

Teaching and Learning in Canada's Research Universities

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SUMMARY

There is a growing body of empirical research on university teaching and learning, and a growing consensus about how teaching methods and instructional climate affect student learning approaches. This keynote will describe the highlights of this research and examine its implications for the way we undertake teaching and curriculum planning in research universities. How much of our teaching practice is based on the evidence from current research? What is effective learning in university; how can it be enhanced, and what evidence do we have for the effectiveness of our programs and teaching methods? How can we encourage a culture of teaching scholarship that might inform good practice for the future?

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Introduction: Dispelling some myths about teaching-research links

It's something of a cliché say that teaching and research are inextricably linked. Involvement in research is the distinguishing characteristic of the contemporary university, and the term "research-intensive" is claimed as a badge of honour by so many institutions that the term has lost much of its meaning. Yet Western universities have not always placed such stress on research, in the sense of faculty engaging in empirical scholarship (what Boyer calls the "scholarship of discovery") -- for example as opposed to being scholarly through reading widely in the field and engaging in discussions with colleagues about academic issues.¹ I would like to try to unpack some of the mythology surrounding the relationship

¹ I am reminded of the wonderfully evocative description of the University of Alberta in the 1920s by Lovat Dickson in his autobiography, *The Ante-Room* (Toronto: Macmillan, 1959).

between teaching and research, especially as it relates to undergraduate education.

First, is it true that good teaching and good research go hand in hand, in the sense that faculty with distinguished research accomplishments are generally good teachers? There is in fact a considerable amount of empirical research on this topic, and while the measures employed are often not ideal, on the whole it appears that there is at best only a modest correlation between teaching effectiveness and success at research.² This to me implies that (a) if you want to be a good teacher you have to work at it, just as you do to become a successful researcher, and (b) if we wish to foster proficiency (or even excellence) in *both* teaching and research we have to deliberately plan for that to happen. Later I will try to make some suggestions about what form such a plan might take.

A second assumption about teaching and research is that undergraduates would benefit from knowing more about faculty research and becoming involved in research themselves. While this seems at first blush to be an attractive proposition in a research university, I would suggest that the benefits depend in part on the nature of the research involved and the goals or learning outcomes envisaged. Do we mean empirical research using methods and problems characteristic of the discipline concerned (e.g. undertaking an honours thesis, or joining a research team in science)? Do we mean tackling an empirical problem commonly faced by professionals in applied areas, such as business, engineering, or medicine? Or is the research approach of a more generic nature, such as problem-based or inquiry learning?

While many faculty are enthusiastic about inculcating undergraduates with the values and methods of the discipline and are keen to prepare students for future postgraduate study and even an academic career in the field, it is important to remember that a substantial majority of undergraduates never go on to postgraduate work, and relatively few outside the professions work in the discipline of their major. In involving undergraduates in research there is an assumption that, say, designing an empirical study in the discipline will develop skills that transfer to other life and work situations. Ironically, however, the empirical evidence for such transfer is mostly lacking. Of course, no-one would deny the need for students to acquire general problem-solving skills and the ability to think deeply and critically about problems and issues. In the next part of the paper I address the issue of how such skills are best developed, and what teaching approaches seem to work most effectively for such goals.

Applying research to teaching

² For a good review, see the 1994 report of the Task Force on Resource Allocation prepared for the Ontario Council on University Affairs: *Undergraduate teaching, research and consulting/community service: What are the functional interactions? A literature survey.*

I would now like to focus on a rather different aspect of the teaching and research nexus, and pose the question of how much of our current teaching practice is research- or evidence-based?

