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Abstract

When college teachers' experience of teaching and their experience of the subject matter they are teaching are analysed in terms of parts and wholes, an underlying relational structure is found. Where the teachers' subject matter focus is on wholes (or wholes made up of parts), their teaching approaches are more strongly related to high quality student learning. When the subject matter focus is more on parts (or parts making up wholes) teacher-focused transmission approaches to teaching are more likely. If the scholarship of teaching involves making more visible what teachers do to make learning possible (so that it may become the subject of public discourse and assessment) then an awareness of the relations between subject matter understanding and learning becomes a part of the scholarship of teaching. This essay presents an overview of the research that leads to these conclusions.

Keywords

Scholarship of teaching, Subject matter and the scholarship of teaching

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Scholarship of Teaching and Teachers' Understanding of Subject Matter

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Abstract

When college teachers' experience of teaching and their experience of the subject matter they are teaching are analysed in terms of parts and wholes, an underlying relational structure is found. Where the teachers' subject matter focus is on wholes (or wholes made up of parts), their teaching approaches are more strongly related to high quality student learning. When the subject matter focus is more on parts (or parts making up wholes) teacher-focused transmission approaches to teaching are more likely. If the scholarship of teaching involves making more visible what teachers do to make learning possible (so that it may become the subject of public discourse and assessment) then an awareness of the relations between subject matter understanding and learning becomes a part of the scholarship of teaching. This essay presents an overview of the research that leads to these conclusions.

Subject Matter and the Scholarship of Teaching

Does a college teacher's understanding of the subject matter they are teaching have anything to do with the scholarship of teaching? On first reflection, and from an initial review of the literature, it would appear that the answer to this question is no. If anything, it is a part of the scholarship of discovery (Boyer, 1990). Of course subject matter is an essential part of teaching. Like learning, teaching has intentionality. Teaching cannot be teaching without the teaching of *something*. That *something* is therefore an integral part of teaching. But the something in this case is usually seen in college education as the students' Object of Study as constituted by the teacher and fellow course designers. The Object of Study is defined by the curriculum content, the assessment approaches and the way teachers address and present that content and assessment. It is not necessarily the same as the teachers' and designers' understanding of the subject matter. Nor is it necessarily the same as the students' experienced Object of Study or the Knowledge Object that is the product of the learning process (Entwistle & Entwistle, 2003).

An understanding of subject matter is also not the same as Pedagogic Content Knowledge which is a specialised body of knowledge developed by teachers (Shulman, 1986). Pedagogic Content Knowledge includes teachers' knowledge of the most useful forms of knowledge representation for learning, the most powerful analogies, examples, illustrations, demonstrations and explanations that make subject matter comprehensible to others; an understanding of what makes learning of some topics difficult or easy, the sorts of understandings students have intuitively and what they bring from prior studies. This knowledge is used by teachers to constitute the Object of Study for students. From this brief analysis, the Object of Study is what is constituted using Pedagogic Content Knowledge, and Pedagogic Content Knowledge is developed from an understanding of the subject matter (and from experience of teaching and students). These associations are represented diagrammatically in Figure 1 below. Students' learning experience is shown at the centre of a series of 'onion-like' spherical 'teaching content' layers, with the closest being seen to have most influence on students' learning.

Students' experienced Objects of Study are likely to be derived in part from the Object of Study as constituted by teachers. Martin, et al. (2000) found that some teachers constitute Objects of Study and have related experiences of teaching that Object of Study that are qualitatively different to those of other teachers. Teachers who adopt an approach to teaching with a focus on monitoring student experience (a Conceptual change/Student-focused teaching approach) are more likely to constitute Objects of Study which are more holistic and focus on the students' ways of knowing. The adoption of an Information transfer/Teacher-focused approach is associated with Objects of Study that are more like lists of aspects of knowledge with a focus that is external to the student (for example, a focus on scientific/textbook/teacher knowledge).

Figure 1. Associations between student learning experience (centre of layers of spheres) and teachers' contributions to the Experienced Object of Study (outer layers)

The scholarship of teaching involves making more visible – so that it may become the subject of public discourse and assessment – what teachers do to make learning possible (Trigwell & Shale, 2004, p553). The literature is full of tips, ideas, approaches and methods that are thought to enhance student learning (e.g. Biggs & Tang, 2007). They include qualitative differences in teachers' approaches to teaching, and qualitative variation in the constituted Object of Study. But until recently no argument has been made that qualitative variation in understanding of the subject matter of teaching is related to the quality of student learning, and therefore that reflection on ways of understanding subject matter is an element of the scholarship of teaching.

