

Researching Learning in Networked Learning – Phenomenography and Variation theory as empirical and theoretical approaches.

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Abstract

Phenomenography and variation theory are presented as empirical and theoretical approaches to research on learning, in particular as applicable to networked learning. Their epistemological, ontological and methodological underpinnings are described. Three studies of relevance are described briefly, and used as examples for a discussion of the research questions that can be asked in empirical studies, the approaches to data collection and/or data generation, and analysis, and the presentation of results in wider frameworks that widen research possibilities. The questions are variants of “What is the qualitative variation of ways in which people experience some phenomenon they meet in their everyday lives?”, in higher education, generally applied to students and their experience of aspects of their study and learning. Learning is seen at an individual level, but empirical results are at a collective level; individuals contribute only fragments of the data that is to be analysed as a whole pool, and results are presented at the collective level of the pool. This paper can be seen as a comparison, a contrast and, possibly, a complement to the other two papers in the symposium which present approaches which are related directly to learning at the individual level and the social level, respectively.

Keywords

Learning, networked learning, phenomenography, variation theory, research methodology

Introduction

For some 40 years, research into student learning has been carried out within the field of what has come to be known as phenomenography and variation theory (Marton, 1981; Marton & Booth, 1997; Marton & Tsui, 2002). Learning of a wide range of subject matters in a number of typical pedagogical situations has been tackled, but little has been done where IT is used to support learning through interaction and communication, Networked Learning. This paper will review the methodological underpinnings of the field and examine its potential for researching learning in networked learning.

The research questions that typify phenomenographic research on learning, in particular related to higher education, are of the general form: How do students experience (understand, perceive, handle, or articulate) important aspects of their learning environment? This can be broken down into three specific aspects, each with its question: How do students understand the concepts, principles, and professional accomplishments they meet in their studies (the what or the content of learning)?; How do students experience or perceive or handle the learning tasks they are expected to tackle during their studies (the how or the approach to learning) and How do students conceptualise the nature of learning practices that underpin their studies in the context of the programme they are undertaking (the motive force of learning)? For each question one would expect an outcome space of qualitatively different categories of description to emerge, based on collected data and rigorous analysis, which could then be related to wider issues of interest to the researcher and to the teaching practitioner.

The assumptions of phenomenography

Phenomenography and variation theory are built on explicit epistemological, ontological and methodological assumptions. The fundamental epistemological stance of phenomenography and variation theory is that knowledge is essentially a relation between the learner and the phenomena being learned – between the knower and the known, the learner and the learned. This is in distinction to the behavioural views of learning in which the learner is an accumulator of facts that lead to higher forms of learning through externally imposed stimuli and feedback, on the one hand, and to the cognitivist views of learners forming internal schema or structures of knowledge that can be retrieved heuristically as needed, on the other hand. These two can be seen in the taken-for-granted practices of teaching in higher education, whether it is assessment or lecturing or tutorials that are scrutinised. The phenomenographic stance is more readily related to the socio-cultural views of knowledge as relational, though more interested in knowing and learning in individuals than in cultures, and more in a pedagogical context than in an historical context. Commonalities can also be seen with the social constructivist epistemology, but the phenomenographic emphasis is on learning content, coming to see important knowledge in particular ways and how to contextualise them, and not at all on learning social structures that have formed around knowledge and how to manoeuvre in them.

Ontologically, phenomenographic research points to individual learning, but tackles it at a collective level, which is to say that the empirical results lie at a level above the individual but can inform the researcher and the teaching practitioner of the learning practices even at an individual level. More precisely, empirical data is collected from a selection of persons, chosen to cover the range of persons for whom the research questions are relevant, and are pooled for analysis; thus the results lie across the whole source of data, a collective level.

The methodological assumption of phenomenography is that there is a limited number of qualitatively distinct ways in which people experience phenomena they meet in their everyday lives, and in the case of student learning, this is restricted to study-related contexts. If the basic research question to be addressed is “How do people experience Φ ?”, a way of experiencing Φ is the unit of research, and the results of a study are expressed as qualitatively distinct units, categories of description, structured in an outcome space, which tell of the variation of ways in which people experience Φ . The approach is essentially inductive and methods can vary according to the actual research question, research context and the phenomenon. How the results are deployed thereafter depends on the overall research question being addressed.