One consequence of the fact that few faculty receive any explicit training in teaching is that we approach the task in a rather amateur fashion -- in the good and bad sense of that term. Indeed most faculty and university administrators are unaware that there is a considerable body of research on effective teaching practice, much of it specific to the special context of higher education. The interesting and influential line of research over the past 25 years has focussed on the factors that promote cognitive development in students -- not simply acquisition of information so often measured by exams, but more generic skills, such as problem-solving, critical thinking, and what the researchers have termed "deep" learning. We now know a good deal about what promotes effective learning in undergraduates, and furthermore this substantial body of research offers many pointers to the way we might best organise teaching to promote deeper and more independent learning.

The emphasis here is not so much on *how much* students learn, but on *change in learning processes*, and how these are affected by instructional interventions (teaching) and institutional learning climate. Investigators have identified different learning approaches, measured changes in learning approaches over time, and tried to discover the determinants of such change. This research derives from a number of individuals working in different countries -- but relying greatly on a cross-fertilization of findings and methods of inquiry. The work is associated with the names of scholars such as Marton and Säljö in Sweden Entwistle and Ramsden in England, and Biggs, Kember, Trigwell, and Watkins in Australia and Hong Kong.

These researchers have identified and described different learning approaches, beginning with the classic papers by Marton and Säljö (1976a, 1976b), who first used the terms "deep" and "surface" approaches to learning, later renamed by Entwistle and Ramsden (1983) "meaning orientation" and "reproducing orientation". Deep learning refers to an approach that emphasises the pursuit of meaning and understanding, with deep learners seen to be intrinsically motivated. The act of learning is its own reward, and the major goal of the learner is to integrate new learning and ideas with their existing understanding. Surface learners on the other hand are primarily motivated to meet minimum task requirements (e.g. to pass the course), and they see learning as mainly a matter of reproducing information without any particular interest in its meaning.

Of course all of us frequently engage in surface learning just to get through the many tasks we face in our everyday lives, and surface learning may indeed be appropriate for many routine matters. But to meet the challenges of change and complexity in modern society, university students inevitably need to use learning approaches that stress depth -- in the sense of conceptual understanding and

integration of new knowledge with existing ideas, to solve complex and often novel or unanticipated problems.

What sorts of learning approaches are used by university students, and how are they affected by characteristics of the institution, especially by teaching methods? An early study at the Australian National University by Watkins and Hattie (1981) reached some pessimistic conclusions. It involved an ambitious longitudinal investigation of 540 students as they proceeded through their undergraduate programs, with approaches to study measured by both questionnaire and personal interviews. The research revealed that students' learning orientations in fact became progressively more surface over the three years of their university studies, and Watkins and Hattie attributed their results primarily to the examination system which, they concluded, discouraged adoption of deeper learning approaches.

More optimistic conclusions can be drawn from an investigation by Ramsden and Entwistle (1981), who studied over 2,000 British university students enrolled in 66 different academic departments in the humanities, social sciences, sciences, and engineering. There was no universal pattern of change in learning orientation over time, but some departments, across all the disciplines studied, did foster adoption of deeper learning approaches by their students. Such departments were characterised by "good teaching", "greater freedom in learning", and "avoidance of overloading". Good teachers were defined by Ramsden and Entwistle as instructors who tried to understand student difficulties, were ready to give help and advice on study methods, and took care to pitch material at an appropriate level. The authors defined "freedom in learning" as allowing students a choice of tasks to complete course requirements, and a choice of learning methods to accomplish these tasks. Other characteristics that appeared to promote deeper learning included setting clear goals and standards for academic work, vocational relevance (perceived links between what was being studied and students' later lives and careers), social climate (good relations between students and teachers), and less emphasis on formal teaching (attending classes) compared to a stress on the importance of individual study.

Several years later, Bertrand and Knapper (1991) did a partial (and much more modest) replication of the Entwistle and Ramsden study in three academic departments at the University of Waterloo, using questionnaires adapted from the 1981 research. Differences between student learning approaches in the three departments were found to differ markedly in the predicted directions, and persisted over time. They were also associated with aspects of teaching and academic climate identified by Ramsden and Entwistle (Knapper, 1995).