In a series of studies exploring the relations between aspects of teachers' experience of teaching, my colleagues and I have focused on variables such as teachers' understanding of their subject matter, what it is that teachers constitute for students to learn, and their experience of research (Martin, et al., 2000; Prosser, et al., 2005; 2007; 2008; Trigwell, et al., 2005). In the part of these studies related to this essay, we found that qualitative variation in teachers' experience of teaching is strongly related to qualitative variation in the way these teachers understood their subject matter. Conceptual change/student-focused approaches to teaching are associated with clear articulation of the important aspects of the subject matter being taught and how these aspects relate to each other to form a cohesive view of the whole subject. Teachers who were unable to explain their understanding of their subject matter as a cohesive whole were more likely to experience their teaching as a process of transferring and delivering discrete parts and topics with a dominant focus on themselves as teachers rather than on their students as learners.

The studies involved interviews with 37 teachers who were asked about three separate but related teaching issues. First, their own understanding of their subject specialism, second, what it is they constitute for students to learn in the classroom (the Object of Study) and third, their experience of teaching and learning.

The five qualitatively different ways that teachers experience their subject matter are described below as Experiences A-E (Prosser, et al., 2005). Each of the descriptions A-E is followed by a quote illustrating that experience.

Experience A: The understanding of the internal structure of the subject matter is experienced as a series of facts and/or techniques – atomistic in structure. There is an awareness of how the subject matter sits within one or more fields of study but the focus of awareness is on the individual internal facts and processes pertaining to the subject matter itself.

'It would be technical information, technical information relating to the design of plastic components. There's information on the ranges of plastic materials that might be available but then there are specific design requirements for those materials, basic things the designer must understand about drafting: how to actually get the plastic part out of a metal tool and how therefore, to design adequately to get that part out of a tool; and what does a split line look for in a complex part. And those type of things that are applicable to a professional designer.'

Experience B: The understanding of the internal structure of the subject matter is experienced as a series of individual concepts or topics – atomistic in structure. There is an awareness of how the subject matter sits within one or more fields of study but the focus of awareness is on the individual internal concepts and issues pertaining to the subject matter itself. Experience B differs from Experience A in that the focus is on concepts, issues and procedures and not just on facts and techniques. They are both, however, atomistic and focus on the subject matter itself.

'Managerial accounting to me is about identifying the relevant information for decision-making and providing decision support to executive management. Whether that be in development of strategy, or whether that be in operational planning, or whether that be in day to day running of an organisation and the feedback which is used to control the organisation... it's information required for control and strategic strategy development within an organisation. So it's, whereas financial accounting is geared towards providing information to external users, then Management Accounting is geared more to providing information to internal users.'

Experience C: The understanding of the internal structure of the subject matter is experienced as a series of concepts, issues or procedures, which are linked and related to form a whole with a coherent structure and meaning – linked relational structure. There is an awareness of how the subject matter sits within one or more fields of study but the focus of awareness is on the internal structure of the subject matter. Experience C differs from Experience B in that while the focus remains on concepts, issues and procedures, these concepts issues and procedures are seen to be linked or related to form a coherent whole rather than being seen as atomistic.

'We're really talking about the whole subject here really, and it's all part and parcel of what makes things ticks at a molecular level, the understanding of the enzymes and the controls of DNA, how it relates to genetic information transfer. They're all happening at the same time. Well, sequentially in the sense that you need to understand about proteins to understand about enzymes to then understand about metabolic pathways, so there's a sequence there. On the other hand, all the stuff with DNA and protein, and the genetic stuff, while it relies on enzymology, it's something somewhat different again. The biochemical techniques are something different again.'

Experience D: The understanding of the internal structure of the subject matter is experienced as a series of concepts, issues or procedures, which are integral to the formation of a whole with a coherent structure and meaning – integral relational in structure. The focus of awareness is on the internal structure of the subject matter and the way the concepts or procedures are related, but there is an awareness that the subject matter is structured according to one or more organising principles within a field (or fields) of study. Experience D differs from Experience C in that while the focus continues to be on concepts, issues and procedures, the concepts issues and procedures are seen to be aspects of an integral whole rather than linked together to form a whole.

