

# **The Integration of Teaching and Research in Canada: The Undergraduate Student Perspective**

*Prepared for:*

*The International policies and practices for academic enquiry conference, April 2007*

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## **Introduction:**

Universities in the 21<sup>st</sup> century have the difficult role of balancing teaching and research mandates that are increasingly in conflict. The Boyer Commission (1998) argued that research universities in the US were guilty of allowing leading researchers in the disciplines to be exempted from teaching undergraduate classes to focus on their research, inevitably resulting in undergraduate students becoming increasingly removed from the research at the fore of their disciplines (Boyer Commission, 1998). There has been a growing international consensus that an undergraduate education needs to ensure that students graduate from their undergraduate studies with higher order skills that prepare them for today's increasingly supercomplex society and economy (Barnett, 2002). As a result, we have seen a shift (or at least an attempted shift) towards a research-based teaching and learning environment across the higher education sector around the world. Institutions are trying to increase the undergraduate exposure to research both inside and outside of the classroom through various individual, departmental or institutional initiatives (Jenkins & Healey, 2005). There has been little written in Canada, however, on the impact that this new focus within higher education has had on the quality of the undergraduate learning environment. The student perceptions of teaching and research can allow universities to evaluate its priorities for undergraduate learning and ensure that it is providing quality education alongside innovative research.

The University of Alberta, a research-intensive university located in western Canada, recently created a Working Group on Teaching and Research which completed a campus-wide environmental scan, collecting data on how the various faculties were integrating research into the undergraduate student learning environment. As a follow up to this initiative, three different studies have been undertaken to explore different aspects of the relationship between research, teaching and learning from the undergraduate student perspective. The first survey used a survey instrument developed by Healey *et al.* in the UK (Healey *et al.*, submitted), while the second and third surveys were completed in conjunction with the Students' Union as part of more comprehensive surveys of the undergraduate experience on campus. This paper will explore the implications of the results of these surveys, as well as raise both implications for policy and practice as well as areas for future study.

## **Review of Literature:**

There have been a number of studies that have focused on the correlation between teaching and research outcomes, most famously a meta-analysis conducted by Hattie & Marsh (1996). They concluded that there was no correlation between traditional measures of teaching and research excellence (student evaluations of teaching and number of publications). "It should cease to be surprising that the relationship between teaching and research is zero, and it would be more useful to investigate ways to increase the relationship" (Hattie & Marsh, 1996, 533). Since

then, there has also been a focus on defining approaches to the integration of research, teaching and learning including: learning about current research findings; learning research methods; learning through an inquiry-based process; learning through engaging in discovery research; and finally researching the teaching and learning process itself (Brew, 2006; Healey, 2005; Griffiths, 2004; Turner & Wuetherick, 2006).

A number of studies have been undertaken to explore the student perceptions of and experiences with research. Most of these previous studies have primarily relied on focus groups, interviews, or surveys with a relatively small sample size (Neumann, 1994; Jenkins *et al.*, 1998; Breen & Lindsay, 1999; Lindsay *et al.*, 2002; Zamorski, 2002; Robertson & Bond, 2006). Neumann (1994) found research to have positive benefits to students by increasing the course's credibility and the perception that students were learning relevant and current course content. Additionally, the research interests of academic staff gave students the opportunity to view instructors as 'real people' and to relate on a level of interest and enthusiasm in the same area of study. Jenkins *et al.* (1998) reported that students' own motivation and interest in a subject area often stemmed from instructor enthusiasm which had roots in the academic's research interests. Students, however, often perceive the research activities of a university as an 'extra' to what they believe is the primary requirement of a university -- the provision of quality undergraduate teaching and learning. Jenkins *et al.* (1998) also reported that students place a higher priority on instructors who are available, able to communicate course content effectively, and engage the students in the subject matter.

In one study, students did place a high level of emphasis on research activities as a central component to the university ethos. Researchers, however, have been surprised about the "level of alienation that some students expressed" (Zamorski, 2002, 419). Students do not view themselves as stakeholders in the research process. They feel that, at best, they have access only to the product of the research. This has left students with a poor understanding of the research process, resulting in negative experiences and difficulties when asked to partake in the research process themselves (Zamorski, 2004). Recently, Robertson & Blacker (2006, 227) argue that while some students have a sense of proximity to, and/or participation in, research, others express frustration at how "research is hidden from them." Drawing on Brew's notions of academic communities of practice, they argue that student frustration manifests when participation in the academic community is delayed and when they are unable to relate their current learning to their perception of that research community (Brew, 2003; Robertson & Blacker, 2006).

