Changing foci and expanding horizons- some reflections on directions for phenomenography and variation theory.

Christine Bruce, 2006

Abstract

This paper documents my journey of reflection, as I consider the way forward for phenomenography and variation theory. In the first half of the paper, I analyse my personal experience of phenomenography and variation theory, and explore some aspects of their development. My own professional journey suggests that phenomenography and variation theory have the potential to transform learning and teaching at every level; and have the potential to transform disciplines as colleagues begin to take an interest in understanding variation in the experience of phenomena related to their discipline. In the second half of the paper, I explore socio-political and methodological directions. I propose that the currently minor themes of growing teacher-researchers and fostering discipline-based research are likely to become more dominant; and that continuing emphases on phenomenography and variation theory will shed new light on our continuing conversations and debates in the university environment. Phenomenography is also becoming established as a well respected qualitative/interpretive research approach in the wider arena. We need to continue to strengthen the research approach, including establishing its interrelationship with variation theory, to make it more readily useable by colleagues engaged in 'discipline' research, and by teacher-researchers.

Introduction

In the first section of this paper I find myself reviewing my personal journey with phenomenography and variation theory, including where and how working with this approach has had an impact on my own professional experience. I am attempting to respond to the question – How have I experienced phenomenography and variation theory? My thoughts seem to revolve around the following four areas: as tools for understanding and bringing about learning amongst students, teachers and researchers; as tools for understanding and bringing about learning at the collective level in other disciplines; as vehicles for introducing a way of thinking about the world that brings about transformative learning in teachers; as ways of thinking about the world that has made an indelible stamp on my own way of being an academic. Reflecting on these experiences leads me to conclude that the ideas, questions and practices that are an essential part of phenomenography and variation theory have fundamentally transformational capacities.

In the second section I explore some developments in the life of phenomenography and variation theory. Both of these foci have coexisted since the journey began, and the phenomena we now describe as phenomenography and variation theory began to appear. The journey began, not with phenomenography and variation theory but with questions: How can we investigate learning? How can we describe what is learned or understood? How can we bring about movement from one way of understanding towards another?

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Today we might say that the focus of phenomenography is on how to elicit variations in understanding; and the focus of variation theory is on how to bring about the discernment of that range of understandings considered appropriate by the teacher. I will look at various articulations of the ideas associated with phenomenography and variation theory over time in an attempt to show how they have been discerned.

In the third section of the paper I consider some influences and shifting emphases around phenomenography in today's university environment. I explore its potential for influencing teaching at every level, for impacting on disciplines and its potential for shedding new light on conversations in the university environment. Finally, in the fourth section of the paper I look at some methodological issues, ways in which we need to work to strengthen phenomenography, including establishing its interrelationship with variation theory.

As I have put together the paper it has become increasingly clear that the visions were established twenty and thirty years ago – every step in the collective journey has been about realising these visions, perhaps in increasingly sophisticated and powerful ways. What can we do together to continue to forward the visions?

Some experiences of phenomenography and variation theory?

Some months ago, a colleague said: 'I'm really glad I read your papers, because now I understand how your brain works.' The comment was a minor one to my colleague; for me it initiated reflection which is still in progress.

When I look back over my history of being an academic, and becoming a researcher, I have lived and breathed phenomenography for much of the time. I have contributed to the university as a librarian, higher degree student, lecturer, developer, researcher, supervisor, and for the last five years as Director of Teaching and Learning in the Faculty of Information Technology at QUT, now morphed into an Assistant Dean Teaching and Learning, and I have worked with phenomenography in every role.

My journey began in 1989 when I joined seminars with Paul Ramsden, Ference Marton and others at Griffith University in Brisbane, Australia. Since then, my learning community has included colleagues, researchers, HDR students and supervisors from my own university and other parts of the world. I have enjoyed many meals and symposia with colleagues interested in 'what and how students learn' – that is phenomenography. I have been privileged to have people walk alongside me a little on my journey, and I have had the privilege of encouraging others to start journeys of their own.

Through these years and experiences, how have I experienced phenomenography and variation theory? The answer seems to lie around the following four areas:

1. As tools for understanding and bringing about learning amongst students, teachers and researchers;
2. as tools for understanding and bringing about learning at the collective level in other disciplines;
3. as vehicles for introducing a way of thinking about the world that brings about transformative learning in teachers;

4. as ways of thinking about the world that have made an indelible stamp on my own way of being an academic?

Phenomenography and Variation Theory as tools for understanding and bringing about learning amongst students, teachers and researchers;

I have used phenomenography to investigate learning in my classroom, and in the classrooms of colleagues; I have explored variation in the conceptions of teachers and researchers; and I have helped colleagues to use these tools. Of the many projects I have worked with, there have been four which have been most significant, and which I have personally led. These are the projects around HDR students' conceptions of literature reviews (early 1990s)(Bruce, 1994); academic conceptions of information literacy (mid 1990s)(Bruce, 1997); students' conceptions of learning to program (Bruce et al 2006; Bruce, Christie and Stoodley, 2006), and researchers', including research students' conceptions of IT research (Bruce, Pham and Stoodley, 2005; Pham, Bruce and Stoodley, 2005). Of all these projects, the one which I have been able to advance most has been the literature review project; and I believe that it is because I was both teacher and researcher, and have been able to use the results to help students and other supervisors.

