

## Supporting the Teaching Researcher

*Respaldo al investigador que es también docente*

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### Resumen

Las tensiones entre los roles investigadores y docentes en la universidad son de sobras conocidas. Hasta la fecha, la formación del profesorado sólo ha tenido en cuenta de forma parcial esta problemática, así como las motivaciones, predisposición y prioridades del investigador que es a la vez profesor. Este artículo ofrece una descripción general de la formación del profesorado (en cuanto a contenido y a proceso) adecuada a un entorno enfocado a la investigación. Concretamente se da información sobre el planteamiento de la formación adoptado recientemente por la universidad Imperial College London. Este enfoque incluye aprendizaje experiencial basado en la práctica, apoyo e input de una amplia comunidad (por ejemplo pares, pares sénior y expertos en educación), clara contextualización respecto a la disciplina y propiedad/interiorización, y énfasis en los potenciales paralelismos entre docencia e investigación así como el valor de la docencia para la investigación. Además, se promueven aquellas prácticas docentes que aprovechan el rol investigador y el potencial institucional, y se ejemplifican mediante la noción de docencia que respalda la investigación.

**Palabras clave:** roles académicos, motivación del personal académico, integración investigación-docencia, formación del profesorado.

### Abstract

Tensions between the research and teaching roles in university are well recognised. Past teacher training practices have only partially considered such issues and indeed the motivations, bias and priorities of the teaching researcher. This paper provides an overview of teacher training (content and process) that is suited for the research-focused environment. Particular attention is given to a training approach that has been recently adopted at Imperial College London. The approach involves practice-based and experiential learning, support and input from a broad community (e.g. peers, senior peers and education experts), clear discipline contextualisation and ownership, and emphasis on the potential parallels between teaching and research and the value of teaching to research. Furthermore, teaching practices that capitalise on researcher and institutional strengths are encouraged, and exemplified through the notion of *research-supporting* teaching.

**Keywords:** academic roles, academic staff motivation, research and teaching integration, teacher training.

## Introduction

Tensions between research and teaching in university are well recognised. Currently, the problems are confounded by the increasing competitiveness amongst research-intensive universities for both research funding and student satisfaction ratings. The latter is exemplified by the now common publication of student surveys such as UK's National Student Survey, Australia's Courses Experience Questionnaire and the US's National Survey of Student Engagement; see also the discussions of Garcia-Aracil (2009). Such competitiveness has led to greater demands on academic staff for both research productivity and teaching excellence, and has raised the controversial notion of *students as customer* (see e.g. Cuthbert, 2010) that has previously eluded significant debate in elite (typically research-intensive) institutions. As a consequence, there has been much recent interest on teaching practices that potentially capitalise on institutional research strengths and priorities. In the UK, for example, an increasing number of initiatives are being reported that consider issues about teaching developments in research-intensive universities, such as the King's-Warwick Project (2010) (see Footnote 1), the Academy of Medical Sciences work on "Readdressing the balance: the status and valuation of teaching in academic careers" (2010) (see Footnote 2) and the Royal Academy of Engineering / MIT report on "Achieving excellence in engineering education" (2012) (see Footnote 3). Various institutional guides and case studies on linking research and teaching are also now common; see e.g. materials from the universities of Exeter (see Footnote 4), Bath (see Footnote 5) and Gloucestershire (see Footnote 6). In a similar way, there has been a reemergence of interest in frameworks for understanding the nature of research-teaching integration, such as those reported by Jenkins and Healey (2005); Healey and Jenkins (2009); Lucas et al. (2008); Taylor (2007).

