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## **Time is on my side: how do engineering academics spend their days - an international study**

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**ABSTRACT:** This article uses empirical data from the international Changing Academic Profession (CAP) survey to establish similarities and differences in work patterns among the world's academic engineers. Overall working hours and the distribution of work between teaching, research and other activities are examined. Summary results indicate that in periods when classes are in session, engineering academics from South Korea and Hong Kong reported a longer working week than equivalent staff from other countries. Engineering academics from Mexico and South Africa spent the highest proportion of their time on teaching, whereas those from Argentina, China and Italy spent the highest proportion on research. The most likely reason for international differences in the length of the working week is that national systems (such as higher education) have been constructed from the individual histories and cultures in each country.

### INTRODUCTION

Academic workloads are a topic of considerable interest, particularly among academics. The perception is that the nature of academic work has changed and continues to change. This is the particular emphasis of the Changing Academic Profession (CAP) survey, conducted in 21 countries on five continents in 2007-2008. This international questionnaire sought out academic opinion on a number of fronts, including the nature of academic employment, general work situation, opinions about institutional governance and job satisfaction. The survey is particularly useful, because it permits analysis of a copious data set of variables.

Among the questions asked as part of the CAP study were the length of the academic working week, both when classes are in session, and when they are not, and the distribution of the academic working week in participating countries between the various components of an academic career. This article examines some of these issues with respect to engineering academics, based on analysis of the CAP database.

It has often been postulated that the academic working week is longer than the one typical of many other professions, but that one of the off-sets for this was the academic *right* to decide on the organisation of that working week:

*It is universally accepted (leaving aside a tiny minority who might argue otherwise) that a lecturer is bound to be present to deliver his or her teaching and to provide support, advice and feedback to students; and to attend meetings and events at which they are supposed to be present. But for the rest of the working day, traditionally it was seen as acceptable for an academic to do the work (such as reading, marking or doing research) at a location to suit the lecturer, including their home. Current discussions on new terms and conditions of employment have included the prospect that, in future, academics will have to be on the campus for the full working day [1].*

Some analyses have examined changes in academic working hours over the years. In the Australian case, for example, Coates et al [2] drew on studies by several others [3-6]; to demonstrate that overall average working hours increased from 45.4 hours in 1977 to 50.6 hours 2007. Within these parameters, the hours devoted to teaching declined by five hours per week, meaning that the proportion of hours spent on teaching declined from 51.3% of the total in 1977 to 36.1% in 2007. The loss of five hours to teaching and the overall increase of five hours in the length of the working week were spent on research, administration and community service in 2007.

Another study of academic working hours by Tight used several surveys from the mid 1940s to the 21<sup>st</sup> Century to examine the British situation [7]. His findings indicated that:

...while there has been an increase in academic workloads, much of this had occurred by the end of the 1960s; the position of research appears to have been maintained, though at a lower level in the newer universities/former polytechnics than in the older universities; much of the increased workload has come in the form of administrative demands [7].

Tight's analysis of 10 British surveys notes that in addition to the expansion in the hours required for administration, the academic working week has increased from about 40 to about 50 hours and that the relative importance of research in the academic mix has not changed.

This article presents an analysis of data from 18 of the countries participating in the CAP survey, and provides summaries by country of the time academics spend on the discrete components of their working week.

#### METHODOLOGY FOR THIS ARTICLE AND THE CAP SAMPLE

This article looks at engineering academics, their average working hours, and national variations and patterns are considered. In the CAP survey, respondents were asked to identify their academic discipline on three fronts: according to their highest degree, according to their current academic unit and according to their current teaching. For this article, *discipline* refers to current academic unit, although it is fair to say that there is not much difference between the three. Details of the CAP survey sample are shown in Table 1. Engineering academics represent differing proportions of the CAP survey population in different countries.

Table 1: CAP survey 2006-2007 respondents by country.

