The Teaching Researcher: Faculty Attitudes toward the Teaching and Research Roles

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INTRODUCTION

In 2010, Imperial College London ran a two-day event focused on the teaching concerns and aspirations of research-intensive institutions [1]. Specifically, discussions were held on the relationship between university teaching and scientific research, how engineering degrees respond to the needs of industry and society, and the student transition into, and experience of, Engineering Education. A survey on the views of the delegates reinforced concerns of the growing dichotomy between the teaching and research responsibilities of academic staff. Whilst institutional and personal prestige may rely on research output, such research-focused institutions must also address the increasing need for student professional skills and aptitude development for work and leadership in global work contexts. Students themselves are stressing a desire for such development and often, in research-focused institutions, for greater involvement in the research life of the institution [2-4]. Thus, a strong need exists for improved synergy in the teaching and research realms of such institutions.

Studies on the tensions between research and teaching are not new, and have considered the perspectives of students, faculty, employers (industry) and academic institutions [5-9]. Often, such studies have focussed on the approaches and antecedents for research-teaching integration [6,7], the benefits of such integration on graduate attributes [8] and managerial and institutional approaches for teaching-research balance [9]. In many cases, focus has been given to the content and design

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of undergraduate courses (i.e. the student learning-experience), rather than the individual faculty motivation for research-teaching integration. One exception has been the promotion of enquiry-based learning as the key to capitalise on the academic's "love for their subject" [10]. However, concern still remains for motivational drivers for teaching outside the immediate research interests of the academic. In a similar way, where practical methods are offered to help facilitate, support and manage a teaching and research balance, the long term incentives for such a balance are unclear given some of the inherent weaknesses of teaching in research-intensive universities [1]. Thus, whilst past research work has helped clarify the influence of teaching and research integration on student learning, and institutional and managerial perspectives and policies for addressing the teaching-research balance, some issues remain. Specifically: little attention has been give to individual faculty motivations for role integration, and indeed day-to-day work practices and coping mechanisms for such integration; few studies provide evidence on how institutional policies can support faculty in creating an effective teaching and research balance; the role of employer engagement in supporting the *teaching researcher*, particularly on teaching matters, is unclear.

Recently, the current authors have undertaken a UK Higher Education funded project titled Practices and Approaches for the Integration of Teaching and Research. The aim of this study was to identify and disseminate practices that help academic staff manage and integrate their research and teaching roles. Data was collected from semi-structured interviews, case studies and a national online survey. The survey focussed on faculty attitudes towards the teaching and research roles, such as: (i) the perceived value of teaching relative to research, (ii) practices for research and teaching integration, (iii) the satisfaction gained from common teaching and research activities, and (iv) the importance of work-life factors and teaching / research related achievements. This paper will focus on data collected from the national survey.

1 METHODOLOGY

1.1 Overall Research Design

The overall project involved a combination of surveys, semi-structured interviews and case studies. Several scientists and engineers (see *Table 1*) were initially consulted to explore their views on the teaching-research links and to enable formulating relevant questions for more in-depth case studies. For the case studies, STEM academics from a broad range of UK institutions were selected based on their achievements in both teaching and research. The online survey was designed to obtain complementary data from a wider pool of academics (see below). The collation of the case studies is currently being undertaken, further details for which have been previously reported [11].

1.2 Participants

Although the target audience of this study was faculty in research-intensive universities, data collection was from a broad range of institutions to reflect individual examples of teaching and research excellence across the Higher Education sector. Specifically, a wide network of Higher Education Institutions was established through contacts within three UK university groups: the Russell Group, i.e. an association of 24 public research universities); the Million+ Group, comprising of 22 post-1992 universities of former College or Polytechnic (i.e. teaching-only) standing; and the 1994 Group comprising of 11 relatively small research universities. Data collection was from faculty across the STEM sector.

