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First year engineering students: Perceptions of engineers and engineering work amongst domestic and international students

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Abstract

Despite being well ahead of many other disciplines in establishing strong and evidence-based research and practice, engineering in many countries still experiences high rates of student and graduate attrition. One possible reason for this is that students enter engineering study without understanding the realities of either their degree program or engineering work, and without a sense of motivation and commitment. The research reported here aimed to extend understanding of first year engineering students' thinking about their competencies, identity, self-efficacy, motivation, and career. The study involved over 1,100 first year engineering students enrolled in a common first year unit. Responses were coded using the Engineers Australia graduate competencies as a framework, and this paper reports findings from the most diverse cohort of students (n=260), of whom 49% were international students with English as their second language. The research identified differences between international and domestic students' perceptions of self and of career competencies, possibly related to self-esteem. Implications include improved confidence and motivation to learn as students consider their strengths, interests and goals. Further, the research raises the need for analysis of international students' cultural and educational background to determine how different cohorts of international students self-appraise and how they associate learning with their future careers.

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Introduction

The ability of students to plan their future lives and careers develops alongside their formation of identity and requires future-oriented thinking. Educators find that students vary greatly in this respect, with some students having a diffuse identity and little notion of what the future might hold and others starting university with a foreclosed (rigid) career identity that is barred to scrutiny (Marcia, 1987). These factors undoubtedly influence students' abilities to negotiate the first year of university study, and yet it would be simplistic to assume that they influence all students in the same way or to the same extent.

First year students are known to struggle with the different learning contexts at school and university. These different schemas contribute to identity uncertainty (Schutz & Luckman, 1973), particularly for students who do not have a sense of university life and the expectations of study. This "cultural capital" is more established in students from higher socio-economic backgrounds, those who are not the first in their family to attend university, and those who attend university in a local or familiar setting: In other words, students "from families and social environments which equipped them with the cultural capital to fit comfortably into the lifestyle and expectations of the university" (McInnis & James, 1995, p. 108).

The discipline of engineering has established strong and evidence-based research and practice relating to the student and graduate experience, and yet attrition from Australian bachelor-level engineering programs persists at around 35% and only 60% of engineering graduates work in engineering-related roles (Godfrey & King, 2011; Trevelyan & Tilli, 2010). Male and Bennett (2013) have suggested that these high attrition rates reflect students entering engineering study without a sense of motivation and commitment, and without understanding the realities of either their degree program or engineering work. In later empirical research, the same authors (2015) found many engineering students to be pre-liminal in their thinking about the sense of purpose of their studies. Adding weight to the previous research, students demonstrated limited knowledge about the roles of engineers, doubts about career and course choice, and concern because they believed their skills to be deficient. These factors aligned with three engineering threshold concepts identified by Parkinson (2011).

The studies mentioned above were conducted with university student cohorts that happened to be largely domestic students with English as their first language. The focus here is a first year engineering cohort (n=260) of whom 49% were international students with English as their second language. As such, this paper attempts to explore potential differences between domestic and international students. This aim is first addressed by way of an overview of the research undertaken thus far, including some of the emergent themes. Then the article presents and discusses the results of the study. We conclude by considering what this means for first year cohorts of domestic and international students and the value of incorporating identity development within existing courses. Implications include improved motivation to learn as students (re)conceptualise their strengths, interests and goals, and specific strategies to take into account the role that cultural and educational background play in how international students associate their learning with their future careers.

Background and context

Educational institutions provide the learning foundation upon which competence for a professional engineering career is established; however, understanding how students position their learning in relation to their future careers is a neglected area of research. Working with first year engineering students in their first semester of study, this study aimed to extend understanding of students' thinking about competencies, identity, self-efficacy, motivation, career preview, and their aspirations and fears relating to engineering practice. We hoped that opening a career dialogue with students would prompt more career-oriented conversations and questions from students. Finally, we anticipated that by understanding our first year student cohort's confidence level in relation to the Engineers Australia (EA) graduate competencies (Engineers Australia, 2011), we would be able to proactively bridge some of the gaps between education and graduate competencies. By working across a large student cohort, we hoped to compare responses from domestic and international students to see what, if any, differences emerged. If present, these differences would inform future research, pedagogical practice, and student support.

The study extended previous research (Male, 2012; Male & Baillie, 2011; Male & Bennett, in press; Parkinson, 2011) that explored three troublesome and inter-linked threshold concepts critical to engineering student achievement: namely, students' understanding of the *roles of engineers*; students' perception of the *value of learning* new material; and the need for *self-directed learning* both as students and into professional life. Later, Male and Bennett's (2013) investigation of students' self-efficacy and the development of salient identity concluded that the engagement of students in future-oriented thinking and self-reflection prompts a reorientation of learning in relation to engineering futures.

