The experience of academic learning: uneven conceptions of learning across research and teaching

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Abstract Research and teaching are often construed by academic staff as incongruous activities that have little overlap in practice. Many studies on the relationship of teaching and research assume an inherent competition or "rivalry" between these two practices. In this study, we draw on a framework that conceptualizes these academic practices not as distinct and irreconcilable, but rather as analogous practices with a common essential goal: the advancement of learning and knowledge. Taking a phenomenographic research perspective, we investigated how 39 early career, research active academic staff at a research-intensive university conceive of learning across their academic experience and practices. We identified five distinct conceptions of academic learning within three general categories: disconnected, transitional, and connected.

Keywords Conceptions of academic learning · Phenomenography · Research and teaching

Introduction

Research and teaching, the two core academic practices of the university, are often construed by academic staff as mutually exclusive and fragmented, even incongruous, activities that have little overlap in practice (Colbeck 1998). Indeed, this long-held perception can be traced back to Cardinal Newman and the nineteenth-century origins of the modern research university (Verburgh et al. 2007). Research is focused on discovering and generating new knowledge, while teaching is focused on developing students and

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disseminating new knowledge. For many academics, achievement—in terms of output, time, reputation and status—in one practice is often regarded as occurring at the expense of achievement in the other practice. This is sometimes known as the "incompatibility thesis" (Barnett and Hallam 1999). The metaphor of a tightrope has been employed to explain the fine line that academic staff—particularly those on the tenure track—must tread, in order to preserve the tenuous balance between research excellence and quality teaching (Wolverton 1998). Indeed, studies on the relationship between teaching and research often assume an inherent competition or "rivalry" between these two practices (Light et al. 2009).

Many studies investigating the nature of the link between teaching and research have focused on the relationship between research excellence and teaching effectiveness. The bulk of these studies have been correlational, mainly seeking to determine whether excellence in the two practices is related. Overall, these studies are inconclusive. In their meta-analysis of 58 studies Hattie and Marsh (1996) found essentially no correlation between research and teaching. Excelling at research does not suggest an academic will excel at teaching, and good teaching does not suggest effectiveness as a researcher (Marsh and Hattie 2002).

At the same time, several scholars have questioned whether correlational studies fully capture the diverse practices described by 'research' and 'teaching' and their relationship, let alone how the two practices may be qualitatively understood in relation to one another (Brew and Boud 1995). Qualitative studies of the perceptions of academic administrators (Neumann 1992), heads of department (Rowland 1996), individual academics (Smeby 1998; Jensen 1988; Robertson and Bond 2001), and students (Lindsay et al. 2002; Robertson and Blackler 2006), as well as studies of institutional change (Robertson and Bond 2005), report the importance of the relationship between the two practices.

In an effort to parse out how this research–teaching nexus has been studied and understood more broadly, Verburgh et al. (2007) analyzed 116 empirical studies of the relationship published between 1990 and 2005. Despite similarities in the general research questions focusing on the relationship between research and teaching, the authors found no common framework for examining the teaching–research nexus. The studies varied across a wide range of populations, institutions, methodologies and levels of analysis. Not surprisingly, their results revealed a much more diverse picture of the research–teaching nexus than previously described. Despite this diversity, however, there was a dearth of studies focused on the integration of research and teaching, and on the relationship of this nexus to student learning.

A number of studies have looked at the relationship of research to teaching with reference to learning in the classroom. In a study of English and Physics academic staff, Colbeck (1998), for example, found the former often integrated their research in their classroom teaching and the latter to train students to conduct inquiry. And in a study of award-winning teachers, Kreber (2000) found a relationship between learning about research and learning about teaching, suggesting that "in order to facilitate student learning in the discipline and to provide for meaningful learning tasks, teachers need to know how knowledge of the discipline is acquired and advanced" (p. 75).

While the above studies still focus on the research–teaching nexus in terms of practice (as opposed to learning), Robertson and Bond's (2001) study of the two practices does tangentially begin to address learning. Developed as a direct result of academic staff responses to Hattie and Marsh's (1996) contention that research and teaching are only 'loosely coupled', Robertson and Bond (2001) identified five distinct ways in which individual academic staff experienced the research–teaching relationship. These included the two practices (A) being mutually incompatible; (B) having little connection;

(C) teaching by transmitting new research findings; (D) teaching by modeling critical inquiry; and (E) teaching and research sharing a learning community. The last two categories appear to assume a quality of student learning which is similar to academic staff learning in their research.