Healey (2005, 193), in summarizing the literature examining student perceptions of research on their learning environment, has argued that students perceive clear benefits from staff research, including enthusiasm, credibility, and "the reflected glory of being taught by nationally and internationally known researchers." There were also several disadvantages perceived by students, including staff unavailability, the lack of ownership/involvement in research activities, and staff research taking priority over their learning (Healey, 2005).

### **Results of the Surveys:\***

All three surveys conducted at the U of A explored the undergraduate students' perceptions of, and experiences with, research. The first survey had 913 students from 13

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\* Only crosstabs with a p value below 0.01 are reported as significant in this paper. The analysis and conclusions of this paper in no way represent the views of the Students' Union at the University of Alberta. The full survey results of the two SU studies are available at: [www.su.ualberta.ca](http://www.su.ualberta.ca).

different faculties complete the survey, for an overall response rate of 19% (based on a random sample of 5000 students from across all disciplines and all years of study). The second survey had a response rate of 2484 students, or 69% of the sample (based on a sample of 3625 students), from 14 different faculties. And the third survey had 1304 students responded from 14 different faculties, for a response rate of 26% (based on a sample of 5000 students). The balance between the various years of study, first through fourth year, was comparable across all three surveys, as was the gender distribution and the distribution across disciplines. Rather than explore the results of each survey individually in detail (each of which is being prepared for publication and would far exceed the suggested limit for this paper), this paper will explore some of the themes that emerged from the three surveys, highlighted by statistically significant results that are representative of those themes.

### *Awareness of Research*

Students on the whole reported a relatively high level of awareness of research activities being undertaken on campus. Almost 70% of students were aware of research seminars and conferences held on campus, as well as the existence of research centres/institutes on campus, while around 60% were aware of both publications (books, articles, etc.) being produced on campus and research posters or exhibitions being displayed on campus. Not surprisingly these numbers increased significantly with the respondents' year of study. The awareness increased even more when students were asked if they were aware if their instructors had obtained (or were in the process of obtaining) research degrees – 87%, were supervising research students – 68%, where undertaking funded research – 67%, or were writing for publication – 65%. Since a significant majority of students agreed that they were not aware of the research reputation of the U of A prior to applying to their program, it can be presumed that their awareness of research is developed through their courses and ongoing interaction with lecturers and other students on campus. There needs to be an increased emphasis on raising that awareness among our undergraduate students, and the message about that research success needs to be an increasing part of our broader communication with the community (including our recruitment of future students).

In each of these studies, we undertook to explore any differences between Science students and Arts students (as those two faculties provided the largest samples), as well as to compare between what has been termed academic disciplines (Arts and Science) versus professional disciplines (Medicine, Nursing, Education, Engineering, etc.). Science students were, on the whole, significantly more likely to be aware of research on campus than Arts students, while interestingly the professional students were significantly more likely to be aware of both the national or international reputations of their departments as well as the presence of research centres or institutes.

### *Experiences with Research*

The relatively high awareness of research activities does not, however, necessarily translate into a high level of reported experiences with research among the same students. While many students report having experienced their lecturer or a guest lecturer discuss research in a class, relatively few students are receiving opportunities to undertake independent research projects (either inside or outside of a class), to work as research assistants, or to contribute to some form of research output (conference paper/poster, publication, etc.). In a recent comparison study between a Canadian university and two universities in the UK, however,

Canadian undergraduate students were significantly more likely to report having participated in a research seminar outside of a class, or having contributed to a research project/paper/conference abstract or working as a research assistant (Wuetherick, Healey & Turner, submitted). As well, thanks in part to the way that introductory psychology is taught at the U of A (and in other North American universities) between 40 and 50% of the surveyed populations have participated as a research subject, which is far greater than reported at two UK universities. Arts students were significantly more likely to have had an instructor or a guest lecturer speak about their research in class than Science students, while (not surprisingly) Science students were significantly more likely to have experiences contributing to research papers, projects or conference abstracts.

One area where students were surprisingly lacking reported experiences was in developing research techniques or learning about research methods. This was reinforced in the comparison study mentioned above where there was no significant difference between the three institutions. This finding is in sharp contrast to a working group report at the U of A where almost every undergraduate program reported having a required research methods course or more generally reported teaching research skills and developing research techniques through labs, tutorials or seminars (Working Group on Teaching and Research, 2004). It is apparent that while students may be aware of research activities, they do not automatically make the jump to understanding how their own experiences are related to that research environment. This reinforces the need to communicate with students how the activities they are undertaking are research activities (Jenkins & Healey, 2005). In particular, the development of research techniques (both generic and discipline specific) are essential as they form the foundation for an ongoing ability and interest in inquiry, which is increasingly important for both further study as well as a career in our increasingly knowledge-based economy (Hoddinott & Wuetherick, 2006).