International students

In 2013, international students accounted for 18.8% of the Australian university population. This included over 14,000 students in engineering and related technologies (Australian Government, 2014). Difficulties encountered by international students are known to include differences in culture, language and social environment, homesickness, the loss of personal support structures, and negotiating a new educational system (Facchinetti, 2010). Moreover, Khawaja and Dempsey (2008) have found that international students encounter "greater incongruence between their expectations and experiences of university life" (p. 31). These difficulties are most pronounced within the first year of higher education, and over the past decade this realisation has resulted in many initiatives to support first year students (Scutter, Palmer, Luzeckyl, Burke Da Silva & Brinkworth, 2011). Some initiatives have included research with both international and domestic students, revealing that common first year challenges may be significantly more troublesome for international students than for their domestic counterparts.

Self-esteem

Of particular relevance to the current study, which focused on perceptions of both self and career, Murff (2005) considered the difficulties faced by international students and found their self-esteem to be negatively impacted. It is possible, therefore, that international students self-assess more negatively on their skills and attributes,

including those relating specifically to their development as professionals within their chosen discipline. This finding resonated with observations made by the authors of the study reported here. As experienced teachers in the engineering foundations year in which the current study was situated, we had observed a marked difference between how domestic and international students interpreted learning outcomes and associated assessments and activities. Our desire to explore and evidence these observations was buoyed by McInnis's (2010) call for empirical research: "What we now need, however, are studies of how the diversity adds value to the first year experience for all students, and how it can change the nature of adjustment and transition issues" (p. 110).

Approach and theoretical framework

The study adopted the theoretical framework of *Possible Selves* (Markus & Nurius, 1986) to encourage students to examine their perceptions of self and career. The *Possible Selves* framework is an established, forward-oriented approach toward identifying both desired and feared conceptions of self. The framework depicts how people plan towards realising their future personas and achieving their career aspirations (Schnare, MacIntyre & Doucette, 2012). Consistent with a social constructivist view of identity development (Dunkel & Anthis, 2001) wherein people actively create their personal realities as they interact with others, the framework has rejuvenated debate about what people hope to become, expect to become, or fear becoming in the future. We hoped that the future orientation of possible selves would help explain the significance of the previously identified threshold concepts and would encourage students to take an active role in developing future selves, considering these in relation to their learning.

This study involved research with 1,100 first year engineering students at a large urban university in Australia. Reported here is a sub-sample of the most diverse cohort comprised six classes of students (n=260) of whom 49% were international students with English as their second language. Only 20 students were mature learners and 34 (16%) were female. For the purposes of this study, we adopted the terms "domestic" and "international" and define these cohorts as they are defined for the purposes of enrolment and funding across Australian higher education. As such, an Australian domestic student is an Australian or New Zealand citizen or an Australian permanent resident whereas an international student is a temporary resident (visa status) of Australia, a permanent resident (visa status) of New Zealand, or a resident or citizen of any other country.

The students were enrolled in a first year, semester-long unit titled *Engineering Foundations: Principles and Communications* (EFPC). The unit forms part of the common Engineering Foundations Year (EFY) program, which provides students with the basic skills needed for engineering practice and leads to discipline-specific engineering studies from the second year. The generic skills and concepts developed in the EFY are designed to support interdisciplinary communication, reflexive practice and teamwork.

The unit is divided into four stages, which cover design, tendering, construction and performance testing. Students work in groups of four or five, forming and managing their own "companies", which

respond to a client brief for a vehicle or bridge. Each company tenders to three other companies, constructs its design once the tenders have been allocated, and tests its final product.

Learning outcomes are aligned with the professional competencies for graduate engineers (Engineers Australia, 2011). This provides an ideal framework against which students can gauge their professional development and begin thinking as student engineers. It enabled the researchers to observe students' thinking and to identity any differences between different student cohorts. The EA competencies developed and assessed during the EFPC unit are presented at Table 1.

In this article, we discuss responses to the questions that explored students' perceptions of professions in their field of study. Our major research question was prompted by observations that international students self-assess more negatively on their skills and attributes. We asked:

What, if any, differences are there between the responses of domestic and international engineering students in relation to perceptions of self and professional?