Likewise, in a study of university academics' experience of research and teaching—which draws upon previous studies linking academic staff approaches to teaching and student approaches to learning (Prosser and Trigwell 1999; Prosser et al. 2005). Prosser et al. (2008) found that the experience of research is related to the experience of the subject matter and moderately related to the experience of teaching. Indeed, they suggest there "is an underlying structure in the way research-active staff experience research, subject matter and teaching" (p. 11) indicating that academics who experience research as a more atomistic practice (focused on parts) also experience the subject matter and teaching as more atomistic; and those who experience research as an integrated practice (focused on wholes) also experience the subject matter and teaching as more integrated.

Finally, the relationship between teaching and research practices has also been described under a framework that brings them together as a family of scholarships (Boyer 1990). This framework defines the work of teachers as (at least potentially) an intellectual, inquiry-based activity, open to peer review and publication. The idea of teaching as scholarship has been extremely influential (Hutchings and Huber 2011; Trigwell and Shale 2004), but limited to very few teachers. Moreover, at best, it shifts the discussion from a relationship between different academic practices to a relationship between different research practices. As noted in the Kreber (2000) study above, it does not directly address the question of student learning.

In this study, we investigated academic staff experience of research and teaching in terms of their understanding of learning, not learning outcomes but rather their conceptions of their own learning and of their students' learning in the field. Drawing on seminal ideas dating back to Humboldt's nineteenth-century concept of the research university (Nybom 2003; Verburgh et al. 2007) we argue that research and teaching at all levels of study can be usefully examined as analogous practices with a common essential goal: the advancement of learning and knowledge (Light 2008; Light et al. 2009). One practice focuses on the learning of the researcher and her peers and the other on the student and her peers. The goal is essentially the same: learning. This change of perspective shifts the relationship between teaching and research from one between practices, with its tensions around roles, status, professional outcomes and so on, to one between their goals. It reinterprets the historic academic nexus or tension as a "tension of learning"—learning of the academic versus learning of the student—and it brings into focus a whole set of new questions. In such a framework, for example, what is the nature of the tension? Is it a "rivalry of learning" or "collaboration in learning"? If the former, whose learning takes precedence? Who makes the decision? Academics will need to address these questions—including their ethical implications—within their own academic contexts. More fundamental, perhaps, is how academic staff understand this phenomenon of learning across the two major practices that define their academic work.[1] This is the main research question of this study.

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[1] The authors recognize that there are academics who teach but do not actively research in the field and others who do research but do not teach or do not teach undergraduates. In this paper we focus on those who do both (see below).

Research methodology

Like other studies focused on the experience of particular phenomena, this study takes a phenomenographic research perspective (Marton 1988), drawing on variation theory (Marton and Booth 1997; Akerlind 2003), to investigate staff conceptions of learning across their academic practice. The focus of phenomenographic studies is not on 'correct' or 'incorrect' conceptions, but rather on the experience of key features of the phenomena (Marton and Pong 2005). The focus of this study is the conception of learning across two primary academic practices: research and teaching. As such, this study does not focus on the academics' actual learning in their research, or on the students' actual learning in a course, but rather on how the academic understands the nature of the learning in these two situations.

Phenomenographic studies focus on the different ways in which a particular phenomenon is experienced or conceived. In addition to the above studies on the research–teaching nexus (Robertson and Bond 2001; Prosser et al. 2008), phenomenographic studies have, for example, looked at academic staff experience of teaching, (Prosser and Trigwell 1999; Light and Calkins 2008); student learning (Prosser and Trigwell 1999), the improvement of teaching (Akerlind 2003), research (Brew 2001), and being a university researcher (Akerlind 2008).

In phenomenographic studies, variation in the ways in which the particular phenomenon (e.g. teaching, research, learning, etc.) is conceived is disclosed in terms of awareness of the variation within the key features describing the phenomenon. Conceptions vary in terms of the awareness of the different ways in which the key features of the phenomenon are distinguished and related—i.e., in terms of the awareness of those aspects that delineate the variation in the way the phenomenon is experienced. The conceptions are hierarchically related in terms of the increasing complexity of awareness of these aspects of variation within the features. The aim of a phenomenographic study is to identify these key features and classify the different conceptions they describe. In phenomenography the full set of conceptions is referred to as the 'outcome space' (Marton and Booth 1997; Marton and Pong 2005). In this paper we describe the outcome space of academic staff conceptions of learning in their research and of student learning in their teaching.