Phenomenography and Variation Theory as tools for understanding and bringing about learning at the collective level in other disciplines;

As I have worked with phenomenography I have observed 1) that research that begins with a focus on learning can change our understanding of fundamental discipline concepts. The classic example is that of the concept of 'mole' (Lybeck and others, 1988) in chemistry. In our work at QUT, we have an emerging interest in the *character of information* as it is experienced by people in different disciplines. The idea of 'information as it is experienced' presently has a very low profile in the information disciplines. 2) that phenomenography is of growing interest to people working in other disciplines and outside the learning frame. In our corner of the world we have identified the potential for phenomenography to contribute to 1) LIS research 2) IS research 3) Construction Management research, 4) Health research 5) Business research.

Phenomenography and Variation Theory as vehicles for introducing a way of thinking about the world that brings about transformative learning in teachers;

So here phenomenography and variation theory are no longer tools. They are vehicles; a different metaphor. Why? Because here they are making possible some sort of 'rite of passage'. The transformation from saying 'I can't explain/understand why my students are not learning'; to saying: 'now I can see what it takes to bring about learning. I have a way of looking at the teaching-learning experience which helps me diagnose challenges, design strategies to help students, create tools that facilitate changing experience of a phenomenon' etc. We all will have examples from our own experience (see some vignettes from my experience in Appendix 1).

Phenomenography and Variation Theory as ways of thinking about the world that have made an indelible stamp on my own way of being an academic?

> I find it almost impossible to not be interested in the different ways of experiencing or thinking about particular issues, policies, agendas. It is a way of being to ask what are the different ways of seeing, experiencing, approaching in this context? How can we get the whole picture, and how does that help us move forward? One way of seeing, and not recognising others is simply bad form…. As an example in my own leadership of teaching and learning scholarship in the IT faculty I have been careful to encourage many approaches to teaching and learning research, whilst simultaneously evolving a focus on phenomenographic research. (Bruce et al, 2006). In this context, interest in phenomenography is beginning to grow as an approach that might answer questions that other approaches will not.

I have come to see that learning the importance of discerning variation is to separate oneself from the mainstream of the research community which seeks to understand trends and similarities. It seems much more natural for people to seek commonality, to ask 'What is shared', than to ask 'What is different?'. As I have gone around talking about my own research, I have discovered that those who say 'Yes, I understand' are more likely to mean 'Yes, I can relate that to my own experience. I think I can see what we have in common'. Those who say 'This is hard', may be grasping that there is variation to be discerned; and perhaps are having trouble coming to terms with the variation because it is not cognisant with the usual ways of thinking.

So what has brought about my commitment to phenomenography and variation theory? Why do I stick with it? My present view is that there is something special about the method and theory which transforms, or at least has the potential to transform, the people that use it. Like many of you I have observed something of that transformation in myself and in the colleagues I have the pleasure of working alongside. So what is it that makes phenomenographers different? I must naturally borrow from Ference who always says – it is the *variation.* Here is the heart of the complexity of the learning experience which we seek to understand.

Observations – in reflecting around phenomenography and variation theory and how I have experienced them, I can

- ***reaffirm the developmental potential of phenomenography for teachers and others practicing in educational settings; a vision which has been asserted and fostered by John Bowden for close to 30 years and has been so beautifully captured by Elaine Martin (2005) in her editorial for the HERD special issue: in tribute to John Bowden***
- ***note the growing possibilities around teachers researching the content and process of learning in their own classrooms; and the growing potential for the use of phenomenography in discipline, other than educational, research.***

Phenomenography and variation theory - some reflections on their development

In this section of the paper I attempt to explore the development of phenomenography, and variation theory. In order to do this I have come back to the key questions: What are phenomenography and variation theory; and what are they each attending to or not; we could say what are the focus and perceptual boundary for each?

I also see these questions and foci as having been addressed for twenty years and more in slightly different forms. What we understand by phenomenography and variation theory today differs – in complexity?- from our understandings of twenty or thirty years ago (at that time I don't think the term variation theory was used, however the phrases phenomenographic pedagogy and relational approach to learning come close to capturing the intent of bringing about new learning outcomes). What is happening today is that sub groups are forming with different approaches to and uses of phenomenography and variation theory. We need to understand more deeply what holds us together.

This is how they presently appear to me:

Phenomenography is a response to the question – **what** does it mean to investigate variation and **how** do we go about doing that? The focus of phenomenography (or the problem it attends to) is on eliciting variations in understanding. Discipline boundaries are constantly expanding.