Variation as a Characteristic of Learning

Learning is characterised as coming to see a phenomenon in a new way, whether more in line with the curricular goals, or a more powerful way for future practice. Learning can be analytically (though not ontologically) separated, in general terms, into *what* is learned and *how* it is learned – the referential aspect and the structural aspect of learning. Although this description of learning appears to be decontextualised, in practice the context of learning is paramount, as is the consideration of context in research on learning (Adawi, Berglund, Ingerman & Booth, 2002). Students might understand the phenomenon of solving a problem, for example, differently according to the context they meet the problem in, or understand the text of a book according to what they expect to be able to do with it in due course. Thus, *context* can be added to the analytical separation, and this is important for studies related to networked learning.

Grounded in a number of empirical phenomenographic studies, a theory of learning has been developed, now known as variation theory of learning (Booth & Marton, 1997; Marton & Tsui, 2002). Expressed briefly, this states that learning about a phenomenon is essentially constituted of discerning new features of the phenomenon and seeing the relation between parts and wholes in structurally new ways and thereby coming to find new meaning in the phenomenon. Discernment of new features and new relations demands that the once taken-for-granted is questioned, and that in its turn demands that variation be experienced – what was once taken as given can then be seen as potentially otherwise. And to experience variation needs a simultaneous experience of both the taken-for-granted and the otherwise, whether in real time or in memory.

The context to the *what* and *how* of learning is then the learning environment that is offered, with its tasks and their intended concepts, principles and practices for learning. The sense that is made of the task or the content can be studied empirically to give qualitatively distinct categories, across the collective of participants and the results can then be turned onto the broader research questions.

Phenomenography and variation theory for research into learning in networked learning

In order to apply the phenomenographic research approach to networked learning, I will consider first the possibilities for empirical research in terms of research questions, data collection, analysis and outcomes.

Research questions

My colleagues and I have been working with learning in the IT-extended university, asking questions about how students in distance courses, in particular non-typical students, experience their learning environments, constituted as they are by the meeting between the current course of studies, their history of studying and the social and cultural situation in which they work (Wigforss & Booth, 2007). In a previous study, questions addressed how groups of students, all practising engineers working in the automotive industry, tackled a collaborative project related to their various but different areas of professional expertise (Booth & Hultén, 2003). These questions are typical of phenomenographic studies, and what distinguishes the ensuing research is less the aim of the research and more the ways in which data was collected to underpin analysis and results. In both studies, interviews were actually carried out but the main thrust of the analysis came from data that was produced in the natural course of events. A third study of relevance here is that carried out by Anders Berglund, into how students of computer technology in Sweden and the US, working collaboratively and extensively at a distance to solve a practical programming problem of designing and implementing communication protocols to control a piece of electronic equipment, experienced their groups and learning in their groups (Berglund, 2005)

Generating and/or Collecting data

By far the most common way of generating data for a phenomenographic study is to carry out interviews which bring the interviewer and the interviewee into dialogue around the phenomenon (or phenomena, or aspects of a phenomenon) from different directions, approaching it from different concrete or potential contexts. In networked learning, however, this is often impossible because of distance. There are attempts to establish methods of online interviewing, using chat-like and social communication sites (e.g. Davis et al., 2004; Chen & Hinton, 1999), but these lack the spontaneity and exploratory possibilities that the phenomenographic interview demands for successful analysis (Åkerlind, 2005).

In the three studies already mentioned, interviews were in fact possible, and were indeed carried out. In fact, for the third of them, interviews provided the only form of data, though incidental data produced in the course was also informative as collected data. But for the first two projects, data that was available as a product of the course proved to be valuable for analysis. The non-typical students of a university course – adults who had decided to investigate the possibilities of taking up higher education and who lacked the necessary qualifications – were being inducted into learning practices of higher education through tasks and seminars designed to introduce typical student ways of working and to discuss them in small groups with the teacher in telephone conferences. Thus there were short essays on various aspects of their ways of coming to terms with studying in higher education, including reflections on the outcome of a visit to a local university and a discussion with a member of staff there. These essays proved to be valuable as objects for analysis, in conjunction with interviews with some of their writers.

