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Beyond craft practice: Searching for an evidence-base on effective pedagogy in higher education

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Abstract: Recent changes in public funding for university teaching in Australia indicate a shift from encouraging innovation to rewarding performance. These changes also require a focus on the student learning experience seen holistically—at the levels of whole-of-degree, campus and institution. This invites a more systematic approach to the improvement of pedagogical practice. This paper reports an attempt to explore the literature on the scholarship of learning and teaching (SoLT) in order to inform such an approach. Our experience is that there is very little relevant literature. We call for an expansion of the SoLT to assist universities to respond to these new challenges.

Keywords: scholarship of teaching; pedagogical effectiveness; empirical research

Introduction

The last two to three decades has seen considerable investment in two areas of higher education pedagogical practice: grant-based funding to improve university teaching; and engagement with and contributions to the scholarship of teaching. In Australia, the former is most apparent in the development of committees to oversee Federal Government funding: the Committee for the Advancement of University Teaching (1992-95); the Committee for University Teaching and Staff Development (1997-99); the Australian University Teaching Committee (2000-04); and the current Carrick Institute, which was launched in 2004. Collectively these bodies have distributed over \$100m in funds.

At the same time, and largely following the publication of Ernst Boyer's seminal text *Scholarship Reconsidered* in 1990, there has been a proliferation of publications and resources associated with the scholarship of teaching. For example, a Google search of the term 'scholarship of teaching' in January of this year produced over 45,100,00 hits in 0.45 seconds. In round terms this translates to an average addition of over 3,200,000 independent web-references each year since Boyer's seminal book was published. A similar search in June 2005 produced approximately 17,100,100 hits – so the rate of generation of new online resources appears to be accelerating at an astonishing rate. Unlike the grant-based funding, the investment in the scholarship of teaching has largely been undertaken by individuals, or small teams of academics. Institutions have tended to support both through their policies on teaching and learning, and to a lesser degree, policies on research.

But the system-level incentives for both types of activity have changed in quite profound ways over the last few years. Initiated in 2004, the Learning and Teaching Performance Fund (LTPF) was "established to recognise excellence in teaching and learning and to promote the overall quality of undergraduate education" (DEST 2005, p.4). This fund provided \$54.4m to

reward 14 of the 38 publicly-supported Australian universities in 2006. In 2007 the value of that funding will rise to approximately \$82m, and to \$109m in 2008. In the Discussion Paper of the LTPF (DEST 2005, p8) there is recognition that the fund is rewarding excellence in outcomes rather than improvements that universities might make in their teaching and learning. That is, the discussion paper acknowledges that the operational outcomes are in tension with the original intentions. There are several consequences of this. In rewarding outcomes rather than improvements it “only exacerbates the problem for those that have not done well this year because they have not received the funding that would enable them to make further improvements”. This policy represents a shift from funding innovation and creativity – as represented in the earlier CAUT and CUTSD funds – to funding performance, defined in quite specific and limited ways. More specifically, the introduction of policies like these requires that universities address whole-of-institution challenges rather than opportunities to support and promote pockets of innovation. It is this challenge that is the focus here: how to develop a systematic approach to the improvement of teaching and the overall learning experience? This goal is paramount to promoting “excellence in teaching and learning” not only amongst a few staff, but consistently at the faculty-wide level, where judgements about universities “performance” are being made and upon which funding is contingent.

The specific context

While QUT has invested over \$10m in teaching improvement projects over the last 20-30 years, it did not receive funding from the LTPF in 2006. This outcome has particular relevance, given our Faculty’s negative contribution based on its poor Course Experience Questionnaire (CEQ) performance. That data tells us that our graduates are, relatively unhappy with the learning experience they receive, an indication (in part) that our teaching needs to improve to meet the learning needs of our students. Coupled with this result is the observation that our staff indicate that they are exhausted and in desperate need of greater support. A recent (2003) Faculty level review suggests that the faculty is characterised by fragmented efforts at improvement. By implication, fragmentation has drained much from the individual and contributed little to the collective. With financial and emotional resources severely depleted, all efforts at systematic improvement from this point forward need to be focussed on achieving specific performance outcomes (e.g. improved CEQ ratings for student learning experiences). Equally, for improvement initiatives to gain the trust and support of the financial controllers and the academic staff, plans for systematic improvement must be derived from credible bases of evidence which suggests certain interventions are likely to actually achieve improvement.