Three sub-questions addressed the themes for exploration:

- *How do students characterise an engineer?*

Table 1: ***Unit learning outcomes as they relate to graduate engineering competencies***

Competency	Knowledge and Skill Base (EA1)		Engineering Application Ability (EA2)		Professional and Personal Attributes (EA3)		
Element	1.2: Understanding of the scope, principles, norms, accountabilities and bounds of sustainable engineering practice	1.6: Conceptual understanding of the mathematics, numerical analysis, statistics, and computer and information sciences	2.2: Fluent application of engineering techniques, tools and resources	2.4: Application of systematic approaches to the conduct and management of engineering projects	3.1: Ethical conduct and professional accountability	3.2: Effective oral and written communication in professional and lay domains	3.3: Creative, innovative and proactive demeanour
Project stage 1							
Project stage 2							
Project stage 3							
Project stage 4							

- *What differences do students perceive between their characterisation of an engineer and themselves as individuals?*
- *In what ways do students relate their learning to their development as an engineer?*

At the start of the unit, students participated in one of six 2.5-hour workshops in which they completed a number of activities and reflections, and they were invited to submit copies of their written responses for analysis. Of the 260 students, 210 (81%) students returned responses to one or more of the data collection instruments. The length of student responses ranged from short-response answers to paragraphs of text. This elicited multiple forms of data including individual reflections, discussion observations and group responses. Ethical approval was obtained prior to the commencement of the study, and participation in the study was entirely voluntary. Participating students signed a consent form and were assured of their anonymity. Students were able to withdraw at any time.

This was a transcendental phenomenological study (Creswell, 2007) involving analytical procedures as described by Moustakas (1994). This approach emphasises belief in the data as reported by participants and begins with identifying key statements and clustering them into themes and meaningful units. Analysis of the qualitative material involved inductive content analysis through which key statements were identified and then clustered into themes and meaningful units. Each researcher then conducted initial deductive coding of the responses using the EA stage 1 graduate competencies and a-priori codes from a previous study (Bennett, 2012) as a thematic framework. Codings were compared and refinements applied. This led to a final codebook and a database using Statistical Package for the Social Sciences (SPSS) quantitative software version 22.

Results

The results section first presents students' perceptions of the characteristics of an engineer, followed by perceived differences between self and engineer. These are aligned with graduate engineering competencies (Engineers Australia, 2011) and additional elements created for those responses that did not align with the EA framework. We then consider students' sense of purpose in relation to the relevance of the unit for the development of their professional selves. In each case, the responses of domestic and international students are separated so that any differences between the two cohorts can be seen.

Student perceptions of the characteristics of an engineer

Students were asked to list up to three characteristics of an engineer. There were 295 responses from the international cohort and 325 from the domestic cohort (an average of 2.95 characteristics per student). As seen in Figure 1, 86% of all responses elicited in all categories related to EA competency 3 (EA3): *Professional and Personal Characteristics* (EA3). For example, engineers were described as having *"good organisation skills"* and being *"reliable, "innovative"* and *"thorough".* Of interest, only 4% and 11% of total responses belonged to the EA competencies *Knowledge and Skill* (EA1) and *Engineering Application Ability* (EA2) respectively. Responses for each competency were aligned with the EA competencies and

