

# Mad as Hell and Not Taking It Any More?: Job satisfaction amongst engineering educators in Australian universities

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## BACKGROUND

Engineering education is emerging as an academic career path in Australia - there is a growing opportunity to build an academic career on based on teaching and educational research. However, there have been significant changes in the sector over the last decade, including increasing student numbers and increasing competition for research funding in the area. At the same time, universities are increasing pressure on academics to produce 'rated' research publications and attract external funding. It seems timely to ask: What are the implications of choosing engineering education research as a career? What do people find rewarding about it and what do they struggle with? Are there sector-wide patterns of job satisfaction that give an indication about how best to plan for and manage a career in engineering education? With increasing numbers of PhDs in engineering education, there is a growing cohort of early career academics who will benefit from the answers to such questions. The answers could also ensure that engineering programs in Australia continue to be improved and developed through the presence of well-supported and satisfied, and thus retained, teaching-focused academics.

## PURPOSE

The paper seeks to open debate about the viability of a career in engineering education in Australia, and what might be done within AAEE and the professional community to support this emerging sector.

## DESIGN/METHOD

This preliminary study draws on instruments developed by the longitudinal study "Professions in Australia" (Malinowska-Tabaka 1987) which compared many aspects of professional life across Teaching, Law, Engineering and Medicine. The questionnaire developed in this research has been adapted and 45 responses from around Australia, including the Group of Eight (Go8), the Australian Technology Network (ATN), and regional universities, are analysed. The questionnaire data was augmented with interviews and diary studies with a smaller sample of respondents. Textual data was analysed thematically and compared with survey results using the constant comparative method.

## RESULTS

Our respondents report that the intrinsic rewards of teaching and working with students is highly influential in their job satisfaction and their decision to stay in their positions. This is despite some acknowledgement that teaching and research on teaching will never be as highly valued by their institutions as technical research. All report themselves to be time-poor. Finally, a classic understanding of job satisfaction (Hackman and Oldham 1976; Karasek 1979) relates job contentment to the amount of autonomy and control the employee has over their work. This appears to hold true for engineering educators also and they report that using this autonomy to "pick your battles" is a significant strategy in negotiating an acceptable working life.

## CONCLUSIONS

Our respondents are remarkably optimistic about the prospects for those just entering the world of engineering education. They offer a variety of advice about how best to manage that career but all agree it is a "job worth doing". There is however a sense that our commitment and the intrinsic rewards of the job leave us open to exploitation; it is time for the institutions that rely on us to develop systems that recognise, promote and reward our contributions.

## KEYWORDS

Career, job satisfaction, professional development

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## Introduction

We are all used to hearing about growing pressures in the higher education sector. If it is not ever-increasing class sizes or the imperative to use technological aids, it's the pressure to publish in highly rated journals and win competitive research grants. In particular we ourselves were feeling the pressure of “*administrivia*” which appeared to be unrelated to educational goals and in fact actively hindered us in our academic and teaching endeavours. Typical stories from colleagues and ourselves included:

*I've noticed that every year there are more bureaucratic procedures, more demands on academics, and less respect from institutional administration and students alike. ... I also seem to be constantly confounded by administrative edicts that require seemingly senseless but time consuming activities that would be better done by the administrators themselves ... and many hours spent dealing with students needing to be spoon fed though what has traditionally been an adult/ independent learning experience.*

*I was "directed" to provide 3 different versions of my exam paper. Different fonts, different font sizes. This came after I had submitted the paper, when all the technical figures were complete. When I asked Examinations to either photocopy to A3, or change the font themselves (they had the .docx file) I was told it was my responsibility to respond to these requests.*

*Dealing with poor students who just don't realise that they are not cutting the mustard, having to justify everything. How someone who got 2/40 could have even thought they were remotely close to passing is beyond me. But they can quote the rules that say they have a right to this and a right to that, but are ignorant of the University policy that says they should come to class – students not taking ownership of their learning!*

*I'm totally overloaded and have far too much to do but I love it. It's so interesting and enjoyable.*

So were we just having a bad year or were things actually getting worse? And if all the things we were noticing were real, what was keeping us all going – we're all still here and, as evidenced by the last quote above, enjoying ourselves despite everything? So with this in mind, we decided to ask what makes for a satisfying career for engineering educators? This paper documents the beginning of our explorations.