Kember has also shown links between the orientation of individual teachers and a change in their students towards deeper learning approaches. Kember developed a scale to measure teaching values and beliefs, and distinguished, following Barr and Tagg (1995) between "subject-orientation" at one end of a continuum, and "student- or learning-orientation" at the other. Teachers holding

more learning-centred orientations, and who encourage more active learning and interaction with students, appear to promote deeper learning than teachers who hold more subject-centred values (Kember & Gow, 1994).

Although the work cited above has been done mainly with student populations in Europe, Australia, and Asia, the findings about links between teaching methods and learning outcomes receive some support from American research that has adopted quite different methodologies. For example, Astin (1993) in a massive project that involved 20,000 students, 25,000 academic staff, and 200 institutions in the USA, showed that the characteristics and behaviour of teaching staff had major implications for student development. In particular, opportunities for student-staff interaction had "positive correlations with every self-reported area of intellectual and personal growth" (p. 383), and there were similar positive effects associated with opportunities for interactions among students themselves. In contrast, sheer number of hours devoted to teaching was unrelated to cognitive development, suggesting that it is the *quality* of staff-student contact, not the quantity, that is of critical importance.

Pascarella and Terenzini (1991) analyzed the results of over 2,600 empirical studies dealing with the impact of higher education on student learning and development. They concluded that student learning is "unambiguously linked to effective teaching, and we know much about what effective teachers do and how they behave in the classroom" (p. 619). Such behaviours include the instructor's ability to establish rapport with students, interpersonal accessibility, feedback to students, active learning strategies, opportunities for students to interact with their peers, and "a curricular experience in which students are required to integrate learning from separate courses around a central theme" (p. 619). Writing about the implications of their research for policy and practice, Pascarella and Terenzini conclude that academic departments should strive to "create environments that attract and engage students in both intellectual and interpersonal learning" (p. 653).

This research is largely unknown to Canadian academics outside of educational development centres. Nonetheless the concept of deep learning is intuitively appealing to most teachers as a sensible goal for undergraduate education. At the same time, many of instructional practices and curriculum planning processes work against achieving a move to deeper learning. Elsewhere (Knapper, 2004) I have attempted to provide a simple overview of research relevant to teaching and learning in higher education and attempted to derive a set of guidelines for good practice.

Developing a scholarship of teaching

The idea that there is a respectable body of research that could inform good instructional practice has resulted in calls for university teaching to be more professionally and evidence based. University teaching is one of the very few

professions where practitioners receive almost no formal preparation for their work, where there is no process for the accreditation of minimum competence, and where involvement in continuing professional education is uncommon -- although the growth of educational development centres has begun to change this to some extent, and in many parts of the world (for example Australasia and Europe) the professionalisation of university teaching is well underway. Boyer and Rice use the term "scholarship of teaching" to describe the process of undertaking research on instructional practice and using teaching methods that reflect the insights from such scholarship. But here too there is a danger that the term will be used to mean whatever we want it to mean, and that the any scholarship of teaching will always be second-best to the "scholarship of discovery" or empirical, discipline-base research.

If we are to base a scholarship of teaching on established scholarly traditions then this might have some of the following implications.

- Teaching should be **informed** and **evidence-based**;
- Teaching activities and achievements should be **documented**;
- Teaching approaches should in general be **replicable** by others, in the sense that someone should be able to understand enough of a teacher's approach to try it for themselves;
- Teaching should have some **conceptual underpinnings**, in the sense that there should be a reason why we do what we do as teachers;
- Teaching should involve some **assessment of process and outcomes** so that we can tell whether our teaching approaches are effective, in particular in promoting particular types of learning;
- Teaching should involve some sort of **reflection** that might lead to change and improvement;
- Perhaps teaching should build on such reflection to effect **change** (hence the idea that scholarly teaching is dynamic and even creative).