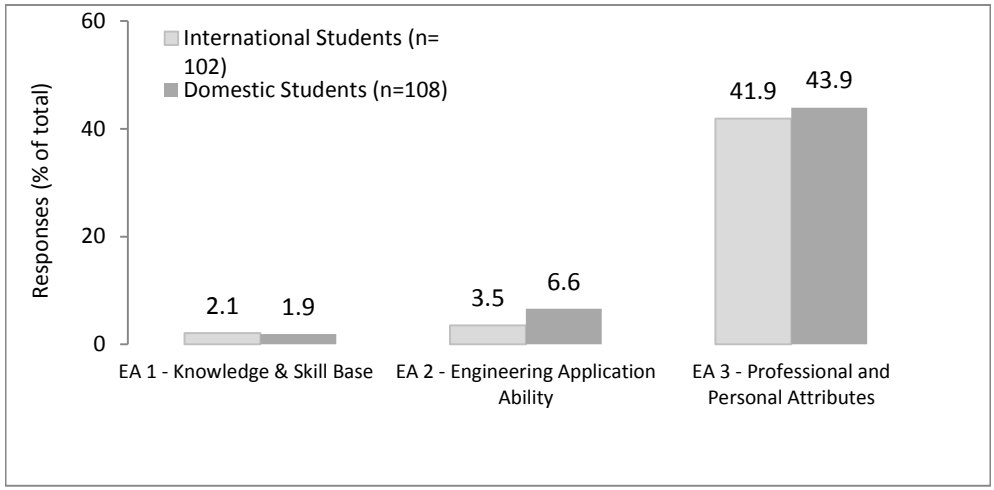

***Figure 1*: Student perceptions of the characteristics of an engineer, coded to EA competencies**

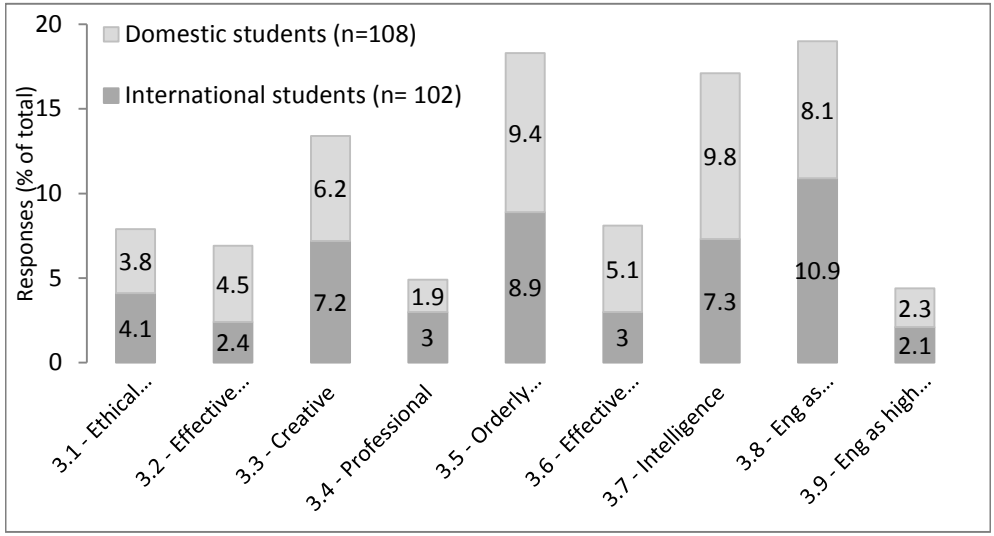

***Figure 2*: Perceived individual elements of EA3 as a percentage of total responses**

additional elements. Total responses were calculated as *c/d x 100, where*

c = Number of responses for that competency/element

d = Total number of responses for that competency/element

Analysis of responses within EA3, shown at Figure 2, reveals student responses that

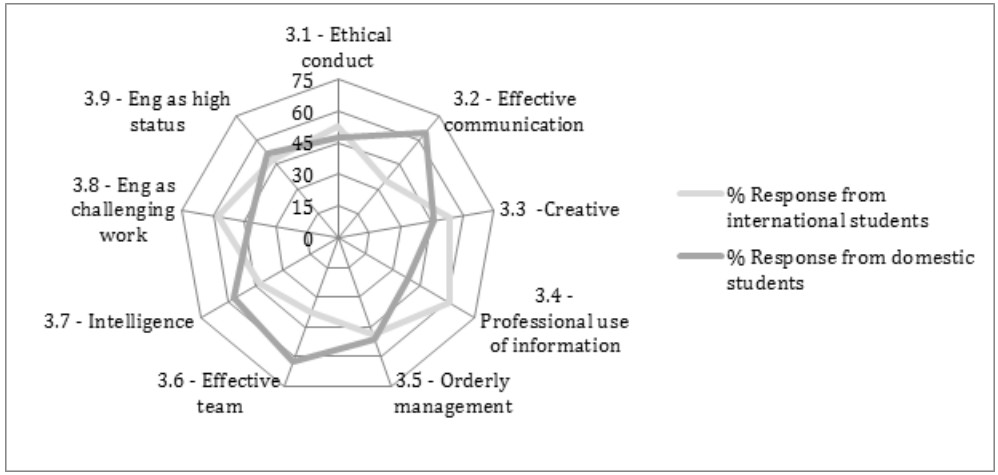

Figure 3: **Student perceptions of EA3 elements (% of total responses)**

aligned with professional and personal characteristics but did not fit under any of the existing elements within this competency. These were categorised using a-priori codes (Bennett, 2012) as additional EA3 elements titled *Intelligence* (3.7), *Challenging Work* (3.8) and *Engineering as High Status* (3.9).

Also shown at Figure 2, students regarded the elements *Orderly Management* (EA3.5), *Intelligence* (EA3.7), *Challenging Work* (EA3.8) and *Creative, Innovative and Pro-active Demeanour* (EA3.3) as the most important characteristics of engineers.

Analysis of responses for each EA3 element determined whether there were differences between responses from international and domestic students when identifying characteristics of an engineer. The response value for each cohort was calculated as *c/d x 100 where*

c = number of responses for an element for a particular cohort and

d = total number of responses for that element for both cohorts

This breakdown of responses at the level of EA3 elements yielded some differences between the international and domestic cohorts (Figure 3). When compared with domestic students, the number of responses from international students was higher by 23% and 15% for EA elements 3.4 and 3.8 respectively. Conversely, for elements 3.2, 3.6 and 3.7 the percentage of responses was lower for international than domestic students by 30%, 26% and 14% respectively.