	Engineering	Other Disciplines	Total	Engineering % of Total
Argentina	152	631	783	19.4%
Australia	68	969	1,037	6.6%
Brazil	76	1,066	1,142	6.7%
Canada	81	1,011	1,092	7.4%
China	718	2,529	3,247	22.1%
Finland	184	949	1,133	16.2%
Germany	224	1,014	1,238	18.1%
Hong Kong	62	707	769	8.1%
Italy	277	1,372	1,649	16.8%
Japan	278	1,080	1,358	20.5%
Korea	147	753	900	16.3%
Malaysia	280	745	1,025	27.3%
Mexico	260	966	1,226	21.2%
Norway	76	785	861	8.8%
Portugal	246	868	1,114	22.1%
South Africa	18	606	624	2.9%
United Kingdom	102	1,131	1,233	8.3%
USA	82	1,055	1,137	7.2%
All respondents	3,331	18,237	21,568	15.4%

Some national education systems have binary systems, such as Finland and Germany, in which higher education comprises universities and polytechnics, with the latter now often referred to as universities of applied sciences. But in countries such as Finland, academics in polytechnics typically express a leaning towards teaching over research and, therefore, spend more of their nominal and proportional time on teaching and teaching-related activities, and commensurately fewer hours on research and research-related activity [8]. However, this article is about hours worked, and even if polytechnic academics tend to emphasise teaching and, therefore, spend less time on research, from the national perspective it is relevant to include all engineering academics in the analysis.

In the CAP survey, respondents were asked to report on the number of hours they typically spent on academic activities, divided into five categories: teaching, research, service (to clients, unpaid consulting, public or voluntary service), administration and other academic activities. Given that teaching is not typically a year-round activity, but is limited to specific teaching semesters or terms, respondents were asked to report on this breakdown both when classes are in session, and when they are not.

In a methodological sense, the concept of *time* is interesting, because of the bias that can be built into academics' responses to questions about it. This has been reported many times, but by way of summary, the authors refer to Bentley and Kyvik's recent summary [8]. They note that self-estimation of working hours are *subject to errors of recall*. They also note issues relating to overlap of academic duties, such as whether scholarly reading is part of research, or ultimately part of teaching, and the problem of generalising hours. The lack of uninterrupted time is an oft-noted barrier to research, therefore, many academics will seek to focus on teaching in specific parts of the year, when it is possible to do so. Finally, Bentley and Kyvik note that some aspects of *academic work* include activities that *go beyond what*

would be considered working time (in equivalent surveys). This reflects the *academic life* extending beyond just being a nine to five job.

These imperfections notwithstanding, the CAP survey presents analysts with the most thorough and consistent international database on the activities and opinions of academics ever produced.

#### HOW DO ENGINEERS SPEND THEIR WORK TIME?

Figure 1 shows the average number of hours that engineering academics reported that they worked. The columns show the number of hours during teaching periods, and the line shows hours when classes are not in session. The graph shows countries ranked from highest to lowest according to total working hours reported when classes are in session. Korean engineering academics, it would seem, work more hours than the rest of the world's engineering academics during teaching periods and second to their colleagues in Hong Kong when classes are not in session. Engineering academics in these two systems reported a working week in excess of 50 hours, year round. During teaching periods, engineering academics from Japan, the USA and Canada also reported a working week of at least 50 hours, with academics from most other countries reporting a working week of between 40 and 50 hours.

Overall, academics in most countries reported a shorter working week when classes were not in session, but this difference was marginal in Hong Kong (where these academics actually said they worked slightly longer), Italy, the United Kingdom, Portugal and Malaysia. The biggest variation in hours worked can be noted in Brazil (-17.7 hours), Norway (-11.3), China (-9.8) and Japan (-9.6).

Information on non-teaching periods was not sought in the Mexican study.