1.3 Questionnaire

A summary of the survey questions is given in *Table 2*. These were a mix of closed and open questions, the former typically requiring a response on a 7 point Likert scale. Two questions were adapted from previously published surveys, i.e. questions 8 and 9 on practices for / the perceived value of teaching and research integration. Questions exploring the specific value and enjoyment of academic roles and achievements (i.e. questions 11, 13, 15) were designed to focus on equivalent teaching and research related matters (e.g. a teaching publication and a research publication), thus enabling an internal reference for gauging the relative value of each. The questionnaire was transcribed into *SurveyMonkey* for online administration and piloted on three academic colleagues.

1.4 Procedure

Several routes were used for the electronic circulation of the questionnaire web link to faculty: (i) the utilisation of faculty email databases held by centralised offices within institutions, such as Educational Development Centres, offices of the Dean / Principal of Education; (ii) the utilisation of a network of colleagues established through the consultation team (see *Table 1*) with requests for on-forwarding of the questionnaire; (iii) the use of existing education networks through, e.g., the Higher Education Academy (HEA), the Higher Education Funding Council for England (HEFCE), and the Staff and Educational Development (SEDA) association; (iv) conference promotion, i.e. the Society for Research in Higher Education (SRHE) annual conference (2012); and (v) direct email collation of a random cross-section of institutions and faculty (especially for those not accessed through other routes. In reality, the approach led to the sampling of faculty across 62 institutions, with an estimated sample population size of 8000.

The cover note to the questionnaire summarised the motivation for the study and ensured anonymity. Approximately 4 weeks was provided for questionnaire completion and where possible, a reminder request was sent 1 week prior the close date. All response data was collected on a single spreadsheet within SPSS.

2 RESULTS

2.1 Demographics

A response rate of 411 was achieved across 62 institutions. Whilst this is a relatively low sample rate (~5%), representation was consistent with national average estimations for the STEM subjects. For example, the STEM discipline of the respondents was recorded as 40.6% science, 6.3% technology, 41.8% engineering and 11.2% mathematics, with a gender split of 71.5% male and 28.5% female. A summary of teaching experience and teaching activity of the respondents is given below:

- Academic rank: 25.5% lecturer; 41.6% senior lecturer / reader; 23.6% professor; 9.2% other (e.g. teaching or research fellow).
- Years of teaching: 23.4% 0-5 years; 20.7% 6-10 years; 56.0% 11 years or longer.
- Percentage of time (during a typical teaching term / semester) spent on research-related activities: 32.6% reported up to 20%; 29.7% 20-40%; 26.0% 40-60%; 6.8% 60-80%; 4.9% 80% or more.
- Student year group taught (multiple years possible): 62.5% first year undergraduates; 59.1% second year undergraduates; 62.8% third year

undergraduates; 55.7% fourth year undergraduates; 73.5% MA / MSc / postgraduate students.

2.2 Research and Teaching Integration

76.9% of the participants responded favourably to the question “doing good research enhances my undergraduate teaching”, i.e. responded as “occasionally” (23.5%), “often” (35.4%) or “to a great extent” (18.0%). In comparison, only 45.0% of participants responded favourably to the question “my research is enhanced by my undergraduate teaching”, i.e. 25.7% “occasionally”, 13.5% “often” and 5.8% “to a great extent”.

When asked about general teaching approaches for student engagement in research (see question 9 in *Table 2*), awareness-level approaches, such as the use of research anecdotes or examples in the classroom, featured most strongly. Specifically, 61.1% of the participants reported that such methods were either “frequently” (45.6%) or “always” (15.5%) used, and 29.6% as “occasionally” used. In comparison, approaches involving the reading, discussion or writing of research papers were relatively uncommon (i.e. 44.8% of participants reported this as “rarely” or “never”, and 35.1% as “occasionally”), as was learning through research work and similar enquiry-based activity (i.e. 23.5% as “rarely” or “never”, and 35.1% as “occasionally”). Nevertheless, a number of respondents commented on the effective use of students in research work, such as the development of methods for testing hypotheses and undertaking initial literature reviews. This was especially so for students in the senior years of study. Likewise, other respondents mentioned regular (annual) lectures on the discussion of current Nobel Prizes and other topical breakthrough technologies and discoveries. Interestingly, a high proportion of respondents reported tuition in research methodology (i.e. 30.9% as “occasionally”, 31.5% as “frequently” and 11.9% as “always”). Some methods for engaging students in research methodology were reported as a mini-conference simulation with student poster displays and the writing of grant proposals.