'... the laws of conservation and momentum and energy are, I guess, part of the foundation. And we would, we would see physics as having a number of foundations which, once you have the foundations allow you to describe almost any system, whatever it might be. Whether it's light, or particles, whether it's magnetic, whether it's at high temperature or low temperature. So, how do they fit in? Well, they are part of this fundamental foundation.'

Experience E: The understanding of the internal structure of the subject matter is experienced as a coherent whole, which is supported by organising theories within one or more broader fields of study. The themes or issues comprising the internal components of the subject matter are experienced as problematic, such as a series of debates, but the focus of awareness is on the ways in which the whole is generalised to a high level of abstraction.

'How do you see within this subject its parts being connected?' 'I don't usually think of it as parts. I usually think of it as examples. So I see that what we're grappling with all the time are very complex questions about human behaviour, human interactions, social change. And then in all of the bits that I like to study, because they interest me most, I just see those as illustrations of maybe that bigger theme reflected in different ways, competing pressures. So if you took, for example, the example of euthanasia, in many ways the issues that I would be interested in are the same issues, whether it was abortion or euthanasia, or indeed some kind of regulation of corporate crime. So it's the examples that change, but fundamentally you're looking at it as a social document.'

Experience E differs from Experience D in that the focus is on the underlying or underpinning theories within which the concepts, issues and procedures are constituted rather than just on the concepts, issues and procedures themselves. With the focus on underpinning theories, the experience shifts in focus away from the subject matter itself to how that subject matter fits into the broader field of study.

Structurally, the key difference in the range A-E is that Experiences A, B and C focus on parts of the subject matter, while Experiences D and E focus on the subject matter as wholes.

Studies of the variation in experience of teaching consistently yield a range of qualitatively different views from a teacher-focused transmission intention to student focused teaching with the intention to develop understanding (Kember, 1997). The six different categories (A-F) found in this study are summarised below:

A: The act of teaching is teacher-focused with the intention of transferring information to the students, with subject matter being concrete and taken for granted and seen as independent topics.

B: The act is teacher-focused, student activity with the intention of transferring information to students, with subject matter being given and seen as a series of related topics.

C: The act is teacher-focused, student activity with the intention of students acquiring the concepts of the discipline, with subject matter being a given, but connected structure of topics.

D: The act is teacher focused, student activity with the intention of students acquiring the concepts of the discipline, with subject matter being a given, but connected structure of topics within a discipline or field.

E: The act is student focused, student activity with the intention of students developing their conceptions, with subject matter being seen as the relationship between teachers' understanding and students' experience.

F: The act is student focused, student activity with the intention of students changing their conceptions, with subject matter being seen as the relation between teachers' world views and student world views which are open to change. (Prosser, et al., 2005)

Structurally, the key difference in this range is that A - D either focus on parts relating to other parts or parts relating to wholes, while in E and F the focus is on wholes (either constituted in terms of parts or relating to greater or other wholes).

When the transcripts of individual teachers are assigned to the highest category in each understanding of subject matter and experience of teaching (nearest to categories E and F respectively) the associations shown in table 1 are found.

Table 1. Relationship between Experience of Teaching and Experience of Understanding Subject Matter

Experience of teaching	Experience of understanding subject matter			
	A B Parts and parts to parts	C C/D Parts to wholes	D E Wholes to parts and wholes	Totals
Parts/parts to parts A, A/B, B, C	6	2	0	8
Parts to wholes C/D, D, D/E	2	10	2	14
Wholes to parts & wholes E, E/F, F	0	2	13	15
Totals	8	14	15	37

Somers'd=.672, p=.000

The results of the study shown in table 1 suggest that when experience is analysed in terms of parts and wholes there is an underlying structure in the way teachers experience subject matter and teaching. Where the teachers' focus is on wholes (or wholes made up of parts), the student-focused/conceptual change and development approaches to teaching are more likely. When the focus is more on parts (or parts making up wholes), information transfer/teacher-focused approaches to teaching are more likely.