Perceived differences between self and engineer

In the first year of study, differences between self and professional (in this case an engineer) are to be expected in terms of skills and knowledge to be developed through the degree program; however, differences may also relate to self-efficacy. This is an important consideration in studies that involve international students

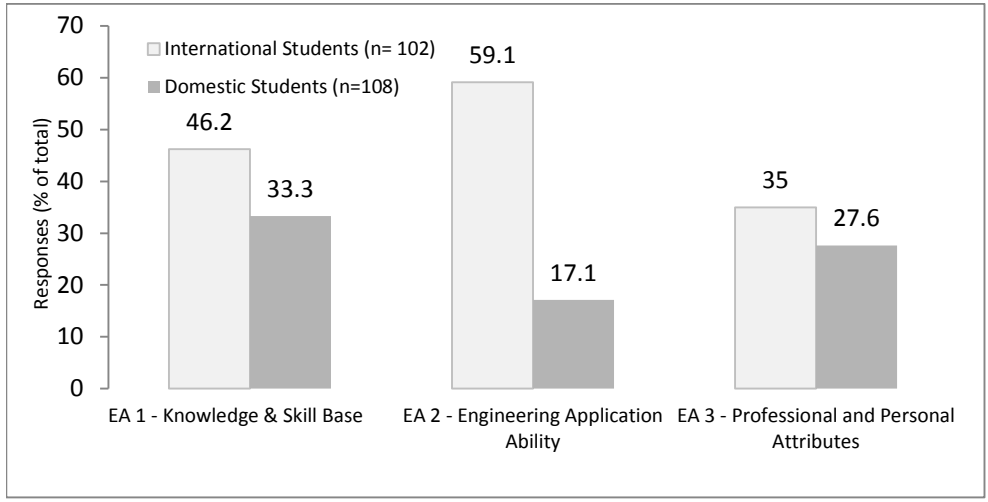

Figure 4: **Perceived differences between self and engineer (% of total responses)**

as previous research has suggested that the self-efficacy of international students may be negatively impacted by the challenges of first year study (cf. Murff, 2005).

Asked to list any perceived difference between an engineer and themselves as individuals, international students identified 100 differences and the domestic students identified 85. Mapping against EA competencies, the gap value for each competency/element was calculated as *e/f x 100 where*

e = Number of responses, in that cohort, to "What differences are there (if any) between the above characteristics and you as a person?" and

f = Number of responses, in that cohort, to "Name three characteristics of an engineer."

Figure 4 illustrates international and domestic students' perceptions of all three EA competencies when asked to list perceived differences between self and engineer. Compared with domestic students, the number of responses from international students was higher for all three competencies: 13% higher for EA1; 42% higher for EA2; and 7.5% higher for EA3. This suggests that international students perceive a greater gap between the attributes they possess and those of an engineer, particularly with respect to EA2: the application of their engineering abilities.

Further analysis of perceived differences within competency EA3 (Figure 5), on which the majority of responses focused, suggests that the most pronounced differences between domestic and international students relate to *Orderly management of self* (16.6%) *Engineering as challenging work* (15.3%), *Engineering as a high status role* (13.6%) and *Ethical conduct* (10.5%), which related to money and status. The percentage responses presented in Figure 5 indicate that international students self-assessed more negatively than domestic students for seven of the nine elements.

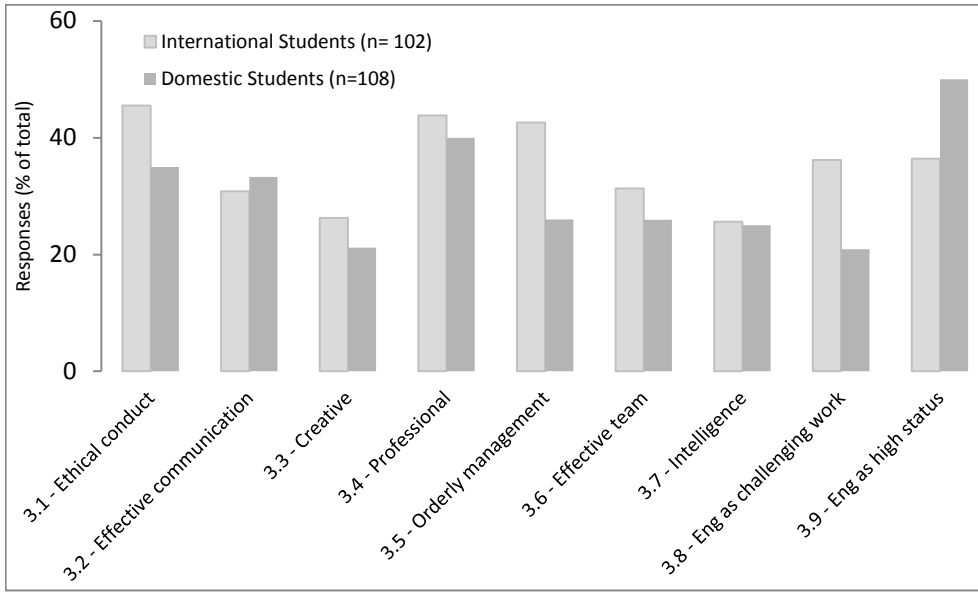

Figure 5 **Perceived differences between self and engineer for EA3 and additional elements**