## What is known about job satisfaction in higher education

Studies of job satisfaction have a long pedigree and, even in the relatively rarefied setting of higher education, a lot is known about what generally contributes to it: autonomy, the recognition of colleagues, a good work/life balance, a perception of fair pay and, for service workers such as ourselves, the capacity to “make a difference” (Bozeman and Gaughan 2011, p.157). However, it is also widely recognised (Lacey and Sheehan 1997, Rhodes et al, 2007) that in multivariate statistical models these variables account for less than half the variance in job satisfaction across samples and in most cases much less. We need to know more about how these factors affect job satisfaction and what interdependencies may exist between them. For the present case we were also interested to establish whether the same pattern of job satisfaction would be reported by those with a significant investment in engineering education.

## Methodology

A validated survey instrument was used to establish the range of variation on widely-used measures of job satisfaction in the professions (Malinowska-Tabaka 1987) which allowed for comparisons to be made not only within the higher education sector but also with engineers in industry. Many job satisfaction studies rely on large-scale surveys but since we expected to have a relatively small number of respondents and we wanted to explore the meaning of the factors in more depth, we augmented the survey with interviews. Respondents were therefore asked to indicate whether they would be willing to participate in follow-up interviews

to pursue the meaning of the trends identified in more depth. The project had ethical clearance (No 2012000603) from the University of Queensland.

## Survey

The primary data-gathering instrument for this study was a survey based on the one used in the longitudinal “Professions in Australia” surveys undertaken over a 30 year period by Western and colleagues (Malinowska-Tabaka 1987). Those surveys examined aspects of working life for (school) Teachers, Doctors, Lawyers and Engineers however the higher education sector was not included. In order to facilitate comparison, the questions in this research were modelled on the work by Malinowska-Tabaka. However questions with reference to particular professions such as “increasing complexity in the law” were removed or altered to fit the target population. Invitations to participate were sent to all authors whose names appeared in the proceedings of AAEE’s 2010 Annual conference (N = 167) on the assumption that submitting a paper to that conference indicated some interest in and experience of the job of teaching engineering. The respondents were also likely to have some experience with the scholarship of teaching and learning (T&L).

## Interviews

Eight interviews were conducted, two in person and six by telephone. The focal topics were:

- Previous industry experience and its impact on teaching careers
- Sources of job satisfaction
- Most significant concerns with the job
- Relevant reference communities
- Advice for those just entering university teaching

## Results

### Demographics

Fifty-four people responded to the survey but only 45 submitted full sets of responses; Table 1 indicates their university contexts, as designated by King (2008), and levels of appointment. Our sample had extensive industry experience before coming into university teaching (Table 2), over-represented women (N = 12, 27%) in comparison to the number of women in engineering academia, and thirty-two of the respondents were Australian trained with another five from the UK or the USA.

**Table 1: Survey respondents type of appointments**

University type	Level A Assoc Lecturer	Level B Lecturer	Level C Senior Lecturer	Level D Assoc Prof.	Level E Prof.	Total
ATN	-	2	3	3	2	10
Established Regional	1	10	5	4	2	22
Go8	-	1	3	3	3	10
New Generation Uni	-	-	1	1	-	2
Not specified	-	-	1	-	-	1
<b>Total</b>	<b>1</b>	<b>13</b>	<b>13</b>	<b>11</b>	<b>7</b>	<b>45</b>