Research methods

Participants

Participants were drawn from a pool of 46 full-time, early career, tenure-track[2] academic staff at a research-intensive university who participated in a year-long substantive academic staff development program in three separate annual instances of the program[3] (12, 15, and 18 respectively). This population was chosen for three main reasons: research-intensive—the focus on tenure-line academic staff meant participants would have an intensive research agenda; teaching-active—program participants were expected to have a teaching as well as research role; and access and consent—program participants agreed to

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[2] Tenure in this research context is primarily granted on the quality and extent of the academic staff member's research and scholarship. While teaching quality is also examined, it plays a minor role.

[3] For details about this program see [http://www.northwestern.edu/searle/programs-events/faculty/searle-fellows/index.html].

participate in a number of on-going learning-and-teaching-related studies. All participants nominated themselves for the program after being invited by the university provost.

Two researchers interviewed all 46 academic staff participants at the start of the program. However, in the analysis, the authors excluded four academic staff whose teaching was focused only on advanced graduate students, post-docs or medical residents. In addition, the authors excluded three subjects from the study when recording errors precluded accurate transcription of their interviews. Complete interview data were obtained from 39 participants, generally regarded as robust for gathering a suitably rich and inclusive range of phenomenographic description (Trigwell 2000; Bowden 2005). These academic staff varied extensively in terms of their disciplines, teaching experience, places of training, age and gender. The sample was comprised of 28 men and 11 women who varied in age from late 20 s to mid-40 s. The participants came from a wide range of disciplines: 10 from medicine, 16 from science and engineering, and 13 from the humanities and social sciences, and they were trained in widely different North American and European contexts.

Instrument

The interviews were conducted by one of the authors and another researcher from the institution's learning and teaching center. They were semi-structured and lasted between 40 and 50 min. The instrument consisted of three sets of open questions, designed firstly to capture the experience of learning in teaching, secondly of learning in research, and thirdly of the relationship between the two. Each set of questions was structured to move from the concrete aspects of the two individual practices towards more general reflections on the nature of learning in the two practices, allowing participants to move from descriptions and rationales of their specific practices to their underlying thinking about the nature of the learning associated with them (Trigwell 2000).

The researchers first asked participants to describe a specific course they taught, explaining the course goals, teaching methods, and assessments. The researchers then asked questions about the nature of the student learning expected in the course. In the next set of questions, the researchers asked participants to describe their research, detailing the kinds of research activities they usually engaged in. At that point, the researchers asked them whether doing research was a learning experience for them, and to describe the nature of learning in their own field of study. Finally, the researchers asked the participants to share their understanding of the relationship between learning in teaching and learning in research. In each case, the researchers followed up with less-structured probes to clarify initial questions or responses, or to refocus responses. Such questions included, "Could you explain what you mean by that?" and "Can you give me an example?" The researchers deliberately separated the questions about students' learning from questions about the academics' own learning, because as Rowland (2000) found, simultaneous discussion of teaching and research can prompt people to think of research and teaching as more closely entwined.

Data analysis

The focus of this study is conceptions of academic learning: how academic staff understands learning across their various academic practices and roles. The authors specifically focus on academic staff descriptions of their undergraduate' students' learning and their own research-based learning. While experience of academic learning includes a wider range of academic contexts and situations—including advising, supervising, and mentoring

colleagues, post-docs, graduate students, professional practitioners, and so on—for the most part, these experiences are related to professional activities and research. More importantly, however, the greatest variation in experience of learning will most likely be found within the distinction between research and the teaching of undergraduate students. To ensure maximum variation, the authors use this narrower distinction in the analysis.

Interviews were audio-recorded, fully transcribed, and analyzed in three phases. To identify specific meanings, one of the authors read through the 24 transcripts from the first 2 years to locate passages in which participants identified, defined, or described their experience of teaching, learning, and research, focusing on how the participants understood the relative connections among those domains (Akerlind 2005). Secondly, the authors read through these condensed transcripts and independently identified key categories of meaning that captured the variation in their experience. The authors then compared these initial categories. When necessary, the authors analyzed full transcripts together to establish consensus on the meanings and their description. In this first instance, the authors agreed that four prototypical conceptions had emerged from the transcripts.