Other examples of the use of research in undergraduate teaching (see question 10 in *Table 2*) led to the following response categories (in descending popularity):

- The use of research data and research papers in classroom problems.
- The teaching of material that the lecturer would like to learn for their own research, i.e. learning through teaching.
- Students as subjects of research, e.g. computer science education, user interface design.
- The use of open-ended problems as a means of explorative research and research-idea generation.

2.3 Important and Enjoyable Aspects of Work Life

Mean scores (in descending order) on the importance of different aspects of the academic work life are summarised in *Table 3*. Academic freedom, an intellectual work environment, flexible work hours, inspirational colleagues / work relationships, and work diversity are indicated as high in importance. Sabbatical (secondment) leave and collaborative teaching / learning opportunities (with both academic colleagues and employers) are indicated as low in importance. Interestingly, the combination of teaching and research appears as a relatively neutral score.

Mean scores (in descending order) on the enjoyment of typical tasks in academic work life are summarised in *Table 4*. Items in bold indicate teaching-related roles. With the exception of research preparation (e.g. funding applications), overall

research-related activities are reported as more enjoyable than teaching-related activities. However, the satisfaction gained from interactions with undergraduate students is comparable (albeit still less) to that gained from research students The assessment of coursework is considered as the least enjoyable activity by this cohort. For the research-teaching work balance (see question 14 in *Table 2*), the reported distribution of ideal vs. actual work balance is shown in Figure 1. The data suggests, a general desire by most faculty to reduce teaching load.

For a range of academic accolades and achievements, mean scores of the value of these are summarised in *Table 5*. Where possible, the data is displayed to demonstrate the value of comparable achievements in teaching and research. Although student success and good student feedback are important to faculty, other teaching achievements, including publication and recognition through prizes and awards, are reported as of relatively low value. Surprisingly, funding for and publication in teaching are reported as of least value amongst the list of typical achievements, in contrary to comparable research activities. Other valued achievements were reported as: the development and progression of postgraduate students; industrial relevance / transfer of research work; international collaborations; consultancy work; recognition and reward for administrative responsibilities; salary increase; successful public engagement; and the use of one's research work in lectures (teaching) by others.

53% of the respondents reported that industry had played a role in their work motivation. As expected, most reasons for such motivation related to research direction (e.g. defining research needs, new ideas and challenges) and funding (e.g. project funding, studentships and consultancy work). A few respondents commented on teaching motivation benefits through student industry visits and the identification of real-world problems and cases.

2.4 Learning to Manage the Different Academic Roles

In learning how to manage different academic roles, mean scores (in descending order) on the usefulness of various support systems (see question 16 in *Table 2*) are summarised in *Table 6*. Support by colleagues and peers through, e.g., discussions, feedback and observations, was indicated as most useful. Surprisingly, the least useful support was reported to be through workshops and other equivalent training, this actually being perceived as less useful than information available in books, guides or websites and indeed work experience in industry.

3 DISCUSSION

Some key findings from the survey are summarised below:

i. For a range of academic achievements, teaching accomplishments are perceived as relatively low in value. This is especially so for teaching (education) related publications and funding.
ii. The satisfaction gained from interactions with undergraduate students is comparable to that gained from research students.
iii. From a broad list of academic work-life benefits, the following are indicated as most important: academic freedom, intellectual work environment, flexible work hours, inspirational colleagues / work relationships, and work diversity. Sabbatical leave and collaborative teaching / learning opportunities (with both academic colleagues and employers) are indicated as low in importance.
iv. In learning to manage different academic roles, faculty considered the support of colleagues through discussions and feedback to be most beneficial. The value of

workshops (and similar) are viewed as relatively low, surprisingly lower than the value of published books, guides and websites on teaching.

v. The faculty role in student research engagement most commonly involves passive teaching methods, such as the use of research examples and anecdotes in lectures.