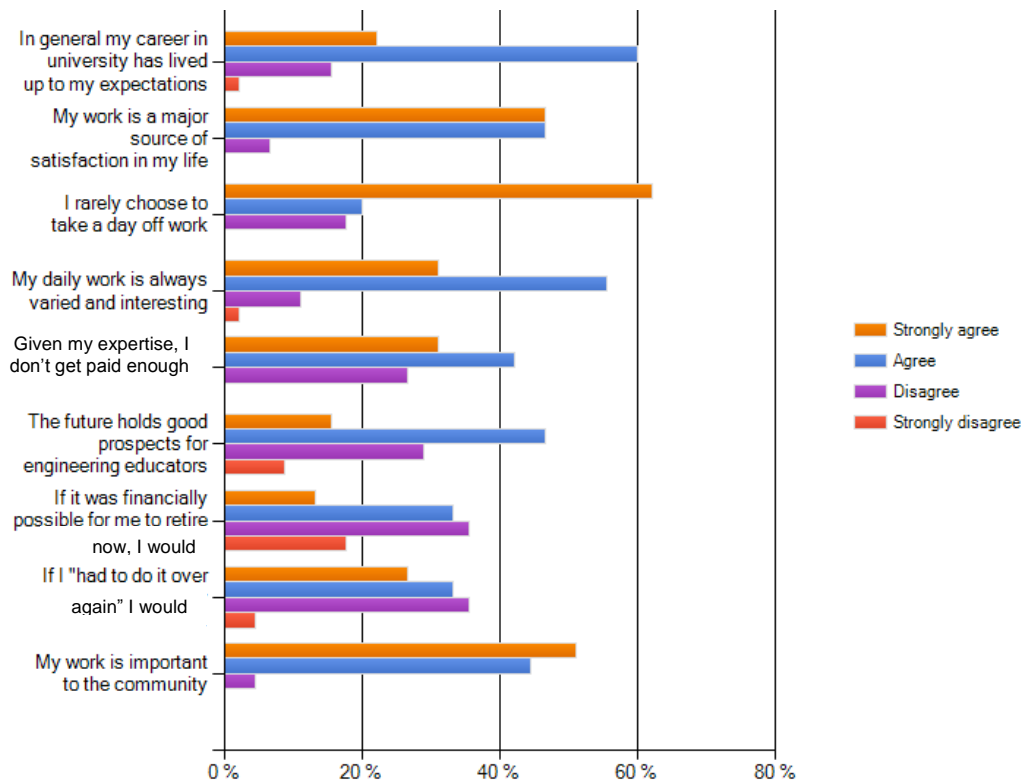
The 8 interviewees included four Level B appointments, one from each type of university; one Level D from an ATN university and one from an established regional university; one professor and one Dean. There were four women and four men in this group. One of the interviewees indicated that technical research was the focus of his activities and that though he had an interest in educational topics he was “no kind of expert”.

**Table 2: Previous working experience**

University type	Consulting	Industry	None	Not specified	Postgrad	Research	Total
ATN	1	6	-	-	2	1	10
Est. Regional	4	13	1	2	-	2	22
Go8	2	4	1	-	1	2	10
New Gen Uni	-	2	-	-	-	-	2
Not specified	-	1	-	-	-	-	1
<b>Total</b>	<b>7</b>	<b>26</b>	<b>2</b>	<b>2</b>	<b>3</b>	<b>5</b>	<b>45</b>

