

Research and Teaching from the students' perspective

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In the context of increasing interest in developing firmer relationships between research and teaching, there has been a growing interest in understanding students' experiences of research and in the relationship between research and their learning. In this paper I briefly outline some of this research and explore what that tells us about how students conceptualise research, what they learn through engaging in research and, as far as is known, what the effects of the integration are on student learning experiences. My aim in examining what research has been done is to identify an agenda for future research, so I will explore the implications of this analysis for research, policy and practice in the future.

Existing research

I want to focus on four areas where research has been conducted in relation to understanding students' perspectives:

1. Students' views of research
2. Students' views of inquiry-based modes of teaching and learning
3. What students learn when engaged in undergraduate research projects
4. The effects on students' experiences of academics engaging in the scholarship of teaching

Students' views of research

Students appear to value the fact that their teachers are engaged in research. They see it as making lectures more interesting and stimulating lecturer enthusiasm for the subject they are teaching (see for example, Jenkins, Blackman, Lindsay, & Paton-Saltzberg, 1998). Breen & Lindsay (1999) suggested that the more motivated students are most likely to see a link between staff research and the teaching. On the other hand, several scholars have noted among students negative attitudes towards the research of their teachers. Students have pointed to staff lack of availability, undue influence of staff research in the curriculum, and, importantly, feelings of being excluded from the research culture of their institution (Healey, 2005, Jenkins et al 1998, Zamorski, 2002). Most of this research has been conducted in the researchers' own institution and has been driven in part at least by policy demands of the institutions concerned. Most of the studies are small scale and qualitative in nature. An exception is a recent statistical study by (Wuetherick, Healey, & Turner, submitted for publication) which examined the views of 515 students from three institutions.

Related to this work are studies of students' perceptions of what research is. Robertson & Blackler (2006) suggest that students in different disciplinary areas have different ideas about research. Physics students, they found, see research as the process of 'breaking new ground, moving forward; as a process of exploration and discovery'. Geography students in their study viewed research as 'gathering information in the world; answering a question' while the English students saw research as 'looking into; gathering; putting it together; focus of interest' (p. 226). These scholars also found that the visibility of

research and perceptions of where research is conducted were different for students in different disciplines. Physics students indicated that research was visible in the presence of laboratories and machinery which was often 'behind closed doors'. It was thought to be done by lecturers 'out there'. Geography students considered that research was most visible 'in the field' and was done by lecturers and students over time 'in the field'. English students considered that research was not visible but manifested itself in dialogue. It was carried out by lecturers and by students in the library or in people's heads.

Some Scandinavian studies have examined, not what students think of their teachers' research, but what they think about learning research methodology. Murtonen (2005) for example, found that students dislike learning about research methodology and do not see the reasons why they should be engaged in research as they do not perceive its relevance to their future careers.

Students' views of inquiry-based modes of teaching and learning

While there is a good deal of research that has examined the levels and kinds of learning that take place within inquiry-based learning contexts, there appears to be relatively little which examines students' perceptions of inquiry-based learning. The little research that has been conducted suggests that students respond differently according to the discipline in which the inquiry-based learning is situated (Abrandt Dahlgren & Dahlgren, 2002) and according to their epistemological beliefs (Tsai, 2000). There is evidence that students experience initial uncertainty within inquiry-based learning situations; that it creates 'psychological dilemmas or disjunctions in students' experiences of the learning context and their lives' (Abrant Dahlgren & Dahlgren 2002, p. 124) but that uncertainty fades as they become more familiar with this approach to learning. Indeed, Ryan (1993) reports that students' engaged in a problem-based learning program place a high level of importance on self-direction in their learning and perceive that their ability to be self directed develops during such a program. Sadlo & Richardson (2003) found that students tend to adopt deep approaches to learning within a problem based curriculum. There is anecdotal evidence that students who engage in problem based learning within a hybrid curriculum which includes traditional teaching do not rate their curricula as highly as they rate more traditional approaches; suggesting that it takes time for students to come to terms with this approach to learning. It may be that the disorientation experienced by students engaged in a full blown inquiry based curriculum is also experienced when elements of inquiry-based learning are integrated into a hybrid course. Nevertheless, A meta-analysis of evaluative research of problem-based learning Vernon & Blake (1993) found that students' evaluations of problem-based learning were consistently more positive than their evaluations of conventional courses.

Counter to the dilemmas associated with experiencing a problem-based learning course, are the very positive attitudes of students to the 'fellowship' and 'community' that students experience in learning in a supportive PBL tutorial group. Further, students appear to appreciate the authenticity of the tasks and the assessment (Abrant Dahlgren & Dahlgren 2002). Some of these aspects of learning are also present when students engage in research projects alongside academic researchers as the next section indicates.