Variation theory is a response to the question – **what** does it mean to discern variation and **how** does that discernment come about? The focus of variation theory (or the problem it attends to) is on bringing about the discernment of that range of understandings considered appropriate by the teacher. Present horizons, or boundaries, seem to be around classroom learning, with some expansion into resource development and bringing about learning in teachers.

What has happened to phenomenography over the years? How has phenomenography evolved?

Early emergence of pheneomenography and interest in understanding the experience of learning As I understand it, in the beginning there was no phenomenography. There were questions around *how we investigate learning*, what learners understood and how they saw learning? Phenomenography emerged as Ference Marton, Roger Saljö, Lennart Svensson and Lars Dahlgren began their investigations into students' experience of learning and various 'contents' of learning. How do students understand the concept of 'price', for example? When I started to use phenomenography in the late 1980s, methodological literature was scarce. Ference was the primary articulator of phenomenography, the Swedish literature was difficult to access. Slowly, approaches to researching and understanding student learning grew clusters of interest in the UK and Australia as well as in Europe. In these early developments we see the beginnings of a dance around investigating the 'content of learning' – the **what-**, and the 'process of learning', - the **how**. Sometimes the two have been investigated separately, for example in studies of conceptions of learning; and sometimes together, as in studies of conceptions of essay writing. Researching student learning is clearly in the foreground here, and phenomenography is often described as an approach for researching student learning.

Emerging use of phenomenography for academic development and interest in understanding the experience of teaching In Australia, phenomenography captured the imagination of academic developers. In the late 1980s and early 1990s, it seemed like Ference practically lived in Australia ☺ During this time, there was strong growth in the use of phenomenography amongst academic developers, and consequently a strong

emergence of research into higher education using that approach. RMIT, through the leadership of John Bowden, became a key centre in Australia for the emergence of that research. As academic developers became a key group using phenomenography, conceptions of teaching and learning became an important strand of phenomenographic research. A clearer separation of lines of research, between conceptions of learning and teaching, and conceptions of the content of learning began to appear.

Growing focus on method and theory (1990s) Over the years phenomenography has been subject to much criticism. The challenges are familiar and have included calls for increased rigour, validity, theoretical foundations and frameworks. Such criticisms were met with an increased emphasis on questions of method and methodology. Conferences were held, articles written and book published. Ference wrote about ontology and epistemology and constitutionalism and awareness. Researchers experimented with the adoption of different theoretical perspectives including phenomenology and hermeneutics. Confusions and questions led to the articulation of much that might otherwise have been left implicit. And that articulation has begun to reveal variation in approach to phenomenography amongst different groups. Reading Bowden, Marton, Prosser and Trigwell, Sandberg and others suggest differences that are not always easy to enunciate. For example:

- John Bowden promotes developmental phenomenography, favours the uncovering of variation in meaning and is care-less of issues around structure☺.

- Mike Prosser and Keith Trigwell adopt a relational approach to teaching and learning as a framework and wed phenomenography with statistical analyses of the frequency of distribution of variation.

- Jorgen Sandberg promotes theoretical consistency and interpretive phenomenography, and

- Ference blends a vote for Gurwitsch and a theoretical framework based on awareness with experimental approaches to testing the outcomes of phenomenographic research.

However, put the interesting messiness aside, and it is pleasant to have finally reached a point, in my home institution at least where we are starting to see shifts in colleagues' perceptions of the quality/rigour of the research; shifts from accusations of low rigour to praising the outcomes. The publication of *Learning and Awareness* (Marton and Booth, 1997) has been a clear historic moment in the articulation of phenomenography, its associated theoretical constructs and techniques, that has helped make this possible.

Stronger visibility of use of phenomenography in the disciplines. Phenomenography is taking a strong place in fields other than educational research. Health, information systems and construction management are three areas at QUT where phenomenography has been used recently to study use of the internet, leadership and technology. In our little part of the world, the growth in number of HDR students across the university using phenomenography is escalating. There has been a strong expansion of interest in phenomenography globally, and across disciplines. The research approach, its emphasis on uncovering variation is in the fore for these researchers- its original and primary use for researching student learning has receded.

Use by teachers for understanding learning.
It seems to me that we are beginning to see a shift from the use of phenomenography primarily by educational researchers (for whom education is the discipline) and developers, to use by classroom teachers in wide-range of disciplines. Phenomenography seems to have an intuitive appeal to teachers and provides a strong foundation for anyone wanting to make a contribution to the scholarship of learning and teaching. While discipline teachers have always been present in the phenomenographic arena their work has not always been as prominent as investigations into conceptions of broader phenomena such as teaching, learning, graduate attributes etc. We are now seeing a reorientation towards understanding student learning of 'content' and 'process'; some contemporary examples in my own domain are studies on internet searching, algorithmic thinking, programming, networking, etc.