Teaching motivation is indicated to arise from a genuine care of student progression and the satisfaction gained from student interactions and course delivery. For the cohort studied in this work, many reported the relatively low value of teaching to their research work. However, others indicate clear efforts in the use of undergraduate students for productive research topic exploration and development. Wider dissemination of such practice is perhaps needed.

Although teaching recognition, and tangible support for teaching and learning developments, are likely to promote a stronger teaching culture, in reality the perceived value of such recognition is likely to be overshadowed by research accomplishments. What may be more effective in the alleviation of research-teaching tensions are support systems that reduce the burden of assessment and research funding preparation. Assessment issues may be addressed through greater formal use of, e.g., teaching assistants and teaching-only staff. Funding application support could arise through specialised technical support staff and indeed faculty training in the greater use of existing research students and workers for grant preparation. Finally, the data indicates the great value of social support in the development and progression of the teaching researcher. This suggests a need for the explicit nurturing of a teaching community to capitalise on, e.g., peer support and mentoring opportunities.

Differences in the above responses based on gender, academic rank and institution type (e.g. research-intensive or teaching focussed) will be presented in future work.

4 ACKNOWLEDGMENTS

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Figure 1 Ideal and actual research-teaching work balance
(1=all research / no teaching; 7=all teaching / no research)

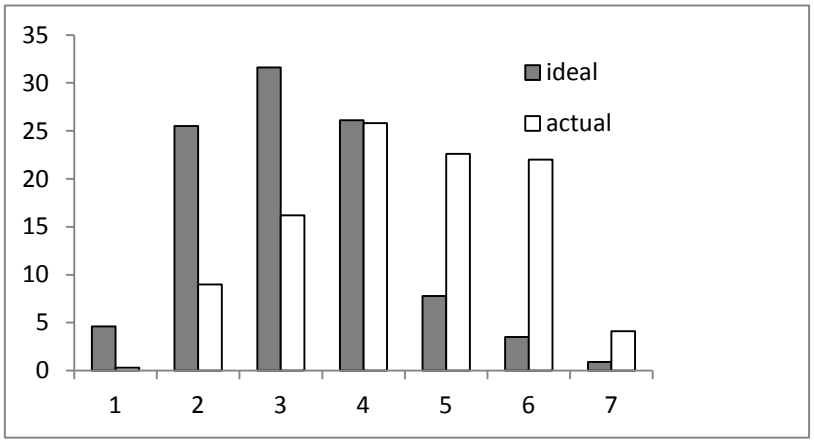

Table 1 Consulted (academic) scientists and engineers in preliminary interviews

Position / role (number of people)	Affiliation
Senior academic staff across STEM universities (13)	Universities of Aston, Loughborough, Liverpool, Northumbria and Imperial College London
Education consultants (3)	Engineering Education
Academic & curriculum advisors (2)	Higher Education Academy
Principal concept engineer (1)	Industry (Shell)
Educational development lecturers and equivalent (4)	Imperial College, King's College, Newcastle University