What students learn when engaged in undergraduate research projects

A study of undergraduate science research at four liberal arts colleges in the US found that the two main benefits to students of engaging in undergraduate research projects during vacation time were a number of personal and professional gains such as increased confidence (for example in their ability to do research, contributing real knowledge as a scientist, or feeling like a scientist) and intellectual development in thinking and working like a researcher including improved ability to apply knowledge and skills, development of critical thinking and problem solving skills and a more advanced understanding of the nature of science/ how scientific knowledge is built (Seymour, Hunter, Laursen, & Deantoni, 2004). These authors also note that nearly 20% of the students reported improvements in skills such as, particularly, communication skills, and some reported that the experience had clarified their career goals. Indeed it was found that many of the students indicated that they thought the benefits that they had gained were transferable to a range of situations. Further, students commented on the length of time involved in research, the care needed to make accurate observations and keep detailed notes, how much attention to detail was required, the tedium and repetition of some lab tasks, the long hours researchers worked, and their difficulties in achieving desired results. Blackmore and Cousin (2003) also demonstrated the ways in which engaging students in research can develop important skills, for example, of structuring one's workload, time management, a wide range of research skills including bibliographical searching, organisation of data, experimental skills and so on. Students commented upon the need to be able to focus on a number of tasks simultaneously. The experience demonstrated the complexity of research work and the need for patience and meticulousness. Baxter Magolda, Boes, Hollis, & Jaramillo (1998) report similar findings in a larger study of students who had engaged in a ten week summer research experience. They found students had increased confidence as learners, developed more capability for thinking independently, more awareness of learning as a life-long process and more capability for achieving career goals. In addition, they found that students had developed more complex conceptions of knowledge as a consequence of engaging in the research experience. Particularly notable is the finding that students valued the opportunity to work with academics in a one-to-one relationship. Commenting on the undergraduate research scheme at Warwick University (Blackmore & Cousin, 2003) similarly report that students on this scheme appreciated the opportunity it provided to play a role in knowledge production through participating in a culture of inquiry.

The effects on students' experiences of academics engaging in the scholarship of teaching

A recent study of the impact of the scholarship of teaching and learning on the experiences of students investigated whether faculty differences in performance on a number of measures of the scholarship of teaching (qualification in university teaching, teaching awards, publications on university teaching e.g. text book, refereed article, conference paper or poster on university teaching) were associated with changes in undergraduate course experiences as measured on a student course experience questionnaire (SCEQ). It was found that this relationship was statistically significant for three of the SCEQ scales – good teaching ($p=.036$), appropriate assessment ($p=.021$), and generic skills ($p=.020$) suggesting that performance in the scholarship of teaching and

learning is related to students' perceptions of their assessment, how and whether their generic skills have been developed and their perceptions of the quality of the teaching (Brew & Ginns 2006).

Agenda for future research

While these studies as a whole have produced some important and valuable insights, and while it is possible to generalize the findings to related contexts, understanding their significance is not possible without locating these ideas within broader social or educational theory. In setting out an agenda for future research, therefore, it is clear that we need to understand these perspectives within the context of theories about, for example, how people learn or how complex organisations such as universities function.

The research on students' perspectives suggests there is variation in the extent to which students consider themselves part of the research community. For example, the English students in Robertson & Blackler's (2006) study viewed research as what they themselves did and saw themselves as participating in research with researchers. This is also the case with students who have engaged in undergraduate research schemes as reported by Blackmore & Cousin (2003) and Seymour, Hunter, Laursen & Deantoni (2004). Yet lying behind these studies are some more profound questions about how scholars are defined in universities. In my book *Research and Teaching: Beyond the Divide*, (Brew, 2006) I suggested that universities need to move towards creating inclusive scholarly knowledge-building communities. There is an implicit critique within this notion. It suggests that currently universities are not inclusive. There are separate categories of people with different roles and the relationships between these are clearly prescribed. The notion of inclusive scholarly knowledge-building communities invites us to consider new ideas about who the scholars are in universities and how they might work in partnership.

Universities are inherently hierarchical and this has been reinforced by mass higher education which has resulted in large cohorts of students who may go through their entire undergraduate degree without ever being taught by a tenured faculty member. Students are being encouraged to engage in 'research tasters' but that there are mechanisms that work to exclude them from the community of researchers. These are now showing in research findings on students' perceptions. So, for example, Robertson and Blackler (2006, p. 226) found that students in physics and geography viewed research as being conducted 'out there', Zamorski (2002) and Lindsay, Breen, & Jenkins (2002) report that students find themselves alienated from the research culture. There is growth in inquiry-based modes of learning but this generally takes place separately from the research activities of academics. The findings of the studies by Seymour and colleagues, and Blackmore & Cousin raise very important questions about the ways in which students are treated when they become research associates as opposed to when they are students. Students in both of these studies reported that they were treated differently from how they are treated in teaching and learning settings. This suggests that opportunities for students to engage in research in the curriculum may change the nature of undergraduate

education but may perhaps not necessarily result in changed relationships between researchers and students.