This is a university where there is a long-term public perception of excellence in ‘real world’ teaching. It is also a context in which institutional policies have tended to focus on the evaluation and improvement of individual units rather than courses. (Note: QUT identifies semester length ‘units’ as the unit-of-enrolment within semesters, while overall degree programs are identified as ‘courses’. This terminology is adopted throughout the paper.) However, the LTPF focuses on course-level issues, as reflected in data on attrition and progression, the CEQ results, and the Graduate Destination Survey (GDS) results.

The challenges we face invite a radical refocussing on course-level learning experiences, and on the development of a more strategic and systemic approach to the improvement of our pedagogical practices. Therefore, we face the challenge of moving our academic culture from a model of individual innovation, towards a systematic model of continuous improvement. It

is hoped that this new model will consolidate and capitalise individual contributions and move the Faculty towards the clearly defined goal of optimising the learning experience. In doing so, we would hope to not only make genuine, faculty-wide improvements in pedagogical practice, but to have this reflected in the students' ratings of their learning experience and the performance of our department. It was from this perspective that we turned to the literature for guidance — to identify well researched insights to assist us in the systematic development of effective pedagogical practices which would enhance the quality of the learning experiences we provide.

Review of the scholarship of teaching

With the interrelated aims of improving pedagogical practices, enhancing student learning, increasing student CEQ ratings, and optimising funding opportunities, we went to the literature to identify the pedagogical practices that were empirically validated as effective in higher education. In short, we went in search of the scholarship of teaching that could inform our staff's teaching and which would be worthy of their efforts to investigate and adopt. Accordingly, we applied stringent selection criteria to a review of discussions of effective pedagogical practice. Claims of pedagogical effectiveness would only be considered if there was some supporting empirical evidence emerging from a rigorous research design. Case studies involving academics researching their own practice would not be included. While valid in their own right, results derived from case studies cannot be shown to generalise beyond the investigated environment. Therefore, these studies were not considered to be a valid source of information for our goals. Equally, this was not a search conducted under the misguided naivety that any one pedagogical approach could enhance learning under all circumstances. Rather, it was a pursuit of empirical, statistically tested evidence of what pedagogical approaches do work, when, why and with whom. It was a search for an evidence base from which strategic changes in our pedagogical approach, at a faculty-level, could be justified, measured and evaluated.

Given research and teaching are the core business of higher education, we were hopeful of finding a great body of research in this regard. While it is true that our stringent selection criteria eliminated many studies from our review, we were disappointed to find that beyond case study claims and anecdotal reports, there was very little research evidence for what constitutes effective pedagogical practice in higher education. It would seem that universities, which place such a high premium on research performance, have fundamentally failed to rigorously research their very own core business - teaching and learning.

We could identify only four papers that provided a detailed outline of their research methodologies, delivered credible empirical data and which indicate findings that may generalise beyond the sample under consideration. Therefore, rather than being able to bring forward convincing insights from the literature about how to improve pedagogical practice in higher education, our most optimistic interpretation of the (lacking) literature is to report on the research methodologies adopted in these studies. The studies reviewed here do not provide any clear answers, but they do provide encouragement about *what is possible* in education research and how it may be possible to develop higher education pedagogy into an evidence-based profession. Finally, the paper includes reflections upon what can be learnt from past research and the lack thereof.

Evidence-based accounts of pedagogical effectiveness

After an extensive literature review, investigating 39 of the major education research journals, 26 research centres, we found only five studies which provided empirical information about the effectiveness of specific pedagogical practices in higher education. We discuss only four of those here. While a few unrelated empirical studies about pedagogical effectiveness in higher education hardly amounts to a comprehensive evidence base, these studies are exciting because they represent something of the opportunities, possibilities and challenges associated with conducting empirical research into pedagogical practice.