Jenkins and Healey (2005) have considered how universities can practically support research and inquiry-based learning through consideration of both institutional and student perspectives. They argue that all undergraduate students should experience learning through (and about) research in a fashion modeled by the academic researcher. Accordingly, the authors define four related categories of teaching that introduce research into the curriculum: (i) research-based, i.e. learning through research work / inquiry; (ii) research-led, i.e. reference to research in the area of study; (iii) research-oriented, i.e. tuition on how to do research / the research process; and (iv) research-tutored, i.e. the reading / discussion / critique of research literature. Bates (2008) also reports on a similar practice-focussed study for a range of disciplines in Scottish universities. Here, the case studies and "snapshots" demonstrate a wide range of activities for bringing in research into teaching that again can be mapped onto the categories defined by Jenkins and Healey. Whilst such studies illustrate methods for research and teaching linkage, less attention is given on individual academic motivations for the teaching role. Rather, there may be an assumption that teaching that has a research element will be naturally motivating for academics. In reality of course, both extrinsic and intrinsic factors may hamper teaching motivation, such as time pressures, promotional rewards, cultural attitudes towards the value and status of teaching, and indeed researcher-bias towards certain teaching and learning styles (Alpay and Jones, 2012). Therefore, to understand authentic drivers for role integration (and subsequent teacher support methods), attention is needed on the affective and cultural aspects of teaching. In other words, greater attention is needed to individual perspectives and the day-to-day practices for motivation and coping as a *teaching researcher*.

More recently, Imperial College London held the first Educating Engineering Leaders (E2L) conference, bringing together an international group of experienced educators and industrialists; see Alpay and Jones (2012). The two-day event focused on the teaching concerns and aspirations of research-intensive institutions. Specifically, discussions were held on the relationship between university teaching and scientific research, how degree programmes 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, and

subsequent detriment to the student learning and development experience. A key message from E2L was that teaching must address the needs for student professional skills development, especially in global and leadership contexts (see e.g. De Graaf and Ravesteijn (2001); Fenner et al. (2006); Pritchard and Baillie (2006)). Indeed, students themselves often comment on the desire for such development as well as greater involvement in the research around them; see e.g. Zamorski (2002); Alpay et al. (2008). Such issues again necessitate teacher training and support practices that give due consideration to the motivations of and demands on the teaching researcher.

Given the abovementioned issues, it is apparent that past teacher training practices have only partially addressed the research-teaching nexus. Several specific concerns remain:

- How should new lecturers be supported in their development as teaching researchers?
- What additional content / process knowledge is needed to support the needs for, e.g., student professional and global skills development? How can researchers be effectively motivated to engage in such development?
- How can a culture for teaching development be fostered in a research-intensive university?

In this paper, an overview of recent developments in the teacher training of new lecturers at Imperial College London is presented. Specifically a multifaceted approach is described that has a focus on experiential, discipline orientated and community supported (i.e. department, peer, education expert) learning. Discussion is then given on how the different facets of support can address the concerns raised above so as to meet the needs of the teaching researcher, and indeed, help embed an ethos for ongoing teaching skills development.

## **Multifaceted teaching support**

The probationary (tenure-track) period for new appointments at Imperial College is typically 3 years. In this time, lecturers are expected to establish a basis for a sustainable research programme, and demonstrate a standard of teaching that meets the expectations and needs of both students and teaching managers. Such teaching development necessitates a broad range of experiences, feedback from different sources (see below), opportunities for personal reflection and, of course, exposure to key teaching knowledge and pedagogy. The management structure of such multifaceted support is important, helping to create a culture for teaching development that may otherwise be undermined by research pressures and priorities. Clear *local* management support (i.e. Faculty (see Footnote 7) / departmental) has distinct advantages over centralised university support, and has been a fundamental change in recent years in the teacher training of Imperial College staff. A related change has been to move away from an expert-to-learner didactic model, to one that involves the teaching (academic) community as a whole in the development process. Further elaboration on these issues is given below.

### **Local management responsibility**

A typical approach in supporting teacher development has been through the use of centralised training with local teaching application and feedback. Such a set-up has the advantage of utilising (and indeed creating) generic education expertise and resources through, e.g., Learning and Teaching Centres, Educational Development Units or equivalent. Furthermore, central workshops often involve participants from a range of discipline backgrounds, thus providing opportunities for sharing good practice across the university. As a means of quality assurance, the Higher Education Academy (see Footnote 8) (HEA) has in recent year's overseen accreditation of such programmes, leading to professional HEA membership of individuals who

have successfully completed training in their institution. In a similar approach, some UK universities require new lectures to undertake a Postgraduate Certificate in Higher Education, i.e. a nationally recognised teaching qualification for university teachers, and often provided by an external institution with participants from several universities. In all cases, central workshop / seminar attendance is usually only one component of support (and training requirement) but nevertheless an important format for core theory and practice transfer.