Emergence of application of phenomenography to understanding the experience of scholarship, research and the research community
More recently phenomenography has been applied to understanding the experience of different kinds of learning, a development that appears to have been fostered by the publication of the University of Learning (Bowden and Marton, 1998). The experience of research and scholarship in the academic community broadly as well as in discipline specific contexts has become a clear focus. Akerlind (manuscript) provides a useful overview of some key developments to date.

What has happened to variation theory over the years? In what forms has it appeared or been articulated?

Variation theory is a response to the question – **what** does it mean to discern variation and **how** does that discernment come about? The focus of variation theory (or the problem it attends to) is on bringing about the discernment of that range of understandings considered appropriate by the teacher.

Variation theory in its earliest articulations. In the beginning there was no 'variation theory'. However, learning has been understood as a change in understanding and questions around bringing about such learning have been asked. In the *Experience of Learning* (Marton, Hounsell and Entwistle,1984), at that time already bringing together some years of research, we read:

> *'Our intention in writing this book has been to present….a view of learning as a change in the learner's understanding brought about by a reconstruction of ideas related to the phenomenon being considered' (Entwistle and Marton, 1984, p.227).*

So we could say that we have *different understandings*, and *bringing about awareness of new understandings***,** key elements of variation theory already appearing.

Marton and Ramsden (1988) present an even more elaborated view 'If we want to change students' understanding, we have to deal with their present understanding in a methodical way. … We have to know what view of a particular phenomenon we would like a learner to develop' (p.272). And later 'A change in the learner's structuring of the phenomenon… is accompanied by a change in meaning. (p. 273)'… learning of the kind discussed here has both a 'how'(structural) and a 'what' (referential) aspect.

They go on to identify a range of teaching strategies for conceptual change learning. and promote the idea that students need to be conscious (aware?) that 'there are different conceptions of the phenomenon in question and see (discern?) what the conceptions are. In this way, a foundation is laid for comparing the relevance and merits of different conceptions.' (p.277).

Variation theory in the form of phenomenographic pedagogy Bowden in articulating 'phenomenographic pedagogy', separates the research approach, phenomenography, from a prospective pedagogical approach, which is underpinned by a particular view of learning. He describes that view of learning as follows:

'Quality learning is about conceptual change – seeing the world differently is an essential outcome.' (Bowden,1990, p.4)

In the same paper he is also careful to distinguish phenomenographic pedagogy from phenomenography:

'The theoretical base underlying this way of understanding processes of conceptual change learning will be referred to as phenomenographic pedagogy. It is derived from phenomenography and should be distinguished from phenomengraphic research, an approach to studying learning that focuses on different student conception… Phenomenographic pedagogy is concerned with ways of facilitating conceptual change by the learner in a context.. (p.1)'

While these articulations still do not use the language of variation theory, the concepts of variation, 'seeing the world differently', and bringing about different way of seeing, clearly appear.

Variation theory in the form of a relational approach
Prosser and Trigwell, (1999) espouse a relational approach to teaching and learning; and emphasise the relations between learning and the context in which learning is situated. Their focus is on 'the relations between students' conceptions of learning, their perceptions of the learning environment, their approaches to learning and learning outcomes in higher education'(p.5). For Prosser and Trigwell, 'relations' means 'correlations' between variables. A major focus in their model (p8) is '***the variation within each of these areas, and how the variation in one area relates to variation in another***'. So, for Prosser and Trigwell there is a key interest in variation as we would expect. They argue also that the relationship between approach and outcome is dependent upon perceptions of the learning environment. Therefore changes to the learning environment or situation, such as assessment, learning goals etc will assist in bringing about changes to the approach – the **how** - and outcome – the **what** -of learning. The latter presumably means structural and referential awareness of the phenomena at hand?

Variation theory formalised
Let's look briefly at some elements of variation theory as espoused in recent volumes such as *What Matters (*Marton and Morris, 2002*)* and *Classroom Discourse and the Space of Learning (2004):*

The object of learning – the 'stated' –'**what'** of learning as encompassed in a learning goal, objective or similar
The intended object of learning - **the what** of learning as perceived by the teacher
The enacted object of learning – **what** is made available to students to learn, or what they can possibly learn
Experiencing the object of learning – experiencing the phenomenon – the **what** and the **how**
Learning about a phenomenon – discerning its critical features and focussing on them simultaneously
Only that which varies can be discerned
The object of learning can be described in terms of the space of variation.
The space of variation encompasses what varies, what varies simultaneously, what is invariant, what is taken for granted

What's happening here? What is similar, and what differs from what has gone before? It seems to me central that a) phenomenography has a place in uncovering the views of the phenomenon or phenomena amongst relevant participants in the learning event, and b) understanding of how learning is brought about is being sought. These are very similar problems to those questions which have been around since the earliest investigations that now form the phenomenographic literature

What differs in much of the work that is going on alongside the articulation of variation theory? It appears to me that the phenomenon is being investigated from the perspective of different participants in the learning experience; and how the phenomenon is being revealed to learners, is being investigated directly in terms of how the 'space of variation'is being revealed.