In the third phase, the authors analyzed the categories of meaning to identify the key features and logical relationships among those features on which the variation between the conceptions was structured. The authors also tested initial categories with an analysis of the 15 further interviews from the 3rd year of our study. This additional analysis identified a fifth (transitional) conception that was supported by a further analysis of the interview data from the first 2 years.

Findings

A preliminary commonality

While this study did not focus on academic staff experience of the nature and practice of their own research or the field of study to which it is attached (Brew 2003; Prosser et al. 2008), academic staff narratives exhibited considerable descriptive diversity associated with their own specific practices. In contrast to this diversity, however, the authors found a broad convergence in academics accounts of their own experience of learning in their research. All participants reported that their research was a learning experience for them, although many began by saying they did not typically think about research in terms of learning. More importantly, their accounts were remarkably consistent in revealing their own learning as a deep learning experience (Entwistle 2005) aimed at understanding, knowledge production, making connections, checking evidence, working with peers, asking questions, doing experiments, etc. This commonality was consistent irrespective of discipline and type of research. Two examples illustrate this commonality:

> As far as the learning process of research, I just keep asking questions that people don't seem to know the answers to and that is guiding me towards a focus on areas that will be interesting to explore and it would hopefully be valuable to understand better (Journalism).
> … [W]e are constant learners. … We ask ourselves a lot of questions – 'What if we know this?' or 'What if we know that?' Then we design an experiment around it, we build and test our hypothesis. If it turns out to be right and we are happy with it then we check the literature to see if there is a precedent for it. … We get feedback from other people (Chemistry).

This initial finding was not entirely unexpected given the sample of academic staff selected: all very active researchers at a top research university. Nevertheless, the pervasiveness of this initial finding is important to report and establishes the conceptual ground for the conceptions of academic learning presented below.

Conceptions of academic learning

Our analysis of the interviews disclosed an outcome space consisting of five types of academic staff conception of academic learning in three categories: disconnected, transitional and connected (see Table 1 below). These conceptions are characterized by three features—a 'learning' feature, a 'teaching' feature, and a research feature, which describe the structural variation in the ways in which academic staff understand learning across their research and teaching contexts. The learning feature suggests how academic staff understand the process of their learning compared to how they understand their students' learning. The teaching and research features reflect the variation in the way academic staff understand how teaching informs their research and how research informs their teaching respectively. The variation in the five distinct conception types is described by these three features.

The table also shows the structural relationships among the five conception types. The particular aspect of variation distinguishing the conceptions is described by each feature. Thus, for the learning feature, for example, the key distinction between type I and type II conceptions, is an awareness that student learning can be like the learning the teacher experiences in their research. Similarly, with respect to the teaching feature, the key distinction between type III and type IV conceptions is awareness that engaging students with research problems and strategies can promote learning. The three sets of aspects of variation (by feature) also show the increasing complexity of the conceptions in the table. The awareness in conception V, for example, that student learning is the same at all stages of study in higher education, includes earlier conceptions that student learning can be the same in some stages or that it can be similar in limited teaching contexts or simply that it might accidently be the same. The same is not true for earlier conceptions; they do not include an awareness of the later aspects of variation.

Learning feature

Disconnected conceptions

Type I

With type I conceptions, academic staff regard student learning (in the teaching situation) as substantively different from their own learning (in the research situation). Unlike their own experience of learning in research, as active, personal, problem-focused and making connections, academic staff see undergraduate learning as more passive, impersonal, and focused on the acquisition of facts, content and abilities. For example, a professor of political science is skeptical that students are learning at all in his large introductory classes, because of the way he understands their learning: "In the large lecture class…I give [undergraduates] a vision of the world in the lecture that they more or less passively accept." He does acknowledge that his teaching assistants may be able to promote learning in smaller groups:

Table 1 Outcome space for the experience of academic learning: variation in and structural relationship of conception types