## Satisfaction

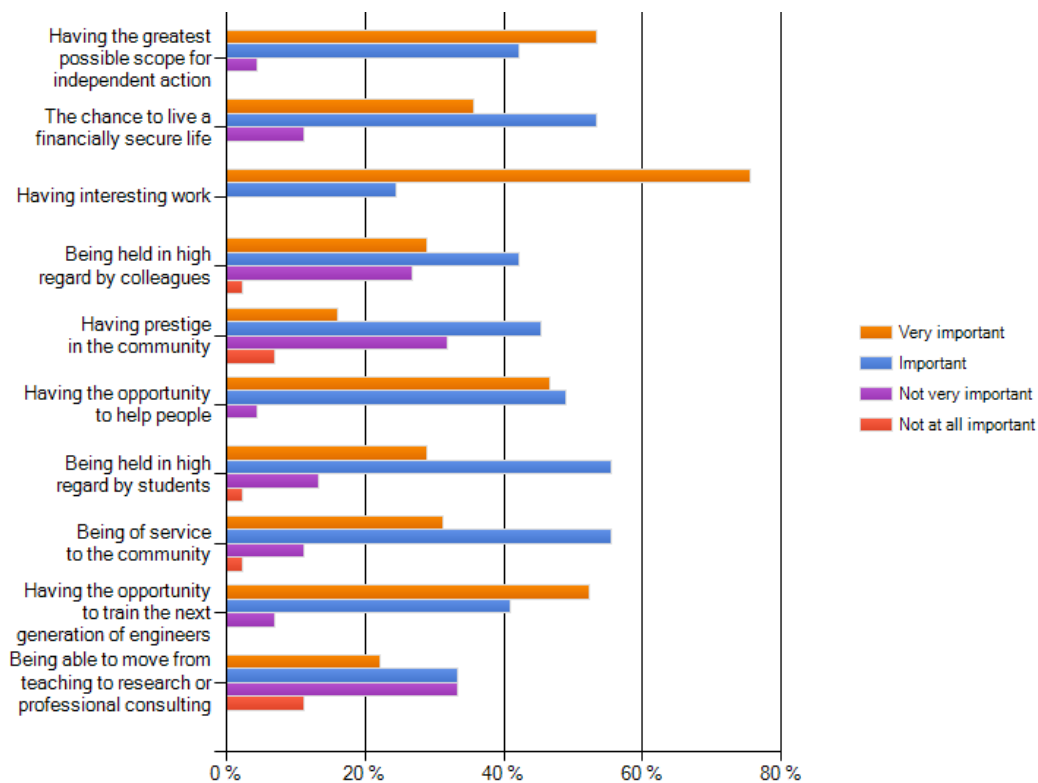
When asked about the sources of satisfaction in their job, our sample of engineering educators indicated a high degree of altruism (Figure 1), finding work to be both a major source of satisfaction in their lives (93%) and important to the community (96%) whilst rarely choosing to take a day off (82%). Indeed 53% of our sample were not driven by remuneration indicating that they would stay in the job even if it was financially possible to retire.



**Figure 1: General satisfaction**

While Malinowska-Tabaka (1987, p.465) finds that for professional engineers, the intrinsic rewards of their work and being of service to the community “bring them rather more problems than satisfaction”, the matter is very different for our cohort. This is reinforced when asked directly about the importance of specific aspects of their jobs (Figure 2) such as “the chance to live a financially secure life”, “the opportunity to help people” and “the opportunity to train the next generation of engineers”.

Since the work of Hackman and Oldham (1976) and Karasek (1979) it is a truism in workplace studies that satisfaction with the job is influenced far more by the amount of control (autonomy) the worker has than by prestige or pay and this seems to be true for our respondents too with 96% indicating that “having the greatest possible scope for independent action” was important.



**Figure 2: Particular sources of satisfaction**

When asked to speak about what was most satisfying in their jobs, seven out of the eight interviewees nominated teaching and working with students. The research-oriented participant said that his satisfaction came from having good products in public use. The more senior interviewees also indicated that mentoring newer staff was important to them. Since the survey was ambiguous about which ‘community’ was important to respondents we asked the interviewees about their interpretation. The most common response (4 of the 8 respondents, although some named more than one community) was that the wider public was the relevant community, although conceptions of that public were varied. The technical researcher wanted to provide the public with ethical and non-polluting products and another wanted to educate students to practice ethical and sustainable engineering. A third indicated a sense of responsibility for the next generation, saying “our future is in our youth and unless we educate them we can’t live up to our potential”. Another respondent mentioned her work with primary schools as important for educating the next generation also. These responses highlight the impulse *to do good in the world* that we have elsewhere found to be a motivating factor for engineering students (Jolly et al. 2010, 2011).