### *Positive and Negative Perceptions of Research*

One final area of interest is the students' perception of the positive or negative impacts of research on the learning environment. About half of the students responded that research positively impacted their learning by increasing their understanding or stimulating their interest in the subject area, while between one-fifth and one-third of students believed that their experiences with research increased their awareness of problems faced by researchers, encouraged them to pursue post-graduate studies, increased their understanding of methodological issues in the discipline, or improved their research skills. On the other hand, between 15% and 25% of students responded that research negatively impacted their learning environment through their instructor's lack of interest in teaching or the students' well-being, the instructors' lack of availability to undergraduate students, the distortion of course content towards research interests, and the inability of the instructor to communicate at an appropriate level. On the whole, students placed a low importance on research when compared to other academic priorities, such as having instructors who are good teachers or who care about student learning, and courses or programs that help prepare them for a future career. Only 40% of respondents in one survey indicated that feeling engaged with research throughout the undergraduate experience was important or very important, while 31% responded that it was of little or no importance. Students largely agreed, however, that instructors actively engaged in research are more likely to be enthusiastic about their subject matter (61% agreed or strongly agreed vs. 8% disagree or strongly disagree), that the most effective teaching is when the lecturer involves them in aspects of the research process (50% vs. 15%), and that they learn the most when undertaking their own research project (41% vs. 20%).

Interestingly, one of the most striking disciplinary differences in all three surveys was the increased positive perception of research among students in academic programs when compared to professional programs. For example, a significantly greater number of students in Arts and Sciences perceived a positive impact through their increased understanding, stimulated interest and enthusiasm, and motivation to pursue postgraduate studies. As well, students in academic programs were significantly more likely to feel that being engaged with research throughout the undergraduate experience was important.

### **Discussion:**

While these results have been presented in a simplified manner, several implications for policy and practice emerge from these studies. As well, several areas for future research become apparent.

#### *Communication with Students about Research*

It is essential that we recognize the important role played by how we communicate with students about research as part of the undergraduate experience. For example, while 83% of students responded that they have experienced their instructor discussing research in the classroom, there are still almost 20% of students who do not connect the content of their courses with the research undertaken in the discipline. This lack of communication is even more evident in the small number of students who report having experienced the development of research techniques and methods, particularly in light of the insistence of the disciplines (with perhaps one or two exceptions) that basically all students take courses on research methodology. In a recent article I argued (along with Healey & Turner) that academic developers can perhaps facilitate the communication about research with undergraduate students, through their work with (particularly new) academic staff (Wuetherick, Healey & Turner, submitted). All academic staff should be encouraged to communicate explicitly about both their own research and the leading edge research in their discipline with undergraduate students, rather than assume that students will inherently understand the connection between what they are learning in the classroom and the research enterprise undertaken in their institutions.

#### *Case for Inquiry-Based and Discovery Learning*

If a research-based learning environment is the goal of higher education, then this data also reinforces the need to develop a more inquiry-based curriculum throughout all years of the undergraduate program. Several scholars argue that the key to effectively integrating teaching and research is to base the curriculum around the idea of inquiry (Brew, 2003; Jenkins *et al.*, 2003; Healey, 2005; Elton, 2001). As would be expected, senior students were more likely to have undertaken their own independent research projects or contribute to ongoing research projects of their lecturers. This supports the notion that programs are currently scaling up research activities gradually, with students undertaking projects of increasing complexity as they near the completion of their degree programs. More emphasis needs to be placed, however, on bringing inquiry-based learning into the learning environment earlier in the degree program (Boyer, 1998). Several other papers submitted to this conference explore the policy and practice implications of inquiry-based learning, however, we also need to find ways to bring students beyond inquiry-based learning to engage students truly in discovery learning. Programs in Canada and the US enable thousands of undergraduate students to work on discovery research projects with academic staff, particularly between the winter and fall semesters, but these

opportunities still only reach a small percentage of the overall student body and are skewed heavily to the natural, applied and health sciences (Merkel, 2001). Students themselves perceive the need to have more opportunities to engage in research activities. Over 40% of students in this study agreed that they learn best when undertaking their own research project or paper, and close to half agreed that the most effective teaching is when instructors involve them in aspects of the research process. We need to provide opportunities for our students to become scholars in their own right, and contribute to the creation of new knowledge across all disciplines.

