



**EARLI SPECIAL INTEREST GROUP
PHENOMENOGRAPHY AND VARIATION THEORY**

Biennial Workshop
Kristianstad University College, Sweden
May 22-24, 2008

Implications of Phenomenography and
Variation Theory in Practice

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I. Message from the Vice-Chancellor

Dear Colleagues,

Kristianstad University College has been given the honour of hosting this year's Workshop on Phenomenography and Variation Theory. It is my conviction that such workshops and conferences not only promote research but foster friendship and mutual understanding across national and cultural borders. This is praiseworthy in a world ridden by conflict and violence. It is a great pleasure for me to bid you all welcome to Kristianstad and our campus, where the armed forces and military training have been replaced by research and education for the common good. I do hope you will enjoy your stay in Kristianstad not just because of the workshop itself but also for the intellectual challenges offered and the colleagues you will meet.

Wishing you a successful meeting and an enjoyable stay in Kristianstad!

Lars Carlsson

Vice-Chancellor

Kristianstad University College

Sweden

II. Message from the EARLI SIG 9 Co-ordinators

Dear Colleagues,

it is our great pleasure to welcome you to Kristianstad University College and to the EARLI SIG 9 Biennial Workshop 2008. The aim of this meeting is to present and exchange research findings and expertise within the field of Phenomenography, Variation Theory and Lesson/Learning Study.

The theme of the workshop is: “Implications of Phenomenography and Variation Theory in Practice” and indicates the focus on the implications of research in the field, including practice from a theoretical (researchers') as well as users' (respondents') perspective. We are pleased that the participants were able to address the challenge of this topic creatively and use it to good effect as a probe for raising relevant issues in educational research and practice. The high standard of presentations accepted and the presence of widely respected keynote speakers surely will challenge our thoughts and give us new ideas about research plans for the future. We also plan to produce a book of papers presented at the conference, aimed to communicate the presented research projects to a wider public.

We would also like to take the opportunity to acknowledge the continuous support of the EARLI as well as Kristianstad University College to our SIG 9. We are also indebted to the reviewers, chairpersons and discussants of the conference sessions for their contribution to the workshop. As usual, last but indeed not the least, we would like to thank all of you for submitting proposals of high quality and for bringing your ideas and experience to the workshop which surely will make it a memorable and successful event.

Mona Holmqvist and Jo McKenzie
EARLI SIG9 Coordinators

III. Organization

European Association for Research on Learning and Instruction

Kristianstad University College

IV. Organizing Committee

Chairpersons:

Mona Holmqvist, Kristianstad University College, Sweden
Phone +708-678 506

Jo McKenzie, University of Technology, Sydney, Australia

Members:

Ming Fai Pang, The University of Hong Kong, Hong Kong
SAR, China

Gerlese Åkerlind, Australian National University, Australia

Local executive members:

Lars Lundström, Leader of In Service Training, Kristianstad
University College

Sofie Nilsson, Kristianstad University College

V. General Information

1. Conference Venue

Building 14 and 15
Kristianstad University College
Elmetorpsvägen,
291 88 Kristianstad
Sweden

2. Meals

Morning afternoon coffee:	Building 14, floor 4 Kristianstad University College
Lunch	Restaurant Metropol (at Campus)
Reception Thursday 22	Kristianstad City Hall
Conference Dinner	Glimmingehus (by bus)

3. Official Language

The official language of the conference is English.

4. Presentation Equipment

All rooms will be equipped with a computer, a data projector and an overhead projector.

5. Smoking Policy

Participants are kindly requested to refrain from smoking all indoor areas and only at marked places outdoor.

6. What is included in the registration fee?

The registration fee includes one copy of conference booklet, a souvenir pack, lunches, morning and afternoon coffee.