A major disadvantage of the centralised model, especially in terms of programme management, is the possible separation of control from *ownership*. For example, whilst it may be in the immediate interests for departments, teaching directors and research groups to have new staff trained in an effective and efficient way, often they are not involved or consulted in the design, development or delivery of such programmes. This can lead to potential conflicts concerning the work and time commitments of the training and the relevance of its content. Identity issues may also arise whereby new lecturers do not readily relate to the educationalists of a generic (non-scientific / non-technical) grouping. Likewise, resentment may arise through a perceived lack of appreciation of the implicit and historic educational expertise of established and distinguished departments. In other words, cultural and communication barriers may arise when addressing pedagogy that has both a theoretical grounding in the education literature, and also a historic, practice-based grounding in the teaching *evolution* of a department and discipline. It may sometimes be forgotten, for example, that concepts such as problem-based and peer learning have been an implicit aspect of engineering education for many decades, rather than a practice that has emerged from pedagogical understanding by education experts.

Dealing with the issue of perceived control is likely to depend on institutional management, consultation and communication structures. However, in large institutions problems will persist. Since October 2010, the overall responsibility for teacher training at Imperial College London has shifted from a central educational group to individual Faculties. Within each of these, teams of academic staff oversee the design, delivery and quality of training programmes. In practice, this has led to greater local (departmental) involvement and empowerment in supporting the development of new lecturers. As will be discussed below, the set-up has not negated or marginalised the expertise of the educationalists, but rather has set a tone of shared responsibility in teacher training and a premise for greater contextualisation of teaching practice. Furthermore, in the case of the Faculty of Engineering, strategic developments on teaching (and corresponding staff preparation and development) are now coordinated through a cross-departmental Faculty Teaching Committee. This provides a discipline-owned mandate / endorsement for initiatives that have potential impact and value to teaching and learning across the Faculty. Nevertheless, annual meetings with other Faculty leads in teacher training ensure practice exchange and some training standardisation across the College.

### **Generic and specialised workshops**

As mentioned above, the generic workshop / seminar approach remains popular as a means of sharing core theory and practice, and exposing new lecturers to a range of education experts. The Imperial College model has led to the rationalisation of a number of former central workshops to three core requirements, namely one-day workshops on learning and teaching, personal tutorials and PhD supervision (see Footnote 9). These can be seen as introducing lecturers to the three key student interaction scenarios: teaching, facilitating research and pastoral care. Each Faculty then provides specialised workshops (or equivalent) to support specific discipline and practice issues. The delivery of these may again involve central education experts, e.g. optional workshops on problem-based learning, large-group teaching and creativity in learning and teaching. Other workshops are Faculty specific and Faculty-led, such as sessions on the use of relevant learning technologies and interactions with and demonstrations from senior peers who are recognised as exceptional teachers.

The Faculty of Engineering uses the specialised workshop format to raise lecturer awareness on topical issues in Engineering Education. For example, current workshop discussions (and / or resources) include:

- Tools and approaches for supporting student skills development, e.g. peer assessment, personal development planning, team development events.
- The effective and creative use of graduate and undergraduate teaching assistants
- Methods for student involvement in research.
- The management of teaching and research roles; coping mechanisms.
- The wider Engineering Education community, e.g. societies, journals and conferences.
- Faculty-level support of teaching and teaching development, e.g. teaching development grants, awards of teaching excellence, learning technology support.

The discussions also provide an emphasis of an Engineering Education *discipline*, i.e. scholarly activity that provides a basis (evidence) for teaching practice and developments that are shared across the different engineering courses. This common theme can help to build an engineering identity amongst the participants, strengthening the concept and value of interdisciplinary learning and inter-departmental teaching support.

A further possible extension of the specialised workshop concept is the involvement of new lecturers in workshops supporting the training of graduate teaching assistants (Faculty of Engineering). This provides new staff with the opportunity to appreciate the concerns and challenges of junior tutors / demonstrators (typically PhD students), and contribute to discussions on effective practice. Placing the new lecturer in the *teacher trainer* role (but supported by an experienced trainer) is also expected to generate much motivation for the individual to reflect on practice and theory. The sessions may also help create a stronger teaching community amongst lecturers and teaching assistants.