Variation theory articulated for non-phenomenographers (2006)
So how is variation theory being articulated more recently? We recently tried to explain it as follows:

"*Of particular interest is the status of the relational frame as one through which the content, learning to learn, and experiential frames are mediated, or brought together. Users of the relational frame are interested in both content (phenomena); and how that content is seen or experienced. Learning in this frame is understood as coming to discern things in new or more complex ways. This view of learning has been more recently formalised and labelled 'variation theory' (Marton and Tsui, 2004; Pang and Marton, 2003).*

Variation theory proposes that learning occurs when variation in ways of understanding or experiencing are discerned. For example, music is learned when different sounds are discerned, reading is learned when the relationship between written words and spoken sounds is discerned, IL is learned when different ways of experiencing it are discerned, information searching is learned when different ways of experiencing that are discerned. In the latter example, a person must discern the difference in searching based on knowing that a database is structured, and searching without understanding the structure, to appreciate the powerful influence of structure on searching. ***Bringing about learning through widening experience, and thus revealing variation, is the underlying principle.****" (Bruce, Edwards and Lupton, 2006)*

Does our simplification capture the essence? How important are details?

Where do differences in concern about the details come from? For example, some of us are more concerned about the direct and indirect object of learning than others. Some of us are more interested than others, when applying variation theory, in holding one dimension invariant while varying other dimensions. Do these differences in approach to variation theory reflect differences in approach to phenomenography and phenomenographic pedagogy? Are some views of variation theory more powerful than others – what are the different views, and which are the more powerful?

Application of variation theory

So we could say that the theory of learning that is now associated with phenomenography and phenomenographic pedagogy is considerably developed beyond what it was ten or twenty years ago. In addition, several applications of variation theory are emerging while simultaneously there is some uncertainty in the phenomenographic community around what is variation theory and its relation to phenomenography. Applications include

- investigating the act of teaching and learning through the lens of variation theory, what does this mean? And how does it interrelate with the use of phenomenography? (such as described in What Matters, 2002)
- the Learning Study (Pang and Marton, 2003) where teachers are taught the basic elements of variation theory, design and teach a lesson, the outcomes of which are compared against that of a control group
- development of instruments such as The Approaches to Teaching Inventory (ATI) (Trigwell, Prosser and Ginns, 2005)
- Situated explorations of how to bring about learning through assessment in relation to a particular phenomenon (eg Edwards and Bruce, 2004)
- The development of learning objects (eg Ross and programming tool by Margot)

Do we have different sub groups forming with different domains of interest, as well as different approaches to and uses of phenomenography and variation theory – variation emerging in the character of focal elements?

Observations – on reflecting around the development of phenomenography and variation theory I am concluding that,

- ***In asking and reinvigorating questions around 'How do we investigate learning from a second-order perspective? How do we investigate the experience of learning? How do we investigate variation? How do we bring about learning? How do we bring about discernment of the space of variation? we have brought about answers that have taken on a life of their own. We must remember to privilege the questions***
- ***Phenomenography is poised for significant expansion into other disciplines, as it strengthens methodologically***
- ***In the teaching and learning arena, phenomenography and variation theory together have potential to transform teaching and learning practice, particularly if we can simplify or communicate the essences easily to practitioners.***

- ***Whilst perhaps not explicitly stated, the idea of variation theory (that discerning variation brings about learning) has been around since the earliest phases***
- ***P'graphy and variation theory have been closely associated since the inception of phenomenography.***
- ***Many current explorations around variation theory are watching what teachers and students do in a classroom, rather than having a teacher investigate what their students are learning and intervene accordingly.***

Expanding the horizons of phenomenography and variation theory – observations on widening influence

What are some emerging directions? What might phenomenography and variation theory contribute in the future? What influence is phenomenography having in the wider higher education arena? In this section of the paper I consider the possibilities, based on observations of contemporary directions around its potential influence. Phenomenography and variation theory have the potential to significantly inform and influence national and international higher education agendas; particularly as academics are being increasingly exposed to the key concepts and directions through Grad Certificate and similar programs [This is the picture that is emerging in Australia]

Connecting to national and international higher education teaching and learning agendas.