In the second example, the discussions that were held between two of the groups provided data that typified different ways of conducting a multi-part discussion with a common goal in sight, and proved to be valuable for analysis. Rather than a phenomenographic outcome space, however, the discussions brought to light the ways in which variation were being brought out in discussions, and how the

contributions to the discussion could lift variation around a specific aspect of the project and thereby open new dimensions of the project that could be dealt with productively.

Thus, networked learning can provide the researcher with data incidental to the course or programme, which is a natural outcome and which can be analysed with the field of phenomenographic research to bring learning into focus.

Data analysis

Analysing phenomenographic data, whether traditional data comprising a number of interviews or the more ad hoc data derived from written networked learning situations, can be seen as an issue of working with wholes and parts of wholes, decontextualising and recontextualising parts to form new wholes that tell a different story from the original whole. A set of interviews can be broken down into fragments which point to different aspects or parts of Φ , and regrouped to form new wholes that constitute qualitatively distinct ways of experiencing the whole Φ . This is done as an iterative process, where fragments are grouped and regrouped, categories are derived and critiqued and the parts are regrouped again. The process is not algorithmic in the sense that there is a given way to handle the parts and the whole; the researcher rather has to derive their own heuristic in accordance with the data available and the research question it is intended to illuminate.

In the case of the first study, of 27 non-traditional university entrants, we had access to their essays on their reflections and ideas when they visited a local university or university college, and were able to analyse them to identify five qualitatively distinct ways of experiencing these institutions of higher education. We actually carried out the somewhat primitive analysis approach of electronically cutting out “meaning units”, i.e. parts of an essay that could be unequivocally related to some aspect of student’s way of experiencing. These we printed out and grouped and regrouped on a big table, discussing the pros and cons of different groupings. This proceeded until a stable set of groups had been identified, which we could see as an outcome space which acceptably covered all the ways of experiencing we could spy in the data. There were five categories, given briefly in Figure 1.

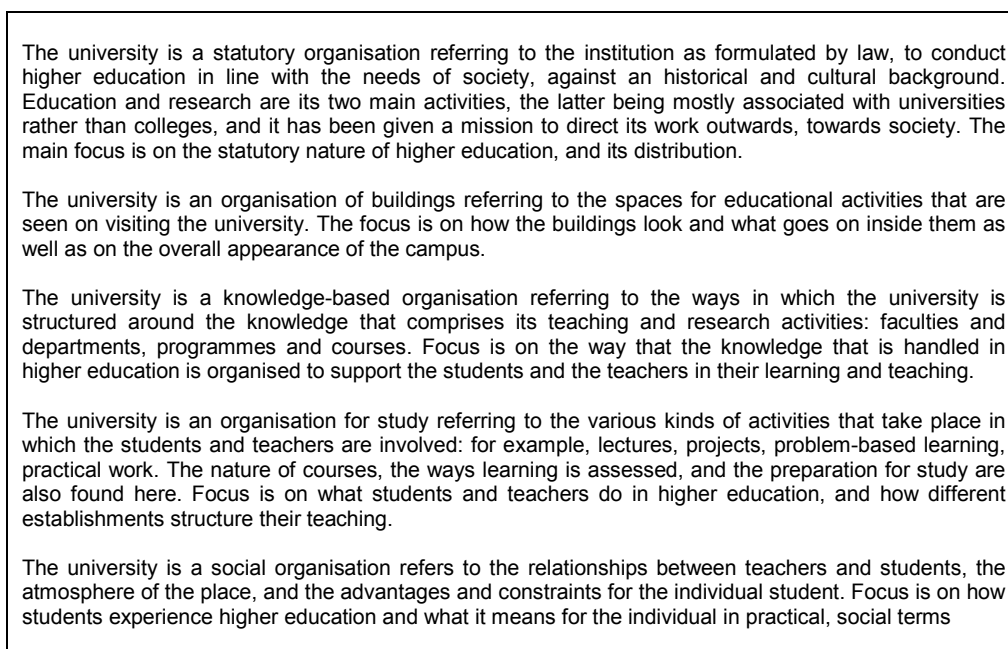


Figure 1. The five ways of experiencing the institutions of higher education, following a study visit to one (Wigforss & Booth, 2007).