Study 1

In a recent study, traditional (lecture/tutorial) pedagogy was compared with Problem Based Learning (PBL) in both an undergraduate and postgraduate exercise physiology unit (Alessio, 2004). Both of these groups were divided to allow half the students to receive tuition via traditional instruction, while the other half experienced the same unit content via PBL. Students provided qualitative data about their learning experience by completing a journal about their experiences during the unit and by responding to an open-ended question at the conclusion of the unit. Test scores (measuring achievement of the same learning outcomes) from the PBL and traditional groups were compared at both the undergraduate and postgraduate level. No significant difference in test performance emerged according to instruction type.

However, students significantly preferred traditional pedagogy over PBL, at both the undergraduate and a postgraduate level. That is, students indicated a strong preference for didactic learning and were critical of feeling “uncertain” in the PBL program, perceiving this approach to be of reduced learning efficiency. While it is possible to speculate that the instructor may have been better at conducting traditional lectures than PBL classes (as one limitation of the study), the results do raise an important issue about the distinction between the teaching that students prefer and the pedagogy which helps them learn. It implies that basing performance measures and funding on students’ ratings of course performance may be an inappropriate proxy for measuring what students have actually learnt. It implies that deviations from traditional lecturing methods (which students are familiar with) may be detrimental to a university’s CEQ (or similar) data, despite equivalent levels of learning being maintained.

This paper raises many interesting questions, not least of which is: what should the goals of higher education be - student satisfaction or student learning? The answer to this question may not be so obvious (i.e. student learning) if our performance measures and funding opportunities are contingent on something else (i.e. student satisfaction). However, it is not the scope of this paper to address this issue. Rather, the important aspect of the study for the purpose of this paper is that it highlights a methodology suitable for investigating how pedagogical effectiveness may be researched with some rigour, using a mixed methods approach. In so doing it exhibits how qualitative and quantitative analyses may be combined to develop data for further understanding pedagogy in higher education. Therefore, while this paper (along with all the others reviewed here) fall short of indicating specific pedagogical practices that can improve learning across large numbers of students, it does inspire some confidence that this level of analysis is possible through systematic, robust investigation.

Study 2

Another study contributing to the debate about what constitutes good university teaching investigated the interrelationship between the teaching approach employed and the learning approach adopted (Trigwell, Prosser & Waterhouse, 1999). The study explored the extent to which transmission focussed teaching was associated with surface learning and conversely, the extent to which student focussed (conceptual change) approaches to teaching were associated with deep learning. A teaching approach inventory (Trigwell & Prosser, 1996; Prosser & Trigwell, 1998) was completed by 46 science teachers and was analysed along with data from 3956 students, across 48 first year chemistry and physics units. Students completed a modified version of Biggs's (1987) study process questionnaire (SPQ).

A statistical analysis of this data revealed a significant relationship between teaching style and approach to learning. Students reported adopting a surface approach to learning in classes where the teachers were 'teacher focussed' and conversely, a deep approach to learning when the teaching was learner focussed. While the credibility of these results is strengthened by the large sample size, the implications of these findings are diluted by the fact that no data was gathered to ascertain if deeper learners actually performed any better than surface learners on their assessment tasks. Thus, while the authors conclude that their results support a shift towards more student and less teacher focussed teaching, caution should be applied to considering the extent to which these results may truly indicate that student focussed teaching optimises student learning outcomes. However, results of the study imply that the systematic faculty-wide improvements in teaching will produce qualitative differences in student learning. Further, with the large sample size used in this study, the relationship between teaching approach and quality of learning is evidently not tied to any one practitioner or cohort of students (an interpretation that would not be possible if this investigation were based on case study data).

Study 3

The most detailed investigation uncovered in the literature review was a study conducted at Griffith University. This research considered how students' approaches to learning were influenced by the pedagogical design (Wilson & Fowler, 2005). The study compared how students' approach to learning changed while enrolled in a conventionally taught (i.e. lectures/tutorials), compared to when they were enrolled in an action-learning unit (i.e. project work, learning groups). Researchers used pre- and post-evaluations of students' approaches to learning.