> 'The conjunction of teaching and research is now probably seen as the most distinctive aspect of the university… capabilities for experiencing, seeing certain things in certain ways, is a key issue as far as quality in higher education is concerned' (Marton, 1998, p.79, 193)

Several areas in which phenomenography and variation theory are exerting influence are emerging; with as yet unrealised potential:

a) Quality frameworks and linking to these – in *The University of Learning,* (Bowden and Marton, 1998; Marton, 1998), John and Ference provide us with the keys to the character of quality teaching and learning : teachers are able to discern the learning outcomes required, are able to discern variation in students present experiences and understanding, are able to design strategies that will bring about the preferred learning outcomes, way of experiencing or understanding.
b) The teaching – research nexus ['learning at different levels'], and transforming our understandings of these– at present we are researching research and learning as through they are completely separate things……transforming understanding of the 'objects' of professional or disciplinary interest, at the collective and 'individual' levels, is what holds these together.
c) Scholarship of Teaching' in different communities – we are seeing the conversation about the scholarship of teaching beginning to link with the conversations that have been ongoing for a long time around influencing student learning.
d) Higher Education Teaching and Learning – we are seeing influence on pedagogy and in a wide range of discipline areas. We are also seeing growing influence on

approaches to staff development, and to the development of learning resources, including online objects.

e) Internationalisation – users of phenomenography and variation theory have begun to investigate variation in different cultural context. The beginnings that have been made have vast potential as teachers from different cultures need to understand teaching and learning in different cultural environments.

Phenomenography and variation theory -Empowering classroom teachers to bring about learning.

Clearly there are many approaches to staff development, and to the implementation and use of variation theory. In recent years my project experiences have led me to conclude what many of you have probably concluded already -that teacher led research, in their own classrooms, has more transformative potential than other kinds. This is the direction that Prosser and Trigwell advocate in *Understanding Learning and Teaching* (1999). While there are many examples of teacher led research in the literature, these do seem to be somewhat overshadowed. A couple of stories will illustrate the difference between the outcomes of teacher led research and expecting teachers to apply the outcomes of research led by 'others' who are perceived as somewhat distant from their situation:

i. In 1999 I began to supervise a research project where the teacher wanted to understand what it was that brought about learning in her classroom. By 2001 she had preliminary outcomes of her investigation. By 2003 she had developed learning strategies to bring about improved learning outcomes. By 2004 she had university funding to develop an application, an online learning tool to help students adopt and use the more powerful investigations. She has a team of people working with her. The tool has been trialled in other discipline areas. Multiple papers have been written by the team. The university has recognised the value of the tool and suggested that strategies be sought to introduce its use across discipline areas. In 2006 the researcher's partner investigator is seeking a university fellowship and a community of practice in other parts of the university to take the work forward.

ii. In 2002 I started working with a group of academics teaching in a troubled area. They wanted to understand how students went about learning in the subject area but they were too busy to undertake the research themselves. So I created a team to work with them. The team worked alongside the academics in identifying what phenomenon ought to be investigated, what the interview protocols should look like, in the development of the outcomes, and in the communicating of results to students. The research assistants and the learning designers associated with the project were keen to implement the outcomes of the research. The academic teachers did not find it easy to see how to use the outcomes. The learning designer created an online tool to support student learning in relevant units; teachers found it difficult to embed the tool into the units learning processes. Last year one teacher in the team said 'we need to understand more about our students in this subject and we need to use phenomenography to do it.' That teacher retired.

The importance of discipline context and ownership in understanding learning has been around since the beginning. Ramsden (1984), for example, comments that, in the Engineering discipline, a solid grounding in procedures and facts early in the course are essential to bringing about deep learning later on. I believe that the value of such insights really has an impact when discipline teachers themselves engage in the relevant research and go about seeking to transform learning. Not only will they have impact in their own classroom, but they also have the respect of their peers.

At QUT we are seeking to take this agenda forward through a CARRICK project that aims to develop and test the use of resources which will empower teachers in disciplines to engage in classroom based phenomenographic research themselves, and consequently to develop learning strategies, assessment or learning objects designed to bring about learning. The project was originally put forward as a Carrick grant application (Bruce, Edwards and Davies, 2006) and has been since redesigned as a Carrick Fellowship application (Edwards, 2006). An extract from the Carrick grant application follows:

Teachers are transformed when they gain the skills and knowledge that enable them to implement learning strategies that demonstrably improve students' understanding of critical discipline concepts and processes. Yet, at a time when the higher education sector is being challenged to professionalise teaching and learning, many teachers, and particularly inexperienced teachers, find it difficult to design strategies that will help students adopt appropriate understandings of aspects of their disciplines.