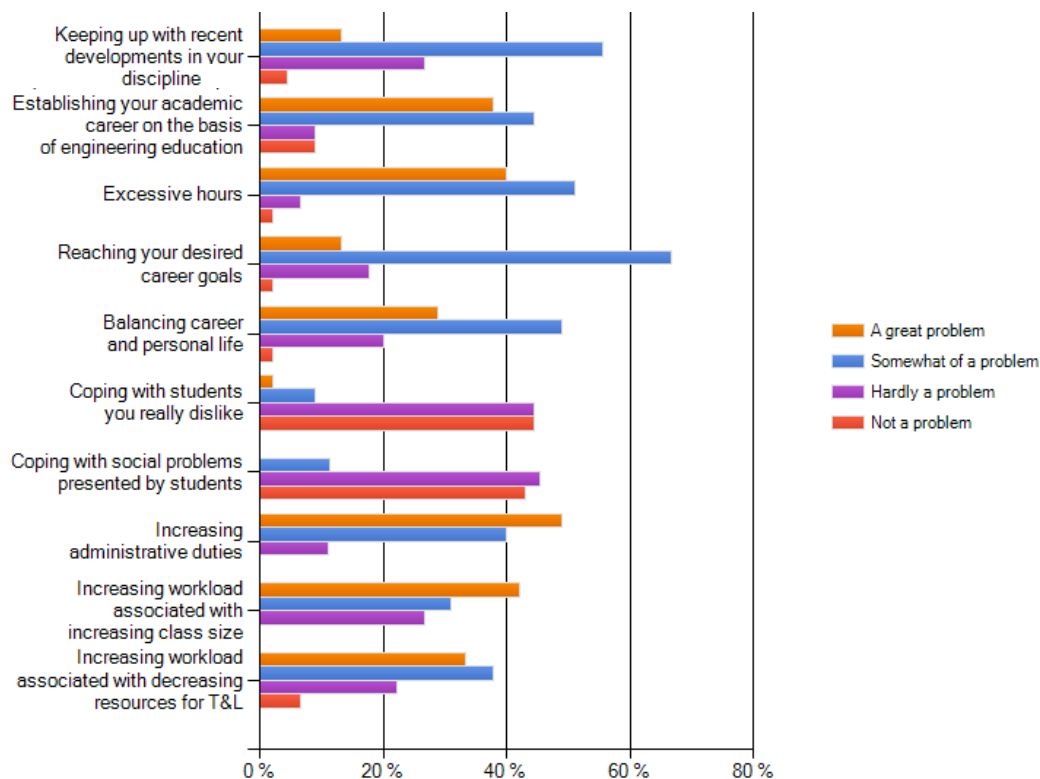
Only one respondent nominated the immediate student cohort as the relevant community and two senior respondents named the Faculty or School in which they worked. One respondent who was inspired to come into teaching because of his perception of deficiencies in new graduates named industry as his relevant community. The only respondent who could not name a community, felt that her work as an engineering educator was never going to be recognised and she had recently resigned to become a school teacher.

## Concerns

The general level of satisfaction people report is tempered by an awareness of problems in establishing a career on the basis of teaching and research on teaching, as Figure 3 shows.

Interviewees also discussed the difficulties of being a successful academic (getting recognition and promotion) on the basis of teaching and research into teaching. Most agreed that reward systems were driven by ERA processes and the like and that there was little recognition to be had there for these fields. For this reason most respondents felt that they

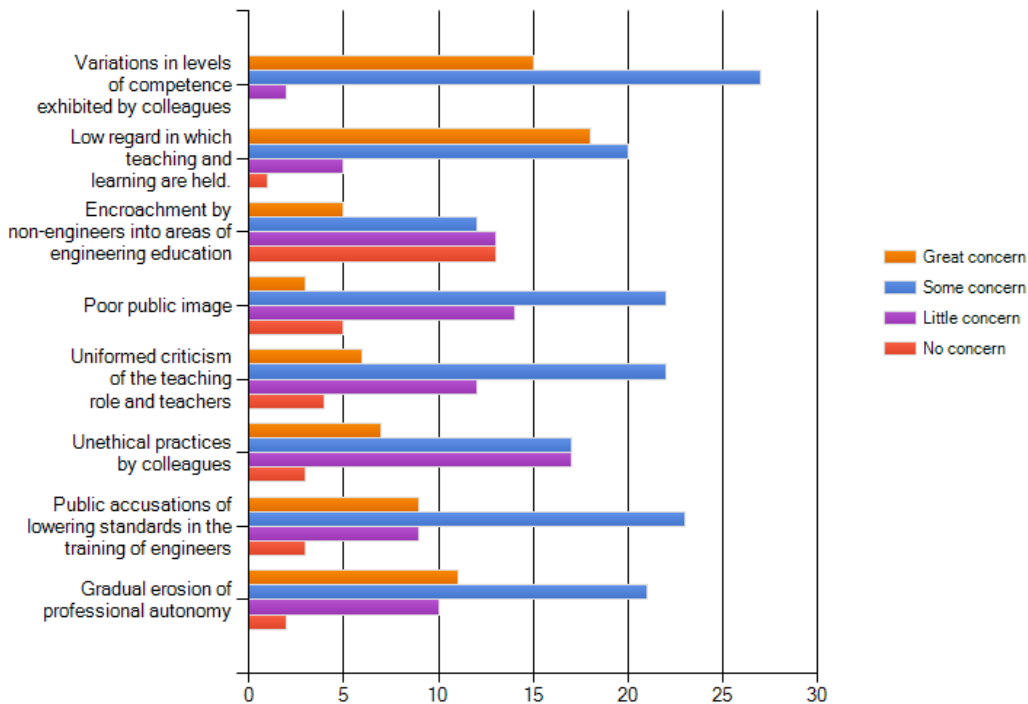
had to maintain some technical research even when they found it “boring”. Those who were lucky enough to have supportive Heads of School had more career success than those who didn’t.