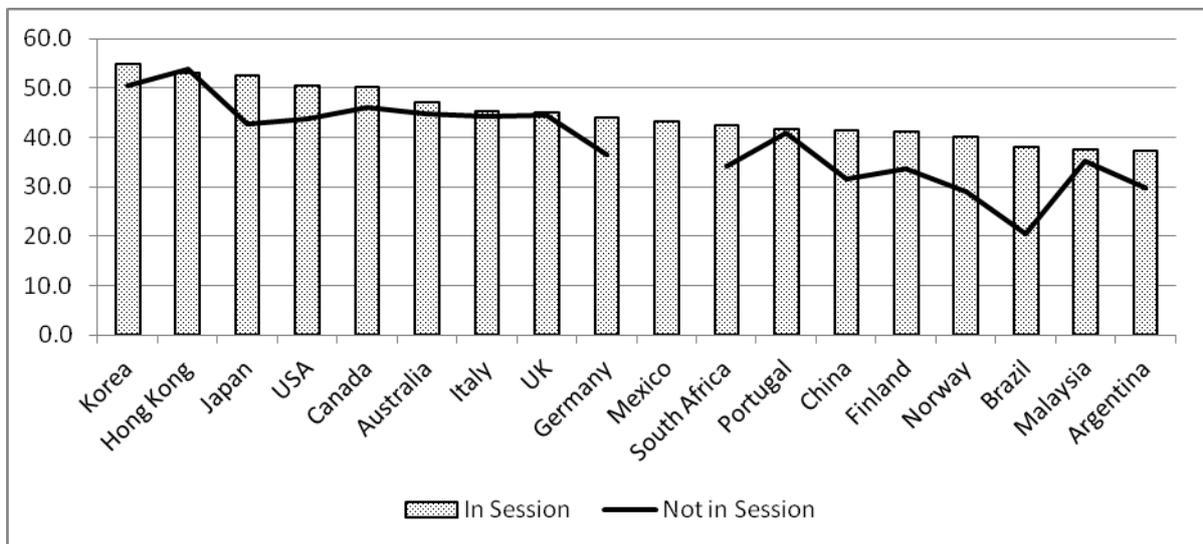


Figure 1: Distribution of average weekly work hours - when classes are, or are not being conducted.

#### WHAT IS ACADEMIC WORK?

Academic work is generally described as covering teaching and research, with (usually) less time being spent on activities such as community service and administration. Using CAP survey data, Figure 2 shows the distribution of hours when classes are in session. Activities other than teaching and research (service, administration and other) have been aggregated into *other hours* for the purposes of these graphs, because they are subsidiary to teaching and research as the major components of academic life. These other activities are examined in more detail below.

When classes are in session, academics from most countries spend around 20 hours per week on teaching and teaching-related activities, with Korea, Japan, Mexico and South Africa spending more than 20 hours per week. The graph in Figure 2 indicates that engineering academics from Argentina, Norway, the United Kingdom and Germany spend markedly fewer than 20 hours per week. However, all in all, the average teaching week for engineering academics can be described as *about 20 hours* of teaching and teaching-related activities. So far as research is concerned, engineering academics in Hong Kong spend almost 20 hours during teaching periods, but in most other countries, it tends to be about 10 to 15 hours. Engineering academics from South Africa, Mexico and Malaysia tend to spend fewer hours on research and research-related activity during teaching periods than their colleagues from elsewhere.

Engineering academics in some countries spend more hours on activities other than teaching or research than academics from other countries. These other activities seem to take up more time in countries such as the USA, Canada, Hong Kong and Korea, and in relative terms, Italian, Chinese and Portuguese academics spend less time. In the main,

countries in which academics worked longer hours overall, were those that tended to spend more hours on activities other than teaching and research.