This project will introduce teachers to key ideas that have emerged as critical in higher education research and scholarship:

1) *There are key learning outcomes that are fundamental to the learning of each subject.*
2) *It is the teacher's role to identify critical concepts or processes that need to be understood and applied.*
3) *Learners will understand these concepts and processes in an identifiable suite of different ways.*
4) *Teachers can identify the set of ways in which critical learning outcome(s) are understood.*
5) *Once teachers can identify their students' understandings, they can design teaching strategies and learning resources that will help learners to transform their understandings.*

While there have been major research studies into aspects of student learning, Tight (2003) acknowledges that there is also much value in teachers undertaking 'small scale research' as part of probationary and other developmental processes. Most institutions do encourage academics to engage in teaching and learning research as part of their Graduate Certificate (Higher Education) programs, although numbers in such programs have historically been small. Working from the premise that the learning and teaching development environment should encourage and support university teachers to engage in research as part of their every day work, the proposed project offers a low cost and effective way for teachers in higher education to pursue this pathway. This approach offers the potential for immediate improvements in teaching strategies and subsequent student learning outcomes. (Bruce, Edwards and Davies, 2006)

Observations -*Based on the experience of the QUT phenomenographic research effort and observations of what is happening internationally I contend that*

- ***more emphasis will be given to discipline research – the horizons will expand or discipline research will appear more in focus***

- ***more emphasis will be given to discipline teachers researching learning specific phenomenon in their disciplines; the teaching-research nexus, rather than staff development will appear more in focus. What does it mean to put phenomenography in the hands of discipline teacher-researchers. And what needs to happen to make that possible?***

- ***The idea of developmental phenomenography is critical, but I would not want to forsake structure ☺, because therein lies the power of identifying how to bring about learning.***
- ***The emphasis is shifting from understanding variation in learning to emphasis on bringing about change in learning***
- ***The emphasis is shifting from use by developers to emphasis on use by discipline experts to understand and improve what they do. Developers more interested in the 'processes' eg. Learning, research, scholarship, discipline teachers more interested in the 'object' of study? Do we need to dwell further on the idea that learning is relational, always about something? Much contemporary work in Aust/UK is about teaching teachers. Where is the emphasis on investigating student learning of subject matter? Returning our emphasis to the learner and learning at both the individual and the collective level.***

Some reflections on method - back to the internal horizon?

I have already established that, in my environment, phenomenography has shifted from being a research approach requiring considerable defence, to being one that is a strong part of the methodological conversation in many disciplines. Supervisors who have experience with the approach are in demand; phenomenography is on the agenda for research students; it is being recognised as being 'one of the more rigorous qualitative approaches' (☺), and it is being adopted and discussed across many disciplines. As we may expect with a relatively new and vibrant research approach, there are methodological and theoretical issues that appear in need of attention if phenomenography is to achieve the wider recognition that it deserves. Some of the thoughts below come from my own research work, from supervising students, from reviewing journal articles or examining theses. We need to:

Further enunciate phases in the development of phenomenography and key contemporary variations around the approach.

Some students continue to perplex me by insisting on validating through quantifying agreement; using multi-methods without an integrative frame; counting the number of times categories appear on transcripts. Some attention to the different perspectives, and their underpinning philosophies would help clarify the frameworks within which it is appropriate to adopt particular techniques, or not.

Phenomenography is not a set of techniques, it is the frame which may be interpreted in different ways, through the lenses of positivism, constructionism or critical theory within which different techniques maybe considered appropriate. So some people choose to take a hermeneutic approach to phenomenography, others interpretivist, some follow phenomenographic work with a statistical analysis. Akerlind (2005) explores variation in

phenomenographic practice. We need now to go further, explore and make explicit variation in the theoretical positions being brought to such research.

Further enunciate our understanding of conceptions and categories of descriptions.

Too many papers I read continue to describe people as *holding* or *having* conceptions, as though conceptions are characteristics of persons, when an important phenomenographic positions are that a) conceptions are not characteristics of people and b) different contexts bring about use of different ways of seeing (Marton and Pong, 2005). In my view this is the single most important issue that needs further exploration. How can we stop ourselves from oscillating between dualistic and non-dualistic stances? We need even more thinking around the theory associated with *conception*, *experience* and *awareness*. We need to understand the shift from asserting that bringing about learning is about changing changing conceptions; to asserting that bringing about learning is about expanding experience and awareness, enabling people to navigate wider conceptual spaces.

Deepen our understandings of the character and status of outcome spaces.

What are the different types of outcomes spaces? And how are these associated with different phenomena? For me the outcome space maps experience or awareness. Each category/ variant of experience has its own internal horizon and external horizon (that perceptual boundary beyond which people do not see when operating in the confines of that category). The complex of the categories reveals how they logically interrelate.

In the many studies that have been conducted using phenomenography some themes emerge. There are those of us that prefer to ignore outcome spaces being unconvinced of their relevance or theoretical importance, and there are those of us who are committed to them to the extent that we believe that the rigour and success of the research lies in being able to reach the point of constructing the outcome space based on evidence from the data. Doubtless there are points in between.