Sense of purpose: Relevance of the unit to the development of professional self

Students were asked: "How might learning in this unit contribute to your development?" Shown in Figure 6, there were 139 responses from international students and 149 from domestic students. Responses were mapped against EA competencies and additional elements. Students' perceived learning outcomes were calculated as g*/h x 100 where*

g = Number of responses identifying a competency/element

h = Total number of responses for that competency/element

Twenty-two per cent of the total responses from international students and 21% from domestic students indicated that learning in this unit would help with effective team membership (EA3.6). This is most probably because through the company-based structure of the unit they expected to learn

… how to cooperate with others; and

…help organise the design and work as a group.

Responses from 37% of international and 43% domestic students reflected their belief that the unit would also help them develop effective communication skills (EA3.2) in that it would

…improve communication skills

…gain confidence in oral presentations

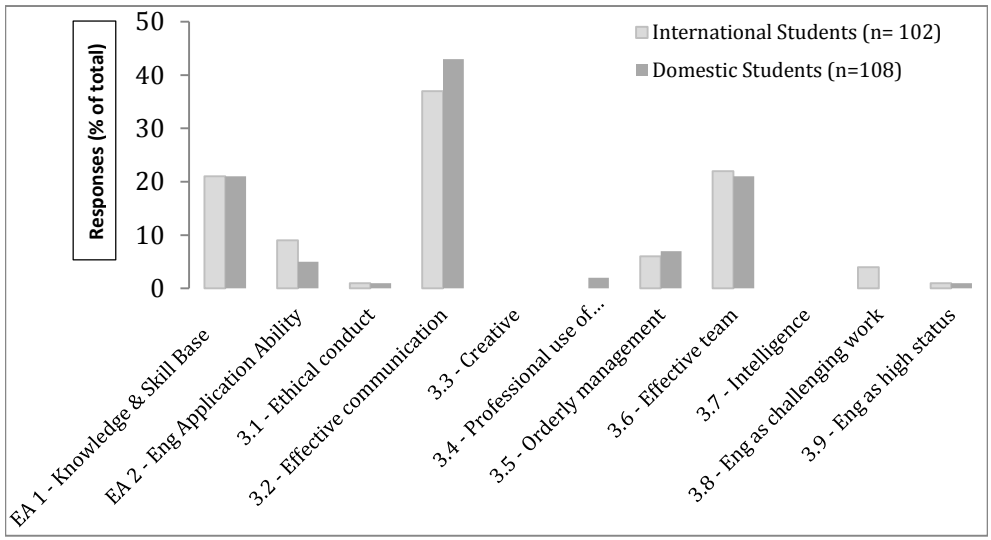

Figure 6: **Perceived unit learning outcomes as % of total responses for each cohort.**

...understand each other ideas; and

...help with report writing

A smaller percentage of responses (9% international and 5% domestic) identified the relevance of the unit with the EA2 competency, which as reported earlier was of far greater concern to international students than their domestic counterparts. The unit outline described element EA2.4 as a project management competency. Data suggest that some students associated this skills development with their individual competencies (EA3.5) rather than from a company perspective as a contributor to a team or company (EA2.4). As such, they focused largely on developing "time management skills" and "project management skills."

Discussion

This study aimed to extend understanding of first year engineering students' thinking about their competencies, identity, self-efficacy, motivation, and career. We also sought to learn whether observed differences between international and domestic students were borne out in empirical research. In the discussion section, we bring these factors together first, under two key themes: awareness of engineering practice and the perceived relevance of the unit in students' development; and second, in differences in the perceptions of international and domestic students.

Awareness of engineering practice and perceived relevance of the unit

Responses to the question of how students perceive engineers and themselves as individuals were relatively low for the competencies *Knowledge and skill base* (EA1) and *Engineering application ability* (EA2), focusing instead on *Professionalism and personal attributes* (EA3). This suggests a general lack of awareness about the technical skills and knowledge demanded by engineering work, but it may also relate to the inward-focus of adolescents during the period of emerging adulthood (Arnett, 2000). The lack of career preview aligns with Male and Bennett's (2013) observations that students may enter university without a clear idea of their future career-selves and that they may need help to develop this thinking.