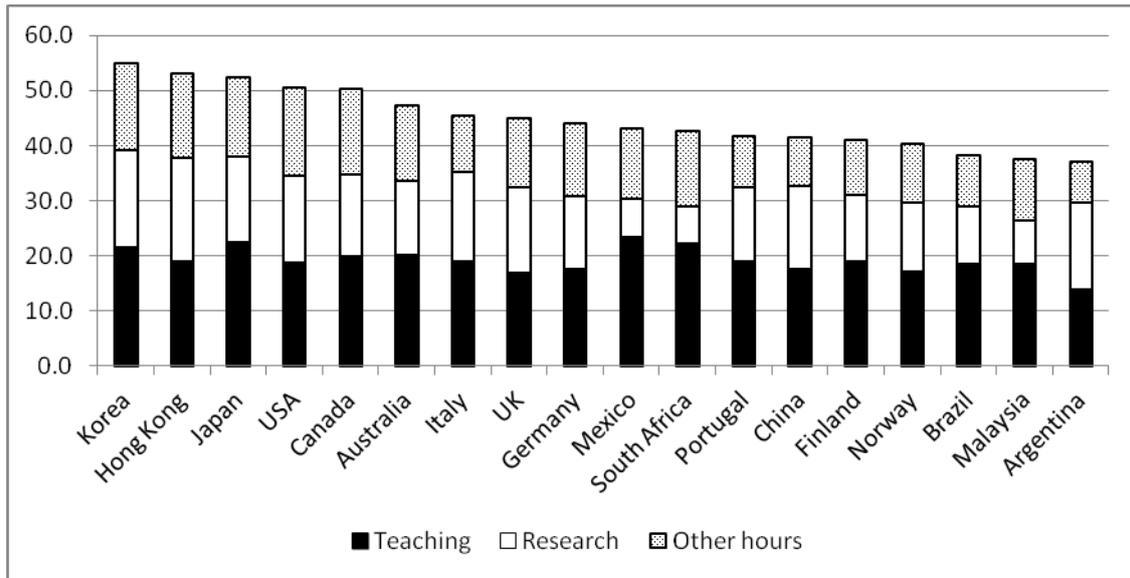


Figure 2: Distribution of working hours when classes are in session (Ranked from highest to lowest of total hours worked).

The main thing in evidence when classes are not in session is that academics across the board spend more time on research. Canada, Hong Kong, Korea and Australia appear to be leading the way on that front. However, some countries work markedly fewer hours when classes are not in session, with Germany, Malaysia, South Africa, Finland, China, all working fewer than 40 hours. Engineering academics from Argentina, Norway and Brazil in fact had an average working week of less than 30 hours when classes were not in session. The main explanation for the relatively low number of working hours in Brazil during non-teaching periods is that many academics take leave. Legislation requires academics to be *on the job* when classes are in session [9]. Figure 2 (above) demonstrated that engineering academics from only three countries (Brazil, Malaysia and Argentina) worked fewer than 40 hours when classes were in session.

Even though the figures above have shown that engineering academics from some countries have a shorter working week that those from other country, it is also interesting to compare the distribution of the working week within each country. That is, what proportion of time do academics from different countries spend on the different components of an academic career. These variations are shown in Figure 3. As can be seen, as a proportion of total working hours, engineering academics in Hong Kong spent the lowest proportion of their time undertaking teaching and teaching-related activities, at about 35% of their total work hours. Several other countries' engineering academics spent less than 40% of their total work time on teaching: Argentina, the USA, the United Kingdom, Korea and Canada. Only South African and Mexican engineering academics spent more than 40% of their working week on teaching and teaching-related duties when classes are in session.