Further more many of the studies have identified different ways of treating the development of outcome spaces for example a) identifying categories as simple or complex, b) positioning categories as reflecting historical development c) positioning categories as identifying increasing complexity or levels of understanding d) reflecting the broadening of the space of variation or indeed a combination of some of these. Questions then emerge around whether for each phenomenon the categories have equal status or whether some are impoverished ways of thinking or even misconceptions, or whether they are all appropriate dependent upon contexts? Can we represent outcome spaces other than two dimensionally? Why should we try? What happens if we allow technology to mess with outcome spaces, and develop dynamic rather than static representations? (for eg, see Edwards, 2006b)

I have often wondered whether these questions are strong for me because most of my work has been around the social science disciplines and views around level, history and misconceptions are stronger in the scientific and technical disciplines. Are the issues and answers specific to each phenomenon? Are different kinds of outcome spaces more likely in specific disciplines, how is each kind defensible? Are the different kinds of outcome space representative of different ways of thinking about this particular element of phenomenographic practice?

Develop 'variation theory'.

There are a number of aspects to this.
1) We need to extend our understanding of variation theory. What is the relationship between variation theory and phenomenographic pedagogy? Is variation theory a theory of learning or is it something larger? What is its relationship with other learning theories? Is it, or could it potentially be, a 'world view' with its associated theory of learning
2) We need to clearly distinguish between the theory and applications of the theory;
3) We should explore the relative importance of some features of variation theory. For example, how important is the idea of varying one dimension while holding others constant in order to bring about learning? How possible is it to do across different types of phenomena?

Clarify the distinction and interrelation between phenomenography and variation theory

Or said another way - separate out and clearly understand the relationship between phenomenography and variation theory. Is phenomenography a precursor to, and independent of variation theory, or is it also an application of variation theory?

Consider the relationship between phenomenography, variation theory and emerging ideas such as threshold concepts (Land and Meyer, 2006)

We need to consider to position phenomenography and variation theory in relation to the broader higher education landscape, and in particular in relation to the emerging notion of threshold concepts and troublesome knowledge. I know that I have not been alone in recognising what Elaine Martin (2006) refers to as the poetry in action nature of 'threshold concepts'; and also in recognising the resonance as resembling the resonance associated with phenomenography and the insights that it continues to give us into learning. The material I have read to date around threshold concepts is clearly staking out its' own, and independent ground, which is appropriate and right. I suspect that there is much scope for understanding what these two territories of thinking could bring to each other, as well as in understanding where and why they might diverge.

Final observations

It seems to me that each of the thought paths that I have taken in this paper have ended in largely the same place – that phenomenography and variation theory have much to contribute to the wider research community and the wider community of teachers. It also seems to me that the tensions inherent in the relationships between these two communities belong also to phenomenography and variation theory. To appeal to the research community there is a need to strengthen and further develop the methodological and theoretical frames, and to appeal to the community of teachers that is a need to simplify to identify the critical elements and make them communicable. Indeed if we can do both, simultaneously we will considerably strengthen both phenomenography, variation theory and the communities they serve.

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Appendix One. Transforming teaching and learning: some vignettes

Vignette 1

A data networks teacher is implementing many strategies to reduce the high-failure and attrition rate in his classes. He then seeks support in trying to understand how students are understanding and interpreting the abstract concept of a 'data-network'. He generates questions to reveal students' understandings and interviews a small group of students. He is surprised to discover the range and surface level interpretations of this fundamental concept. With new insights into students' existing understandings, he then designs learning interventions to bring about the desired understandings. The failure rates for his students have declined significantly. This full time teacher conducted his initial investigation and brought the project to the stage of presenting a refereed conference paper at the QUT Online Teaching Conference over a period of eight months. The teacher has established sufficient motivation to continue the work on a longer term basis. This teacher won a QUT Learning Innovator award in 2005, and received a commendation in the FIT Dean's Excellence Award, 2005.

Vignette 2

A project management teacher is analysing the subject he teachers to better identify what makes students successful. He is introduced to the literature on higher education and the idea of students adopting deep and surface strategies to learning. His subsequent analysis of his work has led to the embedding of authentic and experiential approaches in his teaching. Within a period of six months he presented a refereed conference paper on the topic. This full time teacher has continued with his teaching scholarship whilst engaged in a PhD program on a different topic. This teacher has gone on to win Faculty based teaching awards and a commendation in the QUT Team teaching award 2004.

Vignette 3

An information management teacher questions what makes the light turn on when her students are learning to search the internet. She decides to investigate the different ways in which students search and learn to search the internet. Within the first year she is able to think through what she needs to do, and by the end of the second year implements a project and reported preliminary outcomes in a refereed conference paper. This full -time teacher goes on to develop assessment strategies to bring about the more desirable ways of searching and learning to search and reports the outcomes of that phase of the project at EARLI and in *Assessment and Evaluation in Higher Education.* The teacher has won several teaching awards and undertook a QUT teaching fellowship to expand her research interest and develop resources for other discipline areas

Vignette 4

A librarian develops an interest in understanding students' experiences of essay writing. By the conclusion of her investigation she is not only passionate about what she has learned and working out ways of putting it into practice; she has also published a book on her work and has contributed to an Australian National Award winning teaching team. She is now supervising others in the journey of researching variation in student learning.