Note that no one student voiced any one of these categories in its entirety, nor did any one student give voice to only one of these categories. The categories are constituted from the fragments contributed by all the students, and are thus research constructs rather than individual styles of understanding. This is what

is meant by producing results at the collective – rather than the individual – level. This data was subsequently turned to two interviews conducted with two of the students and used to deepen our understanding of the existential shifts, leaps or creeps from one life-world to another, that they had undergone (Wigforss & Booth, in progress).

The second study was treated differently, since there was no direct data on the students' ways of experiencing the project they were working on. All we had were the discussions carried out by the two groups who went on to complete the course on the occasion we studied it. One of these was much more extensive than the other, and a question that needed addressing was that of what characterized the difference between the two discussions. It was clear that the lesser of the two opened with one participant telling the others that the project was virtually solved by the company itself and could be found on the website for innovative automotive design. There followed a long silence, until the first design spec had to be sent to the teacher when a number of aspects were suggested and incorporated into a brief but suitable document. The other group had a more social and consistent pattern of communication. One member took it on himself to introduce himself and the others followed suit. Here there was more addressing by name and reference to what others in the group had written, whether in accord or discord. No ready answers were proposed but issues were raised, objections made, and suggestions made for how to proceed were discussed.

A taxonomy of three kinds of contributions was initially proposed, which played qualitatively different roles in maintaining the discussion and leading to a specification of a solution to the project. These were Participatory, Factual, and Reflective contributions, where focus moved from the social and referent, to knowledge of relevance to the project, to thoughts on applicability and usefulness. But the nature and location of any learning that was taking place was still in question.

When patterns of addressing issues and maintaining focus on a single topic were traced, it was seen that it was these contributions which gave rise to a relative flurry of discussion, and that these contributions consisted of contrasting two different ways of seeing some aspect of the project. This relates directly to the phenomenographic variation theory, in that one of the participants was bringing the hitherto taken-for-granted way of dealing with some aspect into direct contrast with another way, thereby opening a dimension of variation. Variation theory had brought into focus these critical points where dimensions of variation were opened through one participant taking up an earlier contribution and suggesting, or insisting on, a contrasting feature of how to reach a solution, and thus opening the way to learning and to new thrusts in the design process (Booth & Hultén, 2003). Thus a fourth member of the taxonomy was introduced, dubbed "learning contributions", splitting from reflective contributions.

Outcomes of phenomenographic and variation theory studies.

The outcomes of the studies referred to have been, in the first case, a set of qualitatively distinct ways of experiencing a phenomenon (the institutions of higher education) and, in the second case, a taxonomy of contributions to a web-based discussion on an engineering project that play distinct roles in moving the discussion towards a learning outcome. In the early days of the phenomenographic movement these would have sufficed as results, but the movement has moved on! We were able to refer our results to other aspects of the learning situation, and to widen the theoretical reference frame too.

The study of adult entrants to higher education went on to focus on two of the students who were in some ways similar and different in other ways. Both women in their forties, both with teenage children, both in the care sector of public service, and neither having received encouragement from their families to go on to higher education as a young person but with expectations of their own children. One, however, lived in a large city and worked in an academic setting while the other lived in a more remote place and worked with people with a particular form of handicap. One received support from her family in going back to studies while the other did it in spite of vague disapproval. One had tried several distance courses before but never finished any while the other was quite new to the idea of studying at a distance.

Our study went on to consider the life-worlds of these two women, supported by two interviews conducted a year apart, and delving into the experiences of the women before and after the course in question. Thus the phenomenographic study returned to the phenomenological field of the study of

experience which was so formative in phenomenography's infancy, and gave us insights into what was needed for an adult to make the shift to higher education, in terms of obstacles and scaffold.

The third study, of computer science students in Sweden and US, turned its phenomenographic outcome spaces – of how they experienced the groups and aspects of working and learning in groups – to an activity system framework in order to consider the system as the context for learning. Thus, it became possible to grasp further understanding of how the interactions between individuals had influenced the ways in which groups had worked, and the learning outcomes achieved in those groups.

Conclusion

The context of learning is of great importance in networked learning, and these studies give some ideas of how phenomenography and variation theory have been employed as methodological and theoretical frameworks to study different aspects of learning and the context for learning, in terms of qualitative differences across a cohort of students. Further, these approaches to understanding important aspects of learning can be related to other theoretical frameworks – that share the relational view of knowledge that underpins phenomenography – and thereby widen the field of pedagogical practice in which learning can be studied, including networked learning.

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