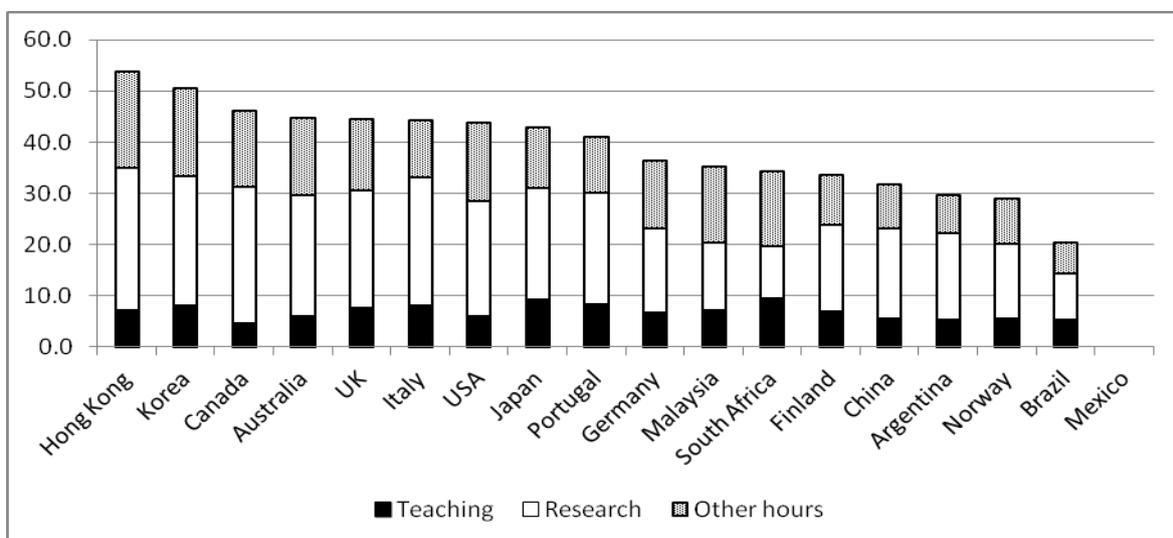


Figure 3: Distribution of working hours when classes are not in session (Ranked from highest to lowest of total hours worked). (N.B. This question was not asked in Mexico).

Figure 4 shows clearly that engineering academics from Argentina on average spend more than 40% of their time on research, even when classes are in session. However, over 30% of academics from Hong Kong, the USA, the United Kingdom, Korea, Italy, China and Norway spent their working week on research in periods when classes were in session.

Activities other than teaching and research are also part of an academic life. Figure 4 also shows that these activities are more important in the working life of academics in the USA, South Africa, Mexico and Canada.

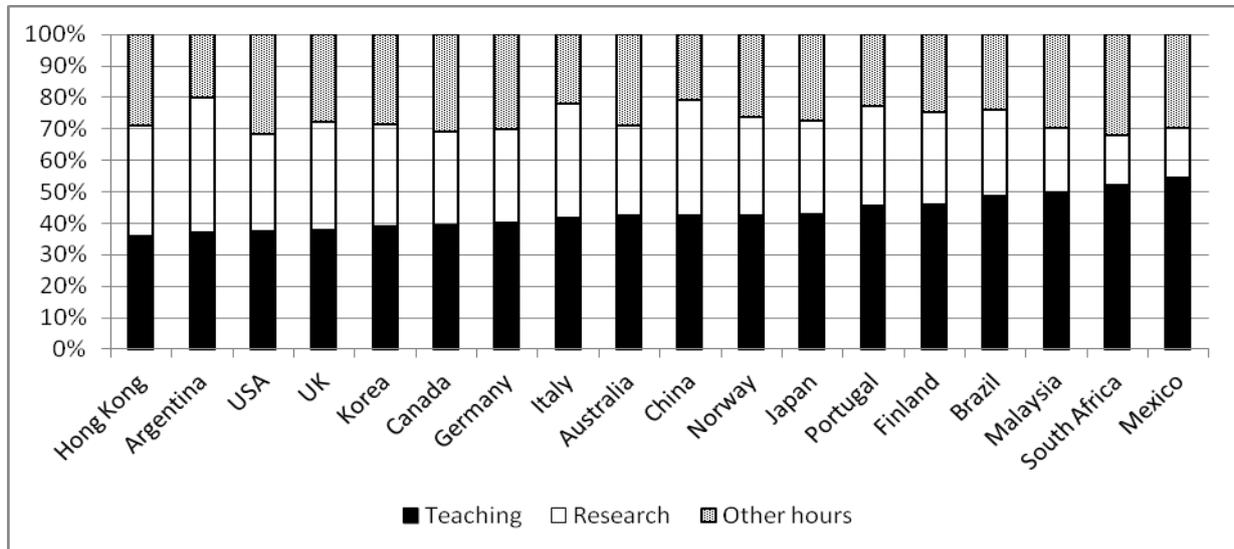


Figure 4: Proportionate distribution of working hours when classes are in session (Ranked from lowest to highest proportion of time spent on teaching).