## Observations

The observation of new lecturers is commonly employed in teacher development. The feedback and follow-up discussions from these can lead to much awareness of teaching style, impact and effectiveness, and help create a peer community for teaching support. All new lecturers at Imperial College are required to arrange observations of their teaching and capture their learning from this through a reflective statement on learning points and areas for action. A second practice (and less common in other institutions) is the *structured* observation of experienced teachers by the new lecturers. This involves preparation for the observation by determining, e.g., the intended learning outcomes and methods of student engagement, and a post-class discussion with the experienced teacher to further explore session design and teaching practice. Learning is again captured through a reflective statement, and particular attention given to possible practice that can be incorporated into one's own teaching. At Imperial College (Faculty of Engineering), this observation requirement has also resulted in the collation of a list of *star* teachers, allowing new lecturers to observe a range of high-caliber teaching from across the Faculty. Typically, observations (as observer and observee) are carried out on several occasions in an academic year, but the frequency is dependent on the development needs of the individual lecturer.

A related observation requirement is based on student feedback and lecture / lecturer evaluation. This is achieved through anonymous online surveys on a termly basis whereby students can provide information on the lecturer's performance. Regular student feedback provides new lecturers (and their mentors – see below) motivation for reflection and discussion on classroom practice, course design, assessment and the student learning experience.

## The academic mentor

The decentralisation of teacher training management, the rationalisation of workshops and the involvement of peers in supporting teaching skills creates an onus for the careful mentor support of new lecturers. For example, such mentors can ensure that there is learning and progression through the relatively sparse and experiential nature of the training, address teaching issues of immediate concern to the lecturer, elaborate on workshop issues and provide critical input on reflective components of the training; see the Appendix for examples of discussion topics with the academic mentor. However, the quality and nature of mentoring can be highly variable, and itself prone to a research rather than teaching focus. As a consequence, a current development at Imperial College is to create separate teaching and research mentor roles. The former would involve a small number of senior academics in each department who regularly meet with the group of new lecturers in that department. Discussion topics would be as before, but with the added benefits of department-specific peer-group discussion, learning and support, and total focus of the session on teaching. The set-up also provides the possibility for a Faculty-level academic mentor community, further ensuring consistent lecturer support and the sharing of good practice in mentoring.

## Meeting the needs of the teaching researcher

The above discussions demonstrate the wider involvement of the academic community and stakeholders in the teacher training of new lecturers. At Imperial College, the training no longer centers on general education experts, but rather includes the input from senior academics, peer groups, undergraduate students and teaching assistants. The format is also practice-based, responding to actual teaching occurrences, observations and feedback. Requirements for regular observations and mentor meetings help to avoid a *tick-box* mentality towards training. Rather, teaching development becomes a practice that is embedded into the culture of the academic role, requiring, for example, engagement with peers and teaching assistants, and response to student feedback. Indeed, upon completion of the probationary period, lecturers themselves may be involved in the observations of junior peers and the delivery of specialised workshops. Moreover, the teaching support community is broadened to include accomplished teachers and teaching support staff within the home department and Faculty as a whole.

In respect to the needs of the teaching researcher, how can such a teacher training model help? The following benefits are indicated from the Imperial College experience:

1. At a pragmatic level, the practice-based approach provides training that is integrated into the work-life of the researcher, reducing the need for, e.g., untimely and excessive workshop attendance.
2. The Faculty-wide involvement in the scheme (e.g. teaching-focused academic mentors; programme endorsement through Faculty Teaching Committee) helps to balance the strong research culture, raising the profile of teaching. This in turn can lead to improved motivation towards teaching and teaching development and potentially greater senior management response in recognising and rewarding teaching achievements.
3. The inclusion of specialised workshops gives focus to current issues / concerns in teaching and the profession. For example, the Faculty of Engineering priorities have been informed by the recommendations of the E2L meeting and recent literature on research-teaching tensions (see above). Examples of subsequent workshop discussion topics have been listed above; additional topics of particular relevance to the research-teaching nexus include:

- The use of undergraduate projects to support *real* research; the use of the research lab as a classroom; modeling problem solving and critical thinking through the research approach.
- Researcher bias in teaching and learning, e.g. “model and simulate” vs. “design and build” approaches.
- The use of industrial / external research contacts in supporting teaching.