**Figure 3: Problems in being an engineering educator**

Although time poverty and difficulty in finding a work/life balance was a significant problem, only one respondent had resigned because of it. There was some acknowledgement that being time poor was to some extent self-inflicted. Senior level interviewees pointed out that if they took workload away from staff, those people typically found other things to fill the time, driven by an inherent interest in the work. As one of these people said, “people always have choices”. Increasing administrative workload and decreasing resources was noted by all but no interviewee complained that it was a major concern. Instead they often made comments along the lines of “you have to pick your battles and move on”.

The survey question about engineering educators’ concerns (Figure 4) confirmed the concern with a general low regard for teaching, but also identified concerns about colleagues’ competence and ethical standards. Interviewees’ responses showed very strong correlation with level of appointment and type of university. More junior respondents acknowledged that there were colleagues with no interest in teaching but felt powerless in the face of institutional inaction. As one of them said, incompetent colleagues had no need to change since “you’re never going to get rewarded for good teaching so people don’t take the same rigour”. Higher level respondents, likely to have a role in appointments, took a slightly different view but here the type of university became significant. At a metropolitan ATN where the Level D respondent had a keen interest in teaching, they actively recruited good teachers. At another university it was noted that over the last few years all new appointments had come from non-Australian backgrounds with quite different and diverse traditions of teaching and expectations of the lecturer’s role. As a result, less attention was paid to their teaching credentials, although mentoring was offered once they were appointed. It was felt that the pressures to increase research outputs militated against teaching development. It is not even certain that educational research is counted in all engineering departments.



**Figure 4: General Concerns**

When we raised the issue of whether our interviewees were familiar with cases of incompetence and unethical behaviour, everyone had stories of staff members who shirked teaching responsibilities which others had to pick up. However, our respondents were reluctant to describe this as a major problem for them. Senior staff talked about reassigning the shirkers and thus, as Misra et al. (2011) note, rewarded such behaviour but junior staff seemed to accept the situation as one they were powerless to do anything about. As one woman said, they don't want to whinge.

### Advice

When asked what advice they would give new academics who wanted to concentrate on T&L, interviewees all acknowledged the inherent difficulty of building a career on these interests. The three most senior respondents said that people who wanted promotion needed to maintain technical research since it was imperative to be seen as “research active” while more junior respondents, especially those at newly created universities and ATNs, appeared to believe that educational research by engineers would be counted as research activity, this was denied by others especially those at Go8s.

Everyone acknowledged the critical importance of having support for T&L interests and seven of the interviewees gave advice about how to gain that support. This advice ranged from establishing interest groups and communities of practice, to talking to lots of people and joining many T&L networks, to building a publishing record in the field that people couldn't ignore, to being determined to pursue T&L interest in the teeth of ‘lack of interest and low esteem’ from colleagues. In one case, it was suggested that academics without appropriate support might either have to decide “this university is not for me” or be content to live without promotion.