Figure 5 replicates this information, but for periods when classes are not in session. Naturally, engineering academics in all countries reported that they spent a lower proportion of time on teaching and teaching-related activities when classes are not in session.

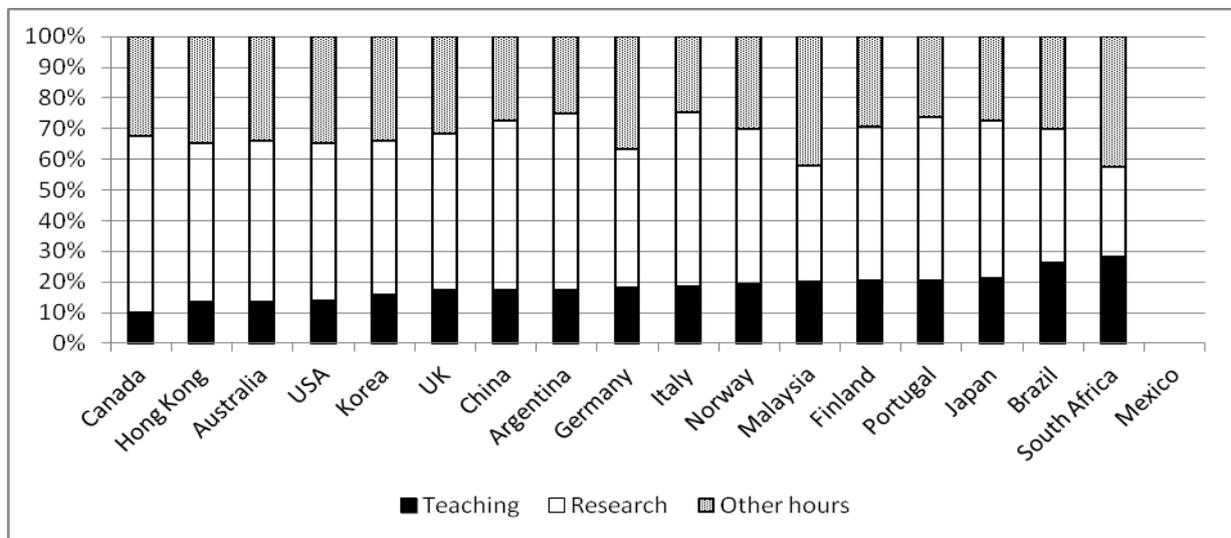


Figure 5: Proportionate distribution of working hours when classes are not in session (Ranked from lowest to highest proportion of time spent on teaching) (N.B. This question was not asked in Mexico).

#### ADMINISTRATION AND OTHER ACADEMIC WORK

The studies referred to earlier noted the increase in the amount of *administration* included within an academic working week. The CAP survey data, as summarised in Figures 4 and 5 show that hours other than those devoted to teaching or research make up a considerable proportion of an academic engineer's working week. Figure 6 goes a step further, by focussing on hours spent on administration, in and out of teaching periods. Hours spent on administration are shown by the columns, measured against the left axis. The black and white columns represent the number of hours spent when classes are in session, and when they are not in session, respectively. The lines in Figure 6 are plotted against the right axis, and represent the proportion of all hours spent on administration. The unbroken and broken lines relate respectively to the proportion of total hours when teaching is in session, and when it is not.