FEATURES	CONCEPTION TYPES				
	Disconnected		Transitional	Connected	
	I	II	III	IV	V
Learning Feature How student learning is related to academic staff learning	Learning viewed as different experience for academic staff and students: surface for students, passive for students, deep and active for academic staff.	Learning viewed as different, but is aware of occasional accidental resemblances and similarities with some students.	Learning viewed as different, but recognition that a similar type of learning can be facilitated for students in some limited contexts (e.g. field trips, experiments).	Learning viewed as the same, but assumes that students need to go through a more surface, passive stage to acquire the facts and skills first.	Learning is viewed as the same - active and deep in terms of teaching and research for both instructor and students at all course stages.
Aspects of Variation Awareness that:	Student learning can be like researcher learning	Learning can be similar in limited teaching contexts	Student learning can be similar but is staged	Student learning can be the same but is staged	Learning can be the same at all stages
Teaching Feature How research informs teaching	No research used in undergrad (or non-clinical) teaching; or provides minimal material from research.	Occasionally provides material from research but only to enhance the content of the syllabus or to help to organize the syllabus.	Research problems and strategies are introduced to illustrate an idea or point, not to motivate student learning or enhance thinking.	Raises problems and strategies from research in the teaching situation to promote learning and critical thinking in the discipline.	Provides research values/philosophy as well as problems/strategies to promote learning and model critical thinking in the discipline.
Aspects of Variation Awareness that:	Research can augment syllabus content	Research problems/strategies can illustrate content	Research problems/strategies can promote learning	Research problems/strategies can promote learning	Research values can promote learning
Research Feature How teaching Informs research	Teaching does not inform research; teaching preparation might remind researcher of content not seen in a while.	Teaching material can sometimes provide new research content and questions researcher had not realized before.	Interaction with students sometimes *unintentionally* provides new ideas/content for research.	Instructor interaction with students *is open to* the possibility of raising new ideas/content and thinking about research issues and questions.	Interaction with students structured to *deliberately* raise new ideas/content and help re-think research issues and questions.
Aspects of Variation Awareness that:	Teaching material can raise research questions	Teaching interaction can raise new research questions	Teaching offers opportunity for new research questions	Teaching can be part of the research process	

… when they get a chance to go to discussion sessions, they can argue about it and ask questions and have a conversation. That's when I feel things would cement in their brains differently than they were before. *If that's ever going to happen* [our italics], I think it happens then.

Although he seems to be aware that students can learn by making connections through discussion and argument, he does not see promotion of such learning as the goal of the class: "In a way, I guess I don't really think that any learning is going on in the class that I hold in those hours."

Type II

Type II conceptions are also characterized by a disconnected understanding of learning. Academic staff may report a resemblance between their own learning and their students' learning in terms of, for example, being able to 'synthesize new ideas', but while ideal that is not necessarily expected. For example:

[Teaching is] conveying knowledge to students [and learning] is receiving knowledge, but ideally also being capable of using it to synthesize new related ideas … undergraduates are not picking their topics because I am picking their topics for them and I am providing them with the theoretical underpinnings and working them through some specific examples and then they have to take that knowledge and apply it (Engineering).

Transitional conception

Type III

In type III conceptions student learning is also viewed as different from academic staff learning in research, but there is an awareness that they can on occasion create contexts which elicit similar learning experiences.

A geology professor reported taking his students on a field trip at the end of the term, because he saw that hands-on experience offers an opportunity to deliberately bring about learning, even though he does not appear to be sure why it works.

[T]here is this transformation, where they have been talking about all this theory in class, then all of a sudden they are there with their hands on the rock, or whatever feature we are talking about, and it all clicks and people come back to me, and they say, 'Oh, I see what you are talking about and this makes a lot of sense. … I've gauged that they came in basically knowing nothing, leaving knowing something' (Geology).

Connected conceptions

Type IV

In connected conceptions, academic staff regard learning as fundamentally the same phenomenon in both the research and teaching situations. However, academic staff expressing type IV conceptions report viewing student learning sequentially; the

construction of knowledge and higher-level thinking skills occurs after a prior, passive stage during which students learn facts:

> Part of it is skill or rote knowledge to the extent that a student learns the basics first, sort of a stepping stone. … They learn the basics first to get the skills, concepts but then they begin to take ownership of the learning process. They begin to get excited about their own ideas about the material as they are learning the materials and having some lecture that works them through different concepts. … and it moves toward a sense of mastery and ownership of the material (Journalism).

Type V

Academic staff with type V conceptions regard the teaching situation as one in which learning should be active, personal, and problem-focused from the outset. Learning is not a staged process but rather a collaborative process in which knowledge is gained through active construction.

> It's not just acquiring more knowledge but it is having to see a fuller sense of the function of that knowledge. What do things mean or don't mean, how they relate to each other and the context in which they function. I see teaching and learning as being intimately linked and interrelated. […] In my literature class, they are reading the information, putting it together with what they already know and then when they come to class we engage in the dialogue that unlocks doors both for them and for me (English).