The conclusions we have drawn from these studies are that university teachers need to reflect upon their own ways of understanding subject matter and consider the implications of this for the ways in which they teach and bring their students into a relationship with that subject matter. It follows that the scholarship of teaching will involve college teachers in exploring and expanding their awareness of their understanding of their subject matter. The extent to which teachers conceive of this in terms of wholes or parts and the relationship of parts to wholes may have major

consequences for the ways in which they teach and the way students develop their own sense of understanding of the subject.

There are also implications for student learning. Faculty who approach their teaching with an information transfer and teacher-focused approach are the teachers of students who have more surface oriented approaches to learning, with lower quality learning outcomes. And faculty who approach their teaching with conceptual change and student- focused approaches are more likely to be teaching students who adopt deeper approaches to learning and have higher quality learning outcomes (Prosser & Trigwell, 1999; Trigwell, et al., 1999).

In a recent essay on teaching in the UK, Ramsden (2010) notes that "There is no technical fix, mandated or otherwise, for the problem of improving the quality of university teaching. We can only stimulate, incentivise and inspire it. Books and websites of the '3,000 tips on feedback' type profess to offer easy solutions for teaching in universities. They face a fruitless task because they focus on the methods and signs of teaching rather than what they are meant to address. They are part of the attitude that puts efficient delivery and compliance with rules above questioning what it is we are providing.

We need to look at teaching the other way round. It is the content that matters above all else: what students are expected to learn, how they go about learning it and how we can help them to develop their understanding of it. Feeling you have something to say about your subject, and then thinking about it from the point of view of your students, are the two prerequisites of high-quality teaching." (Ramsden, 2010, penultimate paragraphs)

Scholarship of teaching must reflect this view. If teaching is about helping to make the learning of something possible, and the scholarship of teaching is about making public, for peer scrutiny, how the learning of that something is being made possible, then the scholarship of teaching includes a reflective awareness that the quality of learning being made possible may be enhanced through more holistic ways of understanding subject matter.

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References

- Biggs, J. & Tang, C. (2007). *Teaching for Quality Learning at University* (3rd ed.) Open University Press: Berkshire.
- Boyer, E. (1990). *Scholarship Revisited: Priorities in the Professoriate*. Princeton: Carnegie Foundation for the Advancement of teaching.
- Entwistle, N.J. & Entwistle, D.M. (2003). Preparing for examinations: The interplay of memorising and understanding, and the development of Knowledge Objects. *Higher Education Research and Development*, 22, 19-42.
- Kember, D. (1997). A reconceptualisation of the research into university academics' conceptions of teaching. *Learning and Instruction*, 7, 255-275.

Martin, E., Prosser, M., Trigwell, K., Ramsden, P. & Benjamin, J. (2000). What university teachers teach and how they teach it. *Instructional Science*, 28, 387-412.

Prosser, M., Martin, E., & Trigwell, K. (2007). Academics' experiences of teaching and of their subject matter understanding. In N. Entwistle and P. Tomlinson, BJEP Monograph Series II, Number 4 - Student Learning and University Teaching, Volume 1, Number 1, pp. 49-59. British Psychological Society.

Prosser, M., Martin, E., Trigwell, K., & Ramsden, P. (2005). Academics' experiences of understanding of their subject matter and the relationship of this to their experiences of teaching and learning. *Instructional Science*, 33, 137-157.

Prosser, M., Martin, E., Trigwell, K., Ramsden, P. & Middleton, H. (2008). University academics' experience of research and its relationship to their experience of teaching. *Instructional Science*, 36, 3-16.

Prosser, M. & Trigwell, K. (1999). *Understanding Learning and Teaching: The experience in higher education*. Buckingham: Open University Press.

Ramsden, P. (2010). No thinkable alternative. *Times Higher Education*, 5 August, Accessed on 11 Nov 2010 at <http://www.timeshighereducation.co.uk/story.asp?storycode=412794>.

Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15, 4-14.

Trigwell, K., Prosser, M., Martin, E. & Ramsden, P. (2005). University teachers' experiences of change in their understanding of the subject matter they have taught. *Teaching in Higher Education*, 10(2), 255-268.

Trigwell, K., Prosser, M. & Waterhouse, F. (1999). Relations between teachers' approaches to teaching and students' approaches to learning. *Higher Education*, 37, 57-70.

Trigwell, K. & Shale, S. (2004) Student learning and the scholarship of university teaching. *Studies in Higher Education*, 29, 523-536.