VI. The Kristianstad University College Map

Kristianstad University College Campus

Common resources Building

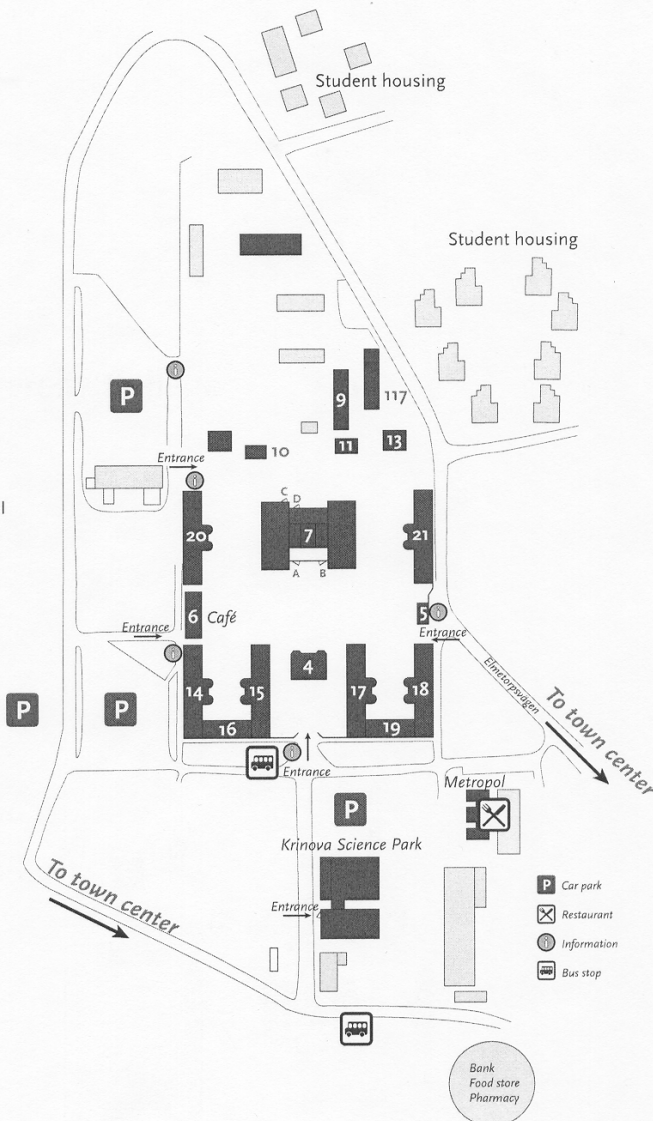
Infocenter	13
Vice-chancellor	4
Assembly hall	7C
Library	7A
Common administration	4
Sports hall	7B
Infrastructure unit	13
International Office Relations	4
Media unit	15
Production unit	7D
Co-ordinator for students with special needs	4
Learning Resource Centre	7
Study administration	4
Student health	Metropol
Student union	Metropol
Student Counsellor	4
Oral health	18

Education & research

Behavioural sciences	14, Metropol
Business studies	18
Humanities & Social sciences	15
Health sciences	17,18,19
Teacher training	21
Mathematics & Natural sciences	20
Engineering	21
Laboratories	9,10,117

Services

Cafeteria	6
Futurum Creative Center	Krinova
Deliveries	7D
Chaplaincy service	Metropol
Restaurant	Metropol



VII. Invited Keynote Speakers

Shirley Booth

Lund University, Sweden

Ference Marton

Göteborg University, Sweden

Ming Fai Pang

The University of Hong Kong, Hong Kong SAR

Ulla Runesson

Göteborg University, Sweden

Lennart Svensson

Lund University, Sweden

VIII. Programme

May 22, 2008 (Thursday)