Not only has much of the research that has hitherto been conducted on students' perceptions been conducted without the benefit of educational theory, it has also been carried out in a policy vacuum. Yet questions to students are politically charged. When students are asked about research activities and perceptions, they are being asked values-laden questions. A key problem with the kinds of research questions that have been asked so far is that they require uncovering aspects of university lives that are so endemic that they more often than not go without questioning. Studies of students' perspectives on research need to take account of the asymmetrical relationship between research and teaching. In universities, in spite of efforts to balance rewards so that research is valued equally teaching, research nevertheless has more power than teaching. Researchers have more power than teachers. So questions to students about their perceptions of research are asked in the context of hierarchical organisational structures which work to define students as 'Other'. Their identity is defined by what they are not. To ask students about research and their relationship to it is to ask students about aspects of what Bourdieu (1998) calls the 'habitus'; i.e. the assumptions we make about what constitutes appropriate behaviour in academic contexts; the aspects of university lives that go unquestioned. So, for example, the organisation of students into year groups is unquestioned. Research in the future needs to take account of the ways in which the university preserves research for the higher years and especially for postgraduate study; as if it were a kind of reward for hard work. They need to go beyond making assumptions that research is available to all who would benefit from it in universities. In short, studies need to take account of the ways in which power operates to preserve research for the elite.

Clearly we need more fine-grained studies of the values conflicts that support and sustain practices in universities that define students as Other. We need studies not just of the ways in which students, but also general staff and some academics perceive that they are excluded from the research community. We know that there is a tendency in some subject areas to view knowledge in hierarchical ways; that some academics suggest that a step by step process to accumulating knowledge of the subject is needed. This effectively excludes all but the most advanced students from doing research. However, paradoxically, there is alongside this frequently a perception that the 'talented' or 'brightest' students are capable of circumventing this. We need to know much more about the mechanisms within university departments that support and sustain particular views of research and teaching and views of students and what they are capable of.

There are some important methodological and ethical issues thrown up by research into aspects of university functioning which normally go unrecognized such as I have described. If we are to accept as Bourdieu (1990, p. 10) suggests, that what we need is a 'systematic exploration of the unthought categories of thought that delimit the thinkable and predefine the thought', then, research needs to be asking about underlying assumptions and encouraging people to critically evaluate the situations they are in. Is it then appropriate, for example, to ask questions of students about how they feel about

being excluded from research? How can students give a view about what it is like, for example, to be told what they have to learn, to have the fundamental questions they have about the subject unanswered, or about how they are treated as a student?

Fundamental to the integration of research and teaching and implicit in these issues are the relationships between academics and students. Typically, these relationships are based on what I have called an academic apartheid; where some people (students and also general or support staff) are treated as second class citizens and denied access to certain kinds of power and resources. We need to know much more than we currently do about the relationships between academics and students. We have noted that when students become research associates when engaged in vacation research scholarships, they are treated differently to when they are engaged as students in courses. We need to unpack the language that is used to define the role and status of students in our universities. Integrating research and teaching depends, as I have argued (Brew 2006) on changed relationships between students and academics. We need studies which explore these relationships as a basis for bringing about change.

Conclusion: implications for policy and practice

This analysis leads to the conclusion that we lack sophisticated means whereby students' learning through research and inquiry can be ascertained. Bereiter (2002) points to the need to engage students in inquiries which begin with their own basic questions. We do not know to what extent students who engage in research and inquiry in their courses are working on questions that interest and involve them. Clearly more attention needs to be focused on understanding the nature of learning that students engage in when they engage in inquiry based learning. This means that we need to develop some authentic measures for demonstrating learning that go beyond ratings of students' perceptions and experiences.

There is a need to ensure that the organisation of learning and of research are facilitative of inquiry-based modes of teaching and learning at the undergraduate level. One important aspect of this is the need for clear ethics policies and procedures that facilitate students engaging in research.

A further implication for practice is the need to articulate a clearer rationale for inquiry-based learning. We need to examine how student learning proceeds across the whole curriculum. Inquiry based learning 'tasters' need to be viewed in the context of the units of study the students experience throughout their whole degree program. We need to open up academic research to undergraduate students; to see them as potential partners in our research.

In terms of broader policy, universities need to set as goals the interrelationship of students as participating scholars and to break down barriers to this. This may be done through, for example, academic development which encourages critical questioning of the relationships between academics and students, the design of collaborative research projects with undergraduate and postgraduate students including research on teaching and

learning projects, the setting up of undergraduate research scholarship schemes, the critical questioning of the language used to refer to students and the planning of new spaces within universities for intellectual collaboration and socializing of students and academics.

At national levels, it is imperative that research councils take seriously the potential contribution to each university's research effort of undergraduate students. This is evident in the work of the National Science Foundation in the US, but it is by no means universal and, in some countries, e.g. Australia it is almost considered taboo. This needs to change.

Finally, universities need to articulate clear and more inclusive rationales for the pursuit of research. This includes opening up definitions of research. Research is, after all, the means through which academics develop a reflexive critique of practice which is vital in the complex ambiguous world we live in today. For the students who are the professionals of the future, developing the ability to investigate problems, make judgments on the basis of sound evidence, take decisions on a rational basis, and understand what they are doing and why is vital. Research and inquiry is not just for those who choose to pursue an academic career. It is central to professional life in the twenty-first century. So understanding at a deeper level how students relate to and learn through research is important.

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