Teaching and research features

Disconnected conceptions

The teaching and research features describe the variation in the ways in which academic staff experience how research and teaching practices inform one another.

Type I

Academic staff with type I conceptions report that their research does not inform their teaching at all or provides minimal input, and, similarly, that their teaching does not inform their research to any great extent. As the Political Science professor mentioned above explains:

> I don't have a strong connection between [teaching and research] and maybe because of that I don't necessarily feel that there is a strong inherent link between the two. I see that there could be positive externalities between the two and certainly teaching the material has made it easier for me to think about my own writing in clear ways. But, I feel the two are really quite separate tasks.

Type II

In contrast to type I conceptions, type II conceptions are characterized by an awareness that teaching and research practices can inform one another, but the influence in both cases is

limited, and primarily regarded as helping inform the content and structure of their teaching.

> … Sometimes lectures that I give are actually part of my research interest. Teaching or talking about things might actually instigate some thoughts about how things are done. I think they are connected. Teaching makes you synthesize the knowledge, sometimes there's gaps in knowledge that you cannot explain which kind of makes you think about things like "Why it was done that way?" and "Why [do] they behave that way" and that gives you ideas for research. Teaching is a passive way of acquiring knowledge but it can lead to active research (Computer Science).

Transitional conception

Type III

Academic staff holding the third type of conception report introducing research problems or questions into their teaching to illustrate an idea or point, but not specifically with the goal of enhancing the quality of their students' learning. Learning is not intentional so much as an afterthought. For example, a clinical communications professor described how in an ideal situation, "I would like to bring research, what I do in the lab, into the classroom". By the end of the term, he explains, "I'm giving them data about patients and saying 'What is going on here?' So that's sort of the experience you're learning, in my view." Similarly reports that interaction with students can help re-think research questions and ideas, while recognized by the academic, are primarily incidental, and not intentionally integrated into the course.

> That's one of the greatest things about having students. They come in with completely new perspectives….I can be quite fossil in my way of thinking about problems…Because I am so fixated on looking at one particular direction, they would come in from a completely different direction. I try and work with them to develop ideas that are not related to my own research. I want to send them off to do their own research; I think that works both ways (Linguistics).

Connected conceptions

Type IV

In this type of conception the realization of the potential for learning through the cross-sharing of ideas, problems and critical, inquiry-based thinking between teaching and research may also arise incidentally, but it is then developed. Instructors holding this conception are aware and open to promoting more active ways for engaging students with research material.

> I could take the stuff I do in my lab and they can design little projects which they did in the course and which they will do next year as well. We'll always use real world examples when you're teaching; otherwise they don't think it's really relevant to them.

While she wants to make her class relevant, she is aware that the goal is not simply to show the relevance, but rather to help the students experience the relevance, and connect to the research themselves.

Type V

Academic staff with type V conceptions do not simply provide rich questions and problems but also promote research-based models, philosophies and values for engaging those questions. They encourage students to think and learn like researchers and scholars in the discipline. As this research drawing on his research explains:

> We're trying to come up with a case study game for them to play. Basically UPS wants an answer to this problem, so we [need] to answer UPS's problem but then also figuring out if it's possible for the undergraduate students to do that. The class is in the winter, so we've been starting this fall to develop this, we call it the out-sourcing game and coming up with this whole framework to get the students to give UPS the answer that they want, so that's been kind of neat (Engineering).

Discussion

The findings reveal a typology of five qualitatively distinct conceptions of academic learning in three categories: disconnected, transitional and connected. They provide a map of how the central idea of learning at the heart of academic work is understood by the academics who do this work. In addition the findings provide a structural description of the relationship between these conceptions in terms of three key features: learning, teaching and research.

In this, they extend our accounts of academic work which have been primarily focused on the relationship between academic practices, and begin to address concerns raised by Verburgh et al. (2007) of the absence of studies focused on the relationship of the research-and-teaching nexus to student learning.

These findings provide a preliminary map of academic staff conceptions of learning across these practices. Moreover, as the sample consisted of academic staff who had nominated themselves to participate in an academic staff development program to improve teaching, it may under represent the more disconnected conceptions. Certainly reproductive conceptions of student learning held by academic staff—associated here with disconnected conceptions and with teacher-centered approaches to teaching—have been widely reported (Kember 1997; Prosser and Trigwell 1999; Samuelowicz and Bain 2001).