It is of some note that the first year students were more focused on characteristics related to professional and personal attributes. This may also stem from the implementation of foundation units that are explicitly associated with the outcomes developed in the Stage 1 (graduate) competencies (Engineers Australia, 2011). Indeed, asked how the learning in their unit might contribute to their development as engineers (Figure 7), the majority of students identified the unit learning outcomes with the EA3 professional and personal attributes. Responses related to the EA1 competency of *Knowledge and skill base* intimate that first year engineering students are aware this will be part of their learning; however, it also highlights the need for educators to spend time establishing the relevance of each unit of study.

The students completed the questionnaires in the first week of the unit and in their first semester of study, and they were not expected at this early stage of study to have developed a deep understanding of the engineering competencies or the unit learning outcomes. That said, as shown at Figure 6, both cohorts of students understood the learning outcomes of the unit; there were no significant differences between domestic and international students. Both student cohorts identified learning outcomes (21% of total responses) that contributed towards EA1 competencies (technical skills and knowledge). The following quotes typify

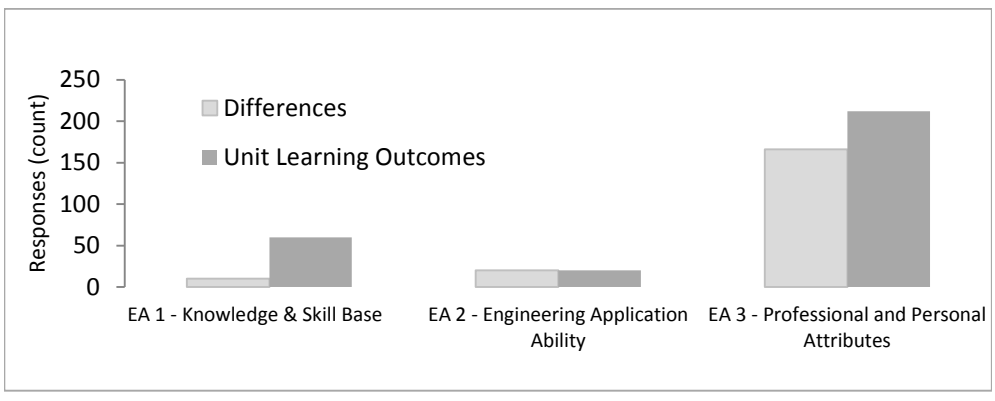

Figure 7: **Perceived differences and unit learning outcomes (count, *n*=212)**

what the students thought the unit would develop:

… provides the basics and foundation of what engineering is and it helps us to understand what qualities we need as well as understand the scope of engineering; and

… basics are always the foundation, the most important part.

Closer inspection of competency EA3 reveals that some elements scored more highly than others. For example, *Engineering as challenging work* was commonly mentioned, whereas P*rofessional use and management of information* received far less responses. This is perhaps to be expected because students have yet to develop an understanding of their chosen career. It is interesting, however, that students did not identify either of these elements as being a learning outcome of the EFPC unit despite their inclusion in the learning outcomes.

It is also of concern that *Ethical conduct and professional accountability* elicited just 8% of the total responses across both international and domestic cohorts when identifying characteristics of an engineer (Figure 2) or perceived learning outcomes (Figure 7). This aligns with Stappenbelt's (2013) finding that engineering undergraduates lack awareness of aspects of professional ethics, and implies that education programs in engineering need to enhance student consciousness in this area.

An interesting finding is that despite students' recognition that creativity as a characteristic of an engineer, they did not identify creativity as a difference between themselves and an engineer, nor did they identify it as a competency they expected to develop. This differs from our previous work, which found many engineering students to be troubled by a perceived lack of creativity (Male & Bennett, 2013). An insight into how creativity is viewed by high school students entering an engineering academy suggests that engineers are not in fact seen as being less creative than artists (Harlow, Scott, Peter & Cowie, 2011). A tentative conclusion is that these first year engineering students, while recognising that creativity is a feature of engineering practice, already feel confident in this area. This is a finding that merits further research at the discipline and program level.

International and domestic students responded differently when considering the characteristics of engineers: for instance, international students were less likely to perceive the work as challenging. Conversely, international students perceived engineers as being intelligent more often than their domestic counterparts. This variance may reflect cultural differences. It has been reported, for example, that while western cultures view intelligence as a fixed attribute, in Eastern countries it is often viewed as malleable (Willingham, 2009). Therefore, international students may relate intelligence to the ability and necessity to work hard rather than to the ability to reason. This variation is likely to have influenced multiple response questions, particularly as students were in their first year of study. Cultural and educational background needs to be considered when analysing future data.