The results indicated that students who were identified as 'deep learners' displayed a deep learning approach in both the conventional and action-learning unit. However, students who were identified as typically 'surface' learners were influenced towards a 'deeper' learning approach when they participated in the action learning design. Interestingly, both 'deep' and 'surface' learners evaluated the action learning class similarly. Therefore, as indicated in earlier research (Alessio, 2004), student's subjective evaluation of a pedagogical approach may not necessarily reflect the actual impact a particular pedagogy is having on learning. Equally, it highlights the challenges associated with making course-level improvements to teaching in the hope of improving learning of diverse students. Again this suggests that in search for how to improve student learning experiences, we need to be clear about how we define "improvement". Improved student evaluations appear unrelated to student learning. Perhaps it is that a progressive university will need to advocate that the performance measures used to judge them reflect a composite of both of these dimensions, and/or that they investigate how the gap between what students prefer and how students learn, can be bridged.

There are many challenges associated with conducting research in the highly complex domain of education. However, this study employed a sophisticated research methodology to overcome some of the challenges associated with conducting comparative research in naturalistic settings. Its findings highlight the importance of considering how differential learning environments may impact on different types of students-as-learners and also, how differences in learning may function as a result learning design.

Study 4

Despite an enormous increase in the use of online learning strategies to either supplement, or replace, traditional modes of delivery within Australian universities, very little research exists to inform us about those characteristics of e-learning practice which make it effective, or simply to justify this shift in pedagogical practice. However, recent research provides some empirical evidence about the online pedagogical practices which optimise student learning (Mehanna, 2004). This study identified seven clusters of pedagogical practice that correlated with significant learning enhancement, as measured by student's grades. Unfortunately, the study did not compare online teaching to traditional modes of delivery. Neither did it measure if improved grades paralleled improved student ratings. However, it did adopt the type of systematic approach that may be taken to investigate the relative effectiveness of different pedagogical practices.

Research methodology issues for educational research

While differences in selection criteria and resourcing have allowed similarly focussed literature reviews to report larger numbers of articles fitting the criteria of rigorous education research, it is generally agreed that there is very little rigorous, empirical research in this area (Wilson, Floden & Ferrini-Mundy, 2001; Hendry & Barrat, 2002; Davies, 1999). Others have been directly critical of the state of educational research, stating that there is a "large amount of second rate academic educational research" (Tooley, 2001, p.138) and highlight that many studies show a blatant disregard for even the most basic research techniques and standards of research quality. Indeed, efforts to consolidate the broader meaning of results from case studies is likely to be futile, given that many studies of this nature fail to provide enough basic detail about their methodologies to foster between-study comparisons.

It is acknowledge there are a number of methodological challenges. As has been noted by authors engaged in the debate about how to progress education research, there is a fine balance between implementing experimental controls to identify causes of pedagogical effectiveness, while also ensuring those same controls do not reduce the ecological validity of a study, such that the implications are redundant in the real world (Newman & Cole, 2004). Reliably replicating an education intervention across different classes represents a clear challenge (Newman & Cole, 2004). Using student work and student-teacher interactions as data sets for educational research highlights the dilemma about when, if and how informed consent is required (Hutchings, 2003).

Researchers also face the challenge of dealing with the individual differences of each student participant. While in social science research, variability due to individual differences is typically reduced through methods of random allocation to experimental groups, this process may not be ethical or possible in an educational context. However, as has been highlighted in the literature, ignoring individual differences, such as prior knowledge of a subject, can significantly impact research outcomes and undermine the validity of results (Shapiro, 2004). Therefore, a researcher cannot simply ignore these issues. Rather, there must be ongoing

development of education research practices that explores ways of overcoming the unique challenges of research in this field.

As these issues indicate, it is important to acknowledge that there are many challenges in developing evidence-based education practice, at least at the level of higher education. Education research in the future faces the challenge of conducting studies that are both scientifically valid and practically relevant (Davies, 1999). On the other hand, the four research studies discussed here suggest that systematic and reliable research into pedagogical practice is possible. Their methodologies indicate that developing an evidence base (rather than just an accumulation of isolated case studies) is possible.