At one level this might simply mean becoming informed about teaching in higher education (what many lowlier professions do as a matter of course) by reading, attending workshops, etc. But we also have to gather evidence about our teaching, for example from students (questionnaires, classroom assessment techniques), from alumni, measures of learning outcomes, identifying the products of good teaching, action research, and perhaps even controlled experiments.

Conclusions: How research might produce better learning – what needs to change

I have spent most of this paper of examining one aspect of the teaching-research interface -- the issue of how empirical research on teaching can impact educational practice. I have argued that, despite the difficulties of undertaking scholarship in this area (because of problems of controlling all the relevant

variables in a complex environment), there is now an impressive and convincing body of research about how the way we organise teaching affects student learning processes and outcomes. We know that how students are taught, what learning tasks and experiences they encounter, and how instruction and curricula are organised have a profound effect on generic learning approaches. But has this had in fact produced any real changes in educational practice?

In my view there is little doubt that teaching has changed considerably since I began my academic career in the early 1960s, and started work as a full-time developer in 1976. Thanks heavens for that, since the teaching methods of 45 years ago would be inadequate to deal with the students and educational pressures of the early 21st century. The range of teaching and learning methods now in use is much broader, there is much greater awareness of ethical and diversity issues in dealing with students, and teaching is regularly documented and evaluated at both the individual and institutional level. Perhaps more important, there are more conversations and reflection about teaching, more reflection about teaching practice and effects on learning, in part due to the establishment of educational development centres, which have acted as catalysts for discussion and innovation.

At the same time, there is a great deal about university teaching that remains problematic, and which stubbornly resists the precepts about good practice that developers have been preaching for several decades. Specifically:

- teaching remains overwhelmingly didactic and reliant on traditional lectures; assessment methods are often trivial and inauthentic (Lammers and Murphy, 2002);
- curriculum development relies far too much on disciplinary tradition and faculty interests, rather than student and societal needs;
- there is still a “tyranny of the academic disciplines” which mitigates against integration of knowledge and insights from different fields;
- and evaluation of teaching effectiveness and learning outcomes is often superficial.

In 2005, classes are generally much larger and teaching is more depersonalised. And because students spend an increasing amount of their disposable time in formal classes compared to 30 years ago, listening instead of processing and reflecting, there is often little time or incentive for them to engage in the independent learning that the modern world demands and most faculty members support. There is enhanced use of educational technology, especially for distance education, but all too often this emulates traditional didactic teaching and testing instead of promoting student curiosity and autonomy. In other words there is too often a poor alignment, in Biggs’ (1999) terms, between what is taught and the competencies students will need in their later lives and work settings.

A major challenge for universities, especially at a time of resource constraints, is to organise teaching so as to maximise learning effectiveness. A major barrier to change is the fact that most faculty are not trained for their teaching role and are largely ignorant of the research literature on effective pedagogy (see, for example, Knapper, 2004). The need for change is urgent, and a number of commentators have offered suggestions on how this might be done (e.g. Biggs, 1999; Kember, 1997; Prosser & Trigwell, 1999; Weimer, 2002). Ideas include:

- Teaching methods that stress student activity and task performance rather than just acquisition of facts;
- Opportunities for meaningful personal interaction between students and teachers;
- Opportunities for collaborative team learning;
- More authentic methods of assessment that stress task performance in naturalistic situations, preferably including elements of peer and self-assessment;
- Making learning processes more explicit, and encouraging students to reflect on the way they learn;
- Learning tasks that encourage integration of information and skills from different fields;
- Curriculum planning that focuses on realistic student learning outcomes rather than disciplinary traditions and faculty preferences.

What is interesting about his list is that some of the initiatives mentioned earlier for involving undergraduates in research would help achieve some of the recommended changes -- in some cases through serendipity, since the initiatives were probably designed with other ends in mind. For example, both problem-based and inquiry methods encourage active learning, meaningful interaction with a teacher, team learning, reflection, authentic assessment, and integration of knowledge from different fields. And even traditional research tasks, such as the undergraduate thesis have the great advantage of encouraging students to take ownership of their own learning, with the teacher as facilitator and guide as well as subject-matter expert. The research universities which have encouraged such initiatives can take credit for encouraging teaching based on evidence of good practice -- even if they perhaps did so inadvertently!