The distinguishing feature of this map rests in the unevenness in the understanding of learning across the scope of academic practice (as represented by the research-and-teaching nexus). The experience of academic learning as a deeper, inquiry-based process engaging higher-order, critical and creative thinking skills across the academy's practices is uneven both in terms of the academics at the center of this learning and the activities in which this learning takes place. The study found that while some academic staff regard learning in both sets of practices as the same, many academic staff do not. Similarly, the study suggests that there is unevenness between practices with deeper understandings of learning more preponderant in research activities than in undergraduate teaching activities. This unevenness reveals a serious breach in the understanding of learning at the heart of the two practices distinguishing academic work. It is a breach which—under the pressures of

time, status and accountability confronting academic staff in research intensive contexts— suggest not merely a practical tension (or rivalry) between the academic staff's research agenda and their teaching responsibilities, but also a more disquieting conceptual tension (or rivalry) of learning at the heart of their work (Light et al. 2009). While this does not mean that disconnected experiences are pervasive across all aspects of academic work, the findings do suggest that academic staff experience of academic learning is permeated with major discontinuities which are, in all likelihood, widespread within institutional cultures (Robertson and Bond 2005).[4]

The unevenness reported here suggests a possible reason why studies of the teaching– research relationship, such as that by Marsh and Hattie (2002), indicate no significant correlation between teaching effectiveness and research productivity, and yet qualitative studies of academic staff often report experiencing a relationship between the two practices (Smeby 1998; Jensen 1988; Robertson and Bond 2001). Academics do experience the key factor at the heart of the effectiveness of these practices—learning—but they do so differently. While some regard student learning as the passive acquisition of content, others conceive it as a deeper conceptual process. And the latter has been correlated with deeper approaches to learning by students and better student learning outcomes (Kember and Gow 1994; Prosser and Trigwell 1999).

The results of this study also support Robertson and Bond's (2001) findings on academic staff experience of the research and teaching nexus. The five descriptions of the practice feature of the outcome space described by this study closely mirror the five categories of experience of the nexus which the authors describe: from being mutually incompatible to sharing community values, issues and questions. And the variation described in the learning feature of the above outcome space suggests an explanation for this variation in these experiences of the nexus, from the type I unconnected conceptions of learning underpinning the mutually incompatible category to the type V connected conceptions of learning supporting the shared community category.

These results also raise an interesting puzzle vis-à-vis the study by Prosser et al. (2008) mentioned above. In contrast to the uneven conceptions of learning across practices reported here, the findings reported by Prosser et al. (2008) indicate an underlying structure of moderately consistent relationships between academic staff experience of the practices of teaching, research and the subject field. While the two studies take different (possibly orthogonal) perspectives, this does raise potentially interesting questions. Is it possible, for example, that an academic may experience a research question and the subject field in a less sophisticated, atomistic (part-to-part) manner, but nevertheless engage the research problem in a deep, constructive way—i.e., not as simply reproducing solutions provided? This does not seem impossible or even unlikely, and might be interesting for future research.

The findings do support Prosser et al.'s (2008) argument that the development of university teachers should not limit itself to "the development of teaching skills and competencies" (p. 13). Providing academic staff opportunities to reflect on and become aware of the variation between key aspects of learning and how they play out unevenly across their academic practices may be critical to substantive change in their teaching. Indeed the findings suggest that current widespread developments in academic development that focus on practice may only be effective to the degree that they encourage

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[4] The authors, of course, focused on research active academic staff. Extending the study to include a pool of academic staff which is not research-active and/or which includes more variation in the experience of learning in research, would provide additional evidence about such a disconnect.

academic staff to reflect on the nature of their own learning to their students' learning, and the relationship between the two—a characteristic shared by the best teachers (Bain 2004) —and not simply to the degree they learn new teaching skills and competencies or introduce best practices (Light et al. 2009). This includes important new practices which introduce inquiry- and research-based activities into the undergraduate curriculum (Healey and Jenkins 2009; Katkin 2003; Kuh 2008; Robertson and Bond 2005). Important as these initiatives are, without assisting academics in developing more connected conceptions of learning, engaging students meaningfully in new inquiry practices may be difficult. Academic understanding of the quality of learning at the heart of all inquiry and research must be present.

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