Conclusion

We indicated earlier that national policy changes in relation to the funding of improvement in both teaching and research are increasingly focused on performance rather than innovation. It is imperative for all higher education institutions to face the challenge and responsibility of developing an evidence base to support optimal teaching and learning practices. Given this, there is an urgent need to expand the scholarship of teaching to include research and reporting of larger system and institution-level initiatives, and to develop meta-analyses of the otherwise disparate research literature. Whether this pursuit will uncover that student ratings are indeed unrelated to learning (as highlighted by some studies reviewed here), remains to be seen. But for both a student's (learning) sake and for a university's (performance rating and funding) sake, teaching and learning within higher education need to be more systematically and rigorously explored. The papers reviewed here argue that this is possible.

Put bluntly, this is a context where salaries are increasingly paid through entrepreneurial initiative, and academics continue to be encouraged to innovate – the 'thousand flowers blooming' model of improvement. There is an urgent need to develop a more systematic and evidence-based approach to pedagogical practice at the course, campus and institution level. This is not only for our benefit but for the benefit of our students, and perhaps equally importantly, to reassure the larger community that our practices are defensible. Until we can do that, politicians have little reason to increase public funding for higher education. We need to be able to demonstrate that we have shifted from a craft to a professional approach in the systematic selection and implementation of pedagogic practices.

References

- Alessio, H. (2004). Student perceptions about and performance in problem-based learning. *Journal of Scholarship of Teaching and Learning*, 4, 24 – 35.
- Biggs, J. (1987). *Study Process Questionnaire Manual*. Melbourne: Australian Council for Educational Research.
- Boyer, E. (1990) *Scholarship Reconsidered: Priorities for the professoriate*. Princeton: Carnegie Foundation for the Advancement of Teaching.
- Cochran-Smith, M. (2004). Teacher educators as researchers: multiple perspectives. *Teaching and Teacher Education*, 21, 219 – 225.
- Davies, P. (1999). What is evidence based education? *British Journal of Educational Studies*, 47, 108-121.
- Department of Education, Science and Technology. (2005) *Learning And Teaching Performance Fund Future Directions: Discussion Paper*. Canberra: DEST.
- Hendry, G., & Barratt, A. (2002). Evidence-based education: How can we decide on the best way to teach? *Focus on Health Professional Education: A Multi-Disciplinary Journal*, 4, 4 – 11.

- Hutchings, P. (2003). Competing goods. Ethical considerations in the scholarship of teaching and learning. *Change, Sept/Oct*, 27 – 33.
- Mehanna, W.N. (2004) e-Pedagogy: the pedagogies of e-learning. *ALT-J Research in Learning Technology*, 12, 279 -293.
- Newman, D., & Cole, M. (2004). Can scientific research from the laboratory be of any use to teachers. *Theory into Practice*, 43, 261 – 27.
- Prosser, M. & Trigwell, K. (1998). *Understanding Learning and Teaching: The Experience in Higher Education*. Milton Keynes: Open University Press.
- Schwandt, T.A. (2005). A diagnostic reading of scientifically based research for education. *Educational Theory*, 55, 285 – 305.
- Shapiro, A.M. (2004). How including prior knowledge as a subject variable may change outcomes of learning research. *American Educational Research Journal*, 41, 159 – 189.
- Tooley, J. (2001). The quality of educational research: A perspective from Great Britain. *Peabody Journal of Education*, 76, 122 – 140.
- Trigwell, K. & Prosser, M. (1996). Congruence between intention and strategy in university science teachers' approaches to teaching. *Higher Education*, 32, 77-87.
- Trigwell, K., Prosser, M., & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education*, 37, 57-70
- Wilson, S., Floden, R., & Ferrini-Mundy, J. (2001). *Teacher preparation research: current knowledge, gaps, and recommendations*, Washington, DC: Center for the Study of Teaching and Policy.
- Wilson, K., & Fowler, J. (2005). Assessing the impact of learning environments on students' approaches to learning: comparing conventional and action learning designs. *Assessment & Evaluation in Higher Education*, 30, 87-101.
- Yeung, S.P. (2001). An empirical study of the influence of teaching approaches and academic ability on students' understanding of environmental issues in Hong Kong. *International Research in Geographical and Environmental Education*, 10, 260 – 283.

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