### Differences by gender

While appointment level or type of university rarely made a difference to response patterns, we noted that gender was sometimes significant. Most studies of job satisfaction find that women are more satisfied with their jobs than men (Lacey and Sheehan 1997; Bozeman and

Gaughan 2011). Table 3 suggests this is true for our cohort and Table 4 presents an interesting corollary: the work/life balance is more of a problem for women than for men.

**Table 3: Satisfied with where I am now**

If I had to do it over again I would definitely want to be where I am	Female	Male
Strongly disagree	-	2 ( 6%)
Disagree	2 (17%)	14 (43%)
Agree	7 (58%)	8 (24%)
Strongly agree	3 (25%)	9 (27%)
<b>Total</b>	<b>12</b>	<b>33</b>

**Table 4: Work/life balance**

Balancing career and personal life	Female	Male
Not a problem	-	1 ( 3%)
Hardly a problem	-	9 (27%)
Somewhat of a problem	7 (58%)	15 (46%)
A great problem	5 (42%)	8 (24%)
Total	<b>12</b>	<b>33</b>

But the really significant differences come when we asked people about workload and administrative duties (Table 5).

**Table 5: Gender differences in perceived problems**

Response	Increasing administrative duties		Increasing workload associated with increasing class size		Increasing workload associated with decreasing resources for T&L	
	Female (N=12)	Male n=33	Female n=12	Male n=33	Female n=12	Male n=33
Not a problem	-	-	-	-	-	9%
Hardly a problem	-	15%	8%	33%	-	30%
Somewhat of a problem	33%	42%	17%	36%	50%	33%
A great problem	67%	42%	75%	31%	50%	28%

It seems as though we, the authors, are not the only ones feeling increasing pressure from non-teaching roles. Several recent studies have demonstrated that women spend more time teaching undergraduates and performing service and administration duties (Bozeman and Gaughan 2011; Misra et al. 2011) and that this creates resentment and poor workplace culture. The data in Table 5 supports these findings.

## Conclusions

As much of the literature points out, the intrinsic rewards of the intellectual life and of teaching, plus the high degree of autonomy with regards to the content of the work, is what makes academic work engaging and keeps people in it. Our survey and interviews echo this finding. Based on this and our experience, we believe that this satisfaction opens academics to the danger of being exploited by unsympathetic systems which rely on teaching as a fundamental part of their business but that don't want to reward it (Misra et al. 2011).

The literature (Misra et al. 2011, Rhodes et al. 2007) makes the point that it is the climate in the workplace that is most important including "acknowledgment, support and appropriate levels of participation in decision-making, nurturing of the intellectual environment, clarity of institutional mission and faculty-administration relations." (Lacey and Sheehan 1997, p. 321)



All of our interviewees spoke of the importance of having supportive structures and senior staff, and this has also been recognised in a recent international review of curricular reform (Graham 2012). But when those structures are not in place or fail, and we start to feel the pressure, what do we do? Maybe it is time for groups such as AAEE to open a dialogue with Deans and Heads of School about creating more inclusive systems that fairly recognise the diverse and important role of engineering educators. It is imperative for the institutions that rely on engineering educators' passion and interest in teaching to develop systems that recognise, promote and reward these contributions.

Our interviewees urged us to pursue our core interests in a determined manner, regardless of what our colleagues think, but this can be difficult. We, the authors, have all followed this advice and, like many of our respondents, very much enjoy our work. But the pressures and expectations of our jobs have caused us to begin this conversation – one that we believe must be had.

## Recommendations

This paper is a beginning. Our findings show that the engineering education sector is fuelled by the inherent rewards of teaching but that across institution and level of appointment, it is generally held in low regard. This low regard in combination with the pressures on Faculties to increase their research has resulted in variations in the levels of teaching competence. This is in direct contrast with messages from Engineers Australia and industry that our graduates need to be ready to work in the 21<sup>st</sup> century and therefore we need to look to changing and improving our T&L paradigms. We therefore intend to continue this dialogue/ research with a larger sample for greater reliability and in order to compare academics who put teaching first with those who privilege research. In this way we could clarify to what extent commitment to teaching impacts on academic careers.

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