Time	Activity			
9.00 – 10.00	Registration and coffee/snacks (Rm 14-225)			
10.00 – 10.15	Opening Ceremony & Welcoming Speech Lars Carlsson (Rm 14-418)			
10.15 - 11.00	Keynote Presentation 1 (Rm 14-418) Ference Marton			
11.15 – 12.30	Parallel Round Table Discussions			
	<i>Session 1A</i> (Rm 14-225) Paulet Brown University of East London Discussant: Ulla Runesson	<i>Session 1B</i> (Rm 14-418) Jainatul Halida Jaidin Queensland University of Technology, Australia Discussant: Ming Fai Pang	<i>Session 1C</i> (Rm 14-425) Selva Ranee Subramaniam Faculty of Education, University of Malaya, Malasia Discussant: Lennart Svensson	<i>Session 1D</i> (Rm 15-321) Gary Kwok Kuen To, Faculty of Education, University of Hong Kong Discussant: Mona Holmqvist
12.30 – 13.45	Lunch			
13.45 – 14.30	Keynote Presentation 2 (Rm 14-418) Shirley Booth			
14.30 – 15.00	Coffe			
15.00 – 16.30	Parallel Paper presentations			
	<i>Session 2A</i> (Rm 14-225) Chair: Maria Pettersson	<i>Session 2B</i> (Rm 14-418) Chair: Airi Rovio-Johansson	<i>Session 2C</i> (Rm 14-425) Chair: Paulet Brown	
	<i>Phenomenography and Variation Theory in new Communities</i>	<i>Undergraduate Teaching</i>	<i>Pre- and elementary school</i>	
	Sheila Webber, UK Bill Johnston, UK Stuart Boon, UK	Beatriz Figueroa, Chile Lucia Dominiguez, Sweden Verónica Yáñez, Chile Mariana Aillon, Chile	Ingrid Pramling Samuelsson, Sweden Cecilia Wallerstedt, Sweden Niklas Pramling, Sweden	
	Anders Berglund, Sweden Ilona Box, Australia Anna Eckerdal, Sweden Raymond Lister, Australia Arnold Pears, Sweden	Peter Davies, UK Cecilia Lundholm, Sweden Jean Mangan, UK	Lydia Murmann, Germany	
	Annika Wiklund-Engblom, Finland	Airi Rovio-Johansson, Sweden	Angelika Kullberg, Sweden	
16.45	Reception at Kristianstad City Hall			

May 23, 2008 (Friday)

9.00 – 9.45	Keynote Presentation 3 Ulla Runesson (Rm 14-418)		
9.45 – 10.15	Coffee		
10.15 – 11.45	Parallel Paper presentations		
	<i>Session 3A</i> (Rm 14-225) Chair: Angelika Kullberg	<i>Session 3B</i> (Rm 14-418) Chair: Anders Berglund	<i>Session 3C</i> (Rm 14-425) Chair: Anna-Karin Carstensen
	<i>Undergraduate teaching</i>	<i>Experiences of learning</i>	<i>Natural Sciences</i>
	Birgitta Nordén, Sweden	Monica Nilsson & Monne Wihlborg, Sweden	Laura N Walsh, Ireland Robert Howard, Ireland Brian Bowe, Ireland
	Constanta Olteanu, Ingemar Holgersson, Torgny Ottosson, Sweden	Ana-Maria Bliuc, Australia Robert Ellis, Australia Peter Goodyear, Australia Leanne Piggott, Australia	Åke Ingerman, Sweden Maria Berge, Sweden Shirley Booth, Sweden
	Jane Mattisson, Sweden	Paul Ashwin, UK Amaury Daele, Switzerland	Helge Strömdahl, Sweden
11.45 – 13.00	Lunch		
13.00 - 13.45	Keynote Presentation 4 (Rm 14-418) Lennart Svensson		
13.45 – 14.15	Coffee		
14.15 – 15.45	Parallel Paper presentations		
	<i>Session 4A</i> (Rm 14-425) Chair: Constanta Olteanu	<i>Session 4B</i> (Rm 14-418) Chair: Ray Godfey	<i>Session 4C</i> (Rm 14-425) Chair: Mona Holmqvist
	<i>Phenomenographic Research Approach</i>	<i>The Learners' perspectives</i>	<i>Learning Study in Teacher Education and Teachers' in-