Table 2 Summary of survey questions

Background: 1. Institution; 2. STEM Discipline; 3. Gender; 4. Academic rank; 5. Years of teaching experience; 6. Time dedicated to research work; 7. Who do you teach?
8 – Please rate your level of agreement with the following statements (1=not at all, 5=to a great extent); (adapted from Ramsden and Moses [5]) [5 point Likert scale] (i) My research is enhanced by my undergraduate teaching; (ii) Having to teach something helps me clarify my ideas in my research work on it; (iii) I share ideas from my research with my undergraduate students; (iv) Doing good research enhances my undergraduate teaching; (v) I feel I have something to learn from my undergraduate students in my research.
9 – Which of the following approaches do you use in your teaching to undergraduate students? (1 = never, 5 = always); (Adapted from Jenkins and Healey [6]) [5 point Likert scale] (i) Students read, discuss and write research papers (or equivalent information); (ii) Students learn through research work, e.g. carry out enquiry-based activities; (iii) Students are made aware of research in the area of study, e.g. through anecdotes or examples; (iv) Students are taught how to do research and what the research process involves
10 - Can you give any other example(s) how you use research in your undergraduate teaching or vice versa?
11 – How important are the following aspects to your work life? (1=no importance, 7=great importance) [see also *Table 3*]
12 - Has industry played a role in your work motivation? If so, please explain how.
13 - How much do you enjoy the following aspects of your academic position? (1=dislike, 7=enjoy) [see also *Table 4*]
14 – Indicate your ideal and actual research / teaching work balance (ignoring any major administrative responsibilities) [see also Figure 1]
15 – For the achievements that are applicable to you, please indicate their value to you (1=low value, 7=high value) [see also Table 5]
16 - In learning to manage your different academics roles, please rate the usefulness of the following (if relevant): (1=not at all, 7=very much) [see Table 6]

Table 3 Important aspects to work life [mean score; standard deviation]

Academic freedom	[6.3; 1.1]	Personal development opportunities	[5.0; 1.0]
Intellectual work environment	[6.2; 1.0]	Industry research collaboration	[5.0; 1.9]
Flexible working hours	[5.9; 1.3]	Advancement within organization	[4.8; 1.6]
Inspirational colleagues	[5.9; 1.1]	Research-teaching integration	[4.8; 1.6]
Diversity of work	[5.8; 1.1]	Industry teaching collaboration	[4.7; 1.8]
PG student development / learning	[5.7; 1.3]	Academic team teaching	[4.1; 1.3]
Collaborative research opportunities	[5.7; 1.4]	Sabbatical / secondment	[4.0; 1.9]
UG student development / learning	[5.1; 1.6]		

Table 4 Task enjoyment [mean score; standard deviation]; teaching tasks in italics

Undertaking research	[6.3; 1.1]	*Interaction with UG students*	[5.6; 1.4]
Research student supervision	[6.0; 1.0]	*Preparation of courses*	[4.7; 1.5]
Research dissemination	[5.7; 1.2]	Research preparation	[3.8; 1.7]
Delivery of courses	[5.6; 1.2]	*Assessment of courses*	[3.2; 1.6]

Table 5 Value of Achievements [mean score; standard deviation]

achievement		**rank**
Research: institutional recognition (e.g. award, prize, letter)	[5.3; 1.7]	8
Teaching: institutional recognition (e.g. award, prize, letter)	[4.3; 1.9]	11
Research: national recognition (e.g. as above)	[5.7; 1.6]	6
Teaching: national recognition (e.g. as above)	[3.9; 1.9]	12
Research: international recognition (e.g. as above)	[6.0; 1.6]	4
Teaching: international recognition (e.g. as above)	[3.8; 2.0]	13
Research publications	[6.2; 1.3]	2
Teaching / learning-related publications	[3.3; 1.8]	15
Accomplishment of novel research work	[6.5; 1.1]	1
Successful introduction of a novel teaching initiative	[5.0; 1.6]	10
Reputation as an accomplished researcher	[6.2; 1.4]	3
Reputation as an outstanding / innovative teacher	[5.3; 1.6]	9
Success in research funding	[5.7; 1.6]	6
Success in funding for a teaching related activity	[3.4; 1.9]	14
Excellent student feedback	[5.8; 1.3]	5
Student success in courses (e.g. achieved grades)	[5.6; 1.3]	7

Table 6 Useful support for learning to manage the different academic roles [mean score; standard deviation]

Colleagues and peers (e.g. discussion, feedback , observations)	[5.4; 1.4]	Work experience in industry	[4.1; 2.2]
Other support staff	[4.4; 1.7]	Books / websites / guides	[4.0; 1.9]
Academic advisor / mentor	[4.2; 1.8]	Other work experience	[4.0; 2.1]
Work experience as post-doc	[4.2; 1.9]	Workshops / training	[3.5; 1.6]