflection. We suggest asking your learners:

Imagine yourself five years into the future, in your first year as a graduate…
How will other people describe you? What attributes will you have? What will you have learned? What will you be able to do? What skills and capabilities do you have? What specific roles will you be in? What projects do you want to be working on? What personal lifestyle will you have? What are your aspirations for your future? What impact will you have on society?

We uncovered many questions during this research. Two key questions include: 1) Will our learners become increasingly diverse and unique or will they become more homogenous and socially-conforming as they make their way through the degree program, in their Professional Purpose and career identities? 2) How do we continue to support and encourage individuality within our program through a whole-person approach? Professional Purpose allows us to peek in the window of learner's future and ideal career identity, which goes beyond the work that they do, but also the lifestyle that they have. We hope that as they progress through the degree program, they continue to challenge the notion of what engineering is, who they are, and what they do and construct career identities that are aligned to their own ideals and values.

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