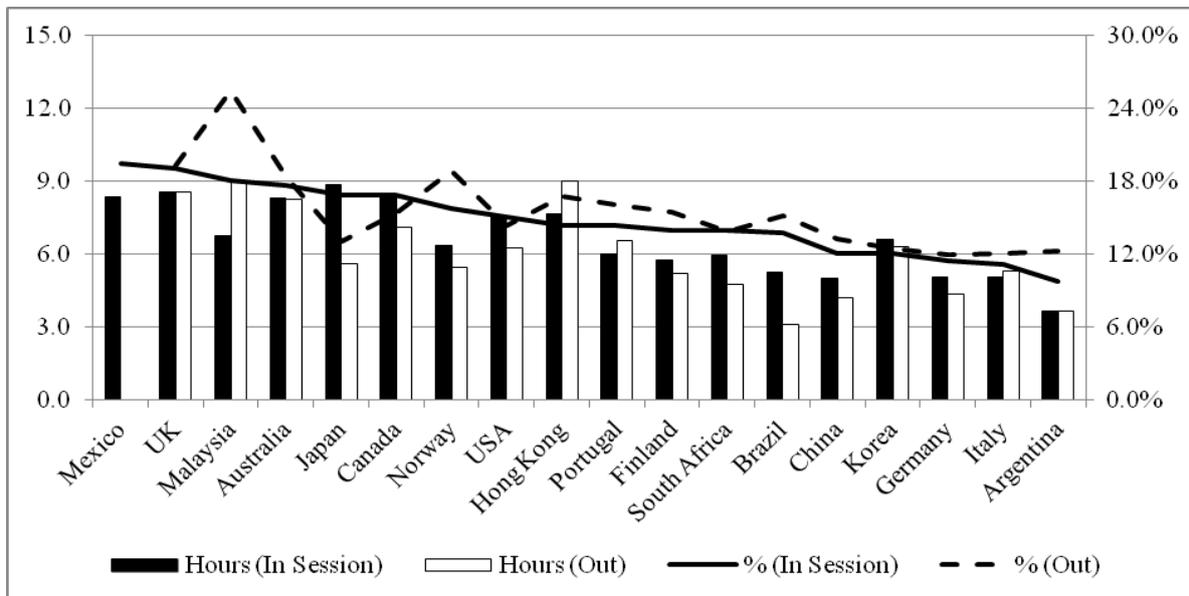


Figure 6: Number and proportion of total weekly hours spent on administration: when classes are in session and not in session. Ranked by proportion of hours when classes are in session. Mexican academics did not report hours in periods when teaching was not in session.

A cursory examination of Figure 6 shows that in at least eight of the 17 countries, engineering academics spend more time on administrative tasks when classes are in session. Engineering academics from seven of the 17 countries spend more time on administration when classes are not in session. In the United Kingdom and Australia, it would appear that it makes little difference whether classes are in session or not: administrative tasks take around eight hours per week.

Japanese engineering academics spend the most hours on administration when classes are in session (8.9 hours, 16.9% of total weekly working hours), but only 5.6 hours per week outside teaching periods (13.1%). Engineering academics from the United Kingdom, Canada and Australia all spend more than eight hours per week on administrative duties, (representing 19.0%, 16.9% and 17.6%, respectively of total weekly hours). The proportion of time spent by Canadian engineering academics is lower in non-teaching periods.

In some countries, engineering academics spend more time on administration when classes are not in session. For example, Malaysian academic engineers, who spend a considerable number and proportion of hours on administration when classes are in session (6.8 hours per week, or 18.1%), spend 9.0 hours, or 25.5% when classes are not in session. This is also the pattern in Hong Kong, Portugal and Italy.

As demonstrated in Figure 6, even if academics in some countries spend eight or more hours per week on administration, this pattern is not uniform. For example, Argentine academics spend fewer than four hours on administrative duties, whether classes are in session or not. They also spend the lowest proportion of their time on administration. Academics from Italy, Germany, Brazil, China, South Africa and Finland also spend fewer than six hours per week on administration.

Responses to the CAP survey by British academics indicating that they spend relatively long hours on administration confirm the results reported by Tight about patterns of academic work in the United Kingdom [7].

## DISCUSSION

The results reported in this article about academic working hours of engineering academics confirm that in most countries, academics work longer hours than those prescribed under employment awards. They also suggest that in some countries, there is a tendency for higher levels of bureaucratisation, at least as far as it has an impact on what academics do with their time.