Despite some achievements in making teaching more scholarly and more effective, clearly there is much more to do if teaching is to be undertaken in a way that is as professional and systematic as our approach to research. This

certainly involves efforts by individual teachers, but it also requires structural changes that can only be led by academic leaders, including hiring practices, reward structures, quality assurance measures that measure learning processes and outcomes in a much more sophisticated way than has been customary, support for research in university teaching and learning (and the role of the research councils), responsibilities of the professional and disciplinary associations, and the whole way in which we accredit university prepare and accredit new entrants to the profession.

Finally I think there is an important role for senior administrators in higher education to become more involved with the university teaching function, to familiarise themselves with what is known about effective practice in teaching, learning, and curriculum planning, and to speak to the community at large about universities not just as educators, not just as managers, fund-raisers, or institutional boosters, but as educators. Higher education in Canada has changed profoundly since Lovat Dickson wrote about the University of Alberta in 1920. While some of these changes have been for the better, but I am not sure that the student experience of higher education has improved as much as many of us would like. To me student learning, now as then, lies at the heart of higher education and any attempts to link research and teaching more closely should have effective and meaningful learning as the major goal.

References

- Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.
- Barr, R. B., & Tagg, J. (1995). From teaching to learning: A new paradigm for undergraduate education. *Change*, 27 (6), 13-25.
- Bertrand, D., & Knapper, C. K. (1991). *Contextual influences on students' approaches to learning in three academic departments*. Unpublished honours thesis, University of Waterloo.
- Biggs, J. (1999). *Teaching for quality learning at university: What the student does*. Buckingham, UK: Society for Research into Higher Education and Open University Press.
- Entwistle, N. J. (1983). *Understanding student learning*. London: Croom Helm.
- Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction*, 7, 255-275.
- Kember, D., & Gow, L. (1994). Orientations to teaching and their effect on the quality of student learning. *Journal of Higher Education*, 65, 58-74.
- Knapper, C. K. (1995). Understanding student learning: Implications for instructional practice. In W. A. Wright (Ed.), *Successful Faculty Development: Strategies to improve university teaching*. Bolton, MA: Anker.
- Knapper, C. K. (2004, May). *Research on college teaching and learning: Applying what we know*. Background discussion paper prepared for the Teaching Professor Conference, Philadelphia.

- Marton, F., & Saljo, R. (1976a). On qualitative differences in learning: I – Outcome and process. *British Journal of Educational Psychology*, 46, 4-11.
- Marton, F., & Saljo, R. (1976b). On qualitative differences in learning: II – Outcome as a function of the learner's conception of the task. *British Journal of Educational Psychology*, 46, 115-127.
- Pascarella, E. T., & Terenzini, P. T. (1991). *How college affects students: Findings and insights from twenty years of research*. San Francisco: Jossey-Bass.
- Prosser, M., & Trigwell, K. (1999). *Understanding learning and teaching: The experience in higher education*. Buckingham, UK: Society for Research into Higher Education and Open University Press.
- Ramsden, P. (1991). A performance indicator of teaching quality in higher education: The Course Experience Questionnaire. *Studies in Higher Education*, 16, 129-150.
- Ramsden, P., & Entwistle, N. J. (1981). Effects of academic departments on students' approaches to studying. *British Journal of Educational Psychology*, 51, 368-383.
- Watkins, D. A., & Hattie, J. (1981). The learning processes of Australian university students: Investigations of contextual and personological factors. *British Journal of Educational Psychology*, 51, 384-393.
- Weimer, M. (2002). *Learner-centered teaching: Five key changes to practice*. San Francisco: Jossey-Bass.