Such topics act to support new lecturers by encouraging them to take advantage of personal and institutional strengths, and to incorporate research practices, networks and projects into their teaching. This approach can be seen as an extension of Jenkins and Healey’s research-based learning category (see above) to one that is *research-supporting*, i.e. learning through research work / inquiry that has a direct relevance to actual research programmes and / or researcher needs. Given this definition, research-supporting may also include the skills development of the lecturer through, e.g., explicit tuition in / supervision of tentative and exploratory research, industry networking, and creative and collaborative problem solving.

1. An awareness of the scholarly nature of Engineering Education, such as evidence-based practice, Engineering Education research, conference networks and publication outlets, helps further raise the profile and intellectual-standing of teaching. In other words, lecturers may better appreciate the similarities between technical and educational research and development. Indeed, in some cases, lecturers may be motivated towards scholarly rigour in their teaching and teaching innovations with the intention of disseminating the activity through publication and / or conference presentation.
2. Opportunities to consider the researcher-approach to teaching, together with opportunities for local peer group support in teaching, can instill an *operational* approach to teaching that is analogous to research. For example, rather than having an independent, *silo* and textbook-based mentality to teaching, the lecturer is encouraged to adopt a research-like approach to teaching involving an up-to-date understanding of current practice, collaborative (e.g. team and interdisciplinary) teaching, evaluation of teaching outcomes and an attitude towards ongoing teaching development.
3. The use of exceptional teachers (who are also active researchers) in workshops to share their personal approaches, strategies and tips. Where relevant, and with the help of an education expert, supportive teaching theory can then be brought in to emphasise pedagogy. Of particular value are the sharing of coping mechanisms, teaching-research work-life management and, more fundamentally, interactions and relationship building with potential role models who excel in both teaching and research. Given its success and popularity, greater use of this approach will be made in future years. In a similar way, currently a national (UK) study is underway to generate further case studies on exceptional teaching researchers (across science, technology, engineering and mathematics), with a particular focus on motivational drivers and role management (see Footnote 10). Such material is likely to add further value to the specialist workshops and mentor and peer-group discussions mentioned above.

Motivated teachers, who actively share and model a research approach, and indeed create opportunities for student engagement in research, are likely to spur student motivation, especially amongst those who have been particularly attracted to an institution because of its research reputation. Finally, preliminary participant evaluation on the new workshops and the scheme has been positive, and as importantly, previous staff concerns on the value and time-commitment of the training have been addressed. Interestingly though, actual time commitment towards training has not been reduced, but rather shifted from classroom (workshop) experiences and portfolio requirements to on-the-job mentor meetings and observation discussions. Further formal evaluation of the scheme is planned as the new cohort of probationary lecturers complete training over the next couple of years.

## Conclusion

A teacher training approach is presented that considers the needs, motivation and priorities of the teaching researcher. Focus is given on emphasising the parallels between teaching and research, and practice that has value to the interests of the researcher. A decentralised model is employed to encourage greater local staff involvement and empowerment in supporting the development of new lecturers, and to help build a teaching community identity. The approach necessitates careful academic mentor support to ensure wholistic and consistent development through the various experiences.

## Footnotes

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## **Appendix**

Examples of discussion topics with the academic mentor:

### Induction

- The probationary period: requirements, procedures and documentation
- Introduction to teaching in the Department, e.g.:
  - Curriculum overview and cross-linking teaching to other modules
  - Departmental teaching structure
  - Teaching and assessment practices
  - Practical, laboratory and design classes / activities
  - Academic vs. personal tutorials
  - Administrative and support roles
  - Evaluation: student evaluations, peer observation and self-evaluation

### Key Teaching Areas

- Course design, e.g.:
  - Learning outcomes
  - Student prior knowledge
  - Knowledge vs. process
  - Instructional methods
  - Assessment methods
- Preparation for teaching, e.g.:
  - Current materials and other resources
  - Possible observations / shadowing
- Academic tutorial support for teaching:
  - Practices
  - Use of graduate and undergraduate teaching assistants
- Assessment and feedback
- Evaluation of learning and teaching
- Supporting students' professional skills development
- Teaching and learning approaches, e.g.:
  - Problem based learning
  - Student-centered learning
  - Inquiry-based learning
  - Practical / hands-on learning

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