It is possible that differences in the proportion of time spent on administrative work across national borders is a function of local contexts. This is one of the propositions suggested by Bentley and Kyvik in their study of academic work patterns [8]. Drawing on sociological institutional theory, Bentley and Kyvik hypothesise that differences in work time patterns across countries should be relatively small, and to some extent, their overall observation is backed up by this examination of engineering academics' average work hours as shown in Figure 1, but there are extremes. For example, what explanation could there be, other than nationally-constructed explanations for the average working week for engineering academics over 50 hours per week when classes are in session in Korea, Hong Kong, Japan and the US, when the equivalent academics work fewer than 40 hours in Brazil, Malaysia and Argentina.

Bentley and Kyvik also suggest that differences in work time patterns is lower among the English speaking countries [8]. As far as engineering academics are concerned, perhaps this proposition is correct. There is not much difference in engineering academics' working hours across the US, Canada, Australia and the United Kingdom. Total average weekly hours worked when classes are in session vary from about 50 per week in the US and Canada, to about 45 hours in the United Kingdom. Although Figure 1 shows that engineering academics in three Asian countries have a longer working week than engineering academics in other countries, there is in fact a gap of about ten hours between the hours worked in Japan, compared with the hours worked in China. Malaysian academics have a shorter working week, both when classes are in session and when they are not, than seems typical elsewhere in Asia.

It is also likely that relative seniority could have an impact on both average working hours and the composition of work. For example, it is highly likely that administration will take up more hours for senior academics than academics just starting out, and the proportion of time spent on administration will also be higher for senior academics. Bentley and Kyvik note that *Administration is perhaps the key activity that distinguishes professors from other academics in their working time patterns* [8]. Speaking about academics in all disciplines, they note that *Professors dedicated significantly more hours towards administration than lower ranked colleagues in all countries except the United Kingdom, Malaysia and Brazil...* [8]. The seniority angle has not been further explored in this article.

Country variations also exist because each country has a different structure for the provision of higher education. For example, some countries have a binary system of higher education, such as Germany and Finland, both of which have a polytechnic sector. In Finland, for example, it is known that polytechnic academics are more likely to express a preference for teaching over research, and that polytechnic academics in general spend more hours in teaching than do their university counterparts [10][11]. Another national pattern is in evidence in Norway, where a considerable amount of research is done in research institutes, separate from universities. Therefore, university academics are more likely to be involved in teaching than research.

Some countries regulate working hours more tightly than others, and it tends to be teaching that is more highly regulated than research. Research in many university systems is undertaken by staff when teaching commitments have been met, and that is one of the reasons why the academic working week in some countries is longer than in equivalent professions. As noted earlier, there has been pressure in some quarters for the nature of the academic working week to become more regulated than it has been in the past: *The problem is, however, that such a tightening of employment conditions removes, or has the potential to remove, a significant amount of the goodwill that keeps academics working beyond anyone's concept of a working week. It could therefore lower academic productivity* [1].

The fact of international massification, as universities and other higher education institutions move from being institutions providing education to the elite to mass providers of education, means that there has been a rapid expansion in the number of students, but typically the expansion in academic staff numbers has lagged behind [12]. However, the national strategies to deal with this expansion has varied in different countries. In Australia, for example, the 100% increase in students between 1990 and 2010 (from 377,000 to 757,000 equivalent full time students) has been dealt with by increasing the number of academic teachers by about 11,500 (equivalent full time). However, over 6,700 (57%) of this new teaching contingent is made up of casual staff, employed on extremely short-term and precarious contracts [13].

Building on the reality of worldwide expansion in higher education, one might expect a matching *globalising* pattern of higher education systems becoming more like each other. Such a tendency is more possible within Europe, through measures such as the Bologna (and related) agreement, the aim of which is to build a pan-European system of mobility of students and staff, and transportability of academic credit [14].

However, even within the context of the European Education Area, national borders mean that national perspectives in higher education, are based on the history and culture of higher education in each country. Therefore, it is likely that national differences will remain between countries, and there is probably no reason to expect that patterns of teaching, research, administration and other activities that make up an academic life will merge into a single, global pattern, in engineering or other disciplines.

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