### *Inclusive, Scholarly Knowledge-Building Communities*

One way that we can begin to approach the idea of involving students in both inquiry-based and discovery learning is by providing opportunities for students to become part of the scholarly community. Brew (2006) argues, quite convincingly, for the development of inclusive, scholarly knowledge-building communities that engage everyone from senior academic staff through to first year undergraduate students. The hierarchy that is implicitly built into the organization of universities must be challenged, as must the definition of who can legitimately be a scholar. We must critically reflect on the ways which we enable not only undergraduate students, but also postgraduate students and sessional (or contract) instructors, to be a part of this scholarly community. This will inevitably result in a profound transformation of the nature of universities. I would argue this type of transformation might merge Barnett's notions of pedagogical and curricula space (where new pedagogies may be attempted in order to enable students to strive "to become authentically their own persons"), scholarly space (where academic staff "pursue their own research interests in their own way"), and intellectual or discursive space (where the academic community is allowed to engage the wider community in order to contribute to social discourse) in a dynamic interrelationship that is truly inclusive of all members of the university community (Barnett, 2005, 7).

### *Future Research Implications*

The literature on the student perceptions of, and experiences with, research has helped to paint a more complete picture of what we are accomplishing through international initiatives to integrate research and teaching. The impact, however, on undergraduate student *learning* is far less understood. There is a need to explore undergraduate student learning beyond the perceptions and experiences of students in order to unpack how these new forms of pedagogy enable students "to become authentically their own persons" (Barnett, 2005, 7). If we are able to better understand how the integration of research and teaching benefits student learning in order to impact what Bourdieu calls the *habitus* – "the set of dispositions that generate and structure human action and behaviour" – we might be able to have more authentic measures of student learning (Dimitriadis & Kamerelis, 2006, 68). Using Bourdieu's framework as a starting point, Brew, for example, begins to explore the assumptions that often go unquestioned in academic contexts in her recent book *Teaching and Research; Beyond the Divide* (Brew, 2006). One further way that we might begin this ontological exploration is through a framework of graduate attributes that goes beyond the traditional learning outcomes or skills expected in an undergraduate education to an understanding of the core values and beliefs that underpin the development of our students' essence or being. The graduate attributes framework used by the University of Sydney, for example, goes beyond the skills and learning outcomes one would expect from an education focused on mode one or mode two knowledge to the core of a students' dispositions or attributes that allow or enable students to thrive in the supercomplexity we would

expect in a society where mode three knowledge is becoming the norm (Barrie, 2004; Barrie, 2006).

This hints at the growing need for scholars to unpack and explore the theoretical frameworks that underpin this research. Much of what has been written in this area arguably has its origins in a progressive educational philosophy. Grounded in the work of Dewey, the progressive philosophy of education values active, experiential/inquiry learning, that allows students to construct their own understanding of the subject and, in a facilitated manner, learn how to apply that understanding in different contexts (Dimitriadis & Kamberelis, 2006). Attempts have been made recently to move us beyond a progressive educational philosophy in order to reflect additional theoretical perspectives, such as critical theory. For example, at the Reinvention Centre for Undergraduate Research at the University of Warwick in the UK, undergraduate students engage in a number of social justice/social change projects where the students are responsible for developing the question and seeing through the inquiry process to an end result (Neary, 2006). There remains, however, a distinct need for us to theorize the exploration of the integration of research, teaching and learning.

## **Conclusion**

Rather unfortunately, it is still a minority of the undergraduate student body that truly comprehends the link between the research activities of their educational institution and their own educational experience. As tuition costs rise, however, students will continue to have higher expectations for the quality of their education and will increasingly perceive that teaching is not as high a priority for post-secondary institutions as research. This conflict between teaching and research can be mitigated by structuring the undergraduate curriculum around the ideas of inquiry and discovery, with a focus on developing higher order skills in our students that enable them engage and thrive within the supercomplexity in which they will increasingly find themselves. Institutions, faculties, departments, and individual academic staff must be aware of their role in increasing the awareness of research to their undergraduate students, and also in communicating with students both about how research benefits their learning and how what they are doing in their undergraduate programs is related to the research mission of the institution.

## **Acknowledgements:**

The three studies that this paper is based on were made possible by the help of several co-investigators, including Dr. Olive Yonge, Dr. Stanley Varnhagen, Margaret Wilson, and Lisa McLaughlin. My thinking around these issues was also influenced strongly by conversations with Nancy Turner, Mick Healey, and especially Angela Brew.

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