We also note general misconceptions relating to the stereotyping of international students. For instance, Kember's (2000) exploration of why Asian students are regarded as "passive learners" who are conservative in their approach to western learning methods provided evidence that students need time to adapt to new forms of teaching and learning. For first year, first

semester studies such as the one reported here, students are almost certainly still adapting. Students' abilities to visualise themselves and their profession relates to the development of socio-cognitive strategies. These strategies emerge as a critical consideration for first year students, who are negotiating a new schema. They are even more critical for international students, who do not have the cultural capital of their domestic peers and who may have moved away from familial support structures.

Differences in the self-perceptions of international and domestic students

The study revealed significant differences in the self-perceptions of domestic and international students, with the latter expressing far less confidence in their skills and attributes when compared to their domestic peers. International students regarded themselves as lacking in all three of the EA competencies: *professional and personal attributes*, *knowledge and Skill*, and *engineering application ability*. Moreover, international students perceived themselves to be deficient in seven of the nine EA3 characteristics.

On the surface, it would appear that international students have lower self-esteem, as observed by Gholamrezai (1995); however, confidence in English language competency is another likely factor. That international students mentioned *Effective communication* less than domestic students was somewhat surprising as we know that communication in the workplace is particularly difficult for students whose first language is not English. The communication theme is one deserving of further research, and the addition of a further cohort in 2015 will enable more nuanced analysis of international students in terms of cultural and education background. Work Integrated Learning scholars would support this deeper analysis. For example, Gribble (2014) has remarked on the poor standard of professional workplace communication skills among, specifically, international students from non-commonwealth countries, and that this manifests itself in what employers regard as inadequate communication skills. It is also quite possible that international students from non-English-speaking countries are aware of the importance of communication skills in the workplace and are not confident that they will meet the required standards before beginning work. This reinforces recent recommendations (cf. Gribble, 2014) regarding the need for engineering undergraduate courses to incorporate the development of English language proficiency throughout the curriculum.

Intelligence is one area where international students expressed as much confidence as domestic students (see Figure 5). As mentioned previously, cultural differences have been reported in the perception of intelligence (Sternberg, 2004). This highlights the need to consider how differences in cultural and educational backgrounds contribute to how students perceive themselves and their future selves for all the characteristics discussed above. Rambruth and McCormick (2001) have signalled that this translates into learning diversity that requires inclusive teaching and learning strategies, and the work of Kember (2000) seems to reinforce this call.

Another point to consider is that international students cannot be regarded as a homogeneous group as they represent a range of countries (Australian Bureau of Statistics, 2011). Likewise, the domestic cohort will include cultural diversity. The

fact remains that engineering students in many Australian universities have little exposure to engineering practice in the early years of engineering study, and the international students undertaking university studies in Australia are predominantly from the Asian and Middle Eastern countries (Australian Education International, 2010). Although we expect that the importance of exploring possible future selves and self-efficacy crosses international boundaries, the above factors indicate that students' awareness and self-efficacy could differ across contexts. Education institutions must consider the cultural and educational perspectives of students when developing and refining their programs. Future studies should, therefore, include a comprehensive profile of each student's cultural and educational background. The transition between students' actual identity and their designated identities, which have the "potential to become a part of one's actual identity" (Sfard & Prusak, 2005, p. 45), are prompted by multiple factors including labels of giftedness, significant others, changes of circumstance, and education-related decisions such as those made prior to and during higher education. The current study reinforces the need to consider and respond to students' cultural and educational background not only at the university level, but also at the level of course and unit.

Conclusion

In this study, the Possible Selves framework (Markus & Nurius, 1986) enabled us to examine the extent to which students were able to perceive themselves in terms of roles, attitudes, beliefs and aspirations. Erikson (1982) and Berzonsky (1989) linked this ability to the development of socio-cognitive strategies that consider both context and intrapersonal factors and, in turn, to academic performance. Whilst both student cohorts were able to some extent to consider their future lives and work, the low self-esteem demonstrated by international students may well be indicative of the challenges they face negotiating their first year of post-secondary study; however, the picture is far from simple and almost certainly differs according to cultural and educational background. This suggests the need for further research to examine whether and how enhanced future-oriented thinking and the consideration of socio-cognitive strategies at the class level improves self-esteem and supports the transition into study for multiple cohorts of international students.

Most research relating to international students' ability to cope across a range of domains has focussed on expectations of course and experience, and difficulties associated with culture, language, social environment and the loss of personal support structures. However, individual self-concept and self-efficacy is also crucial and is likely to be negatively impacted by any one of these factors. This study adds to calls for institutions to help students develop their sense of identity and purpose, and it raises the possibility of employing a future-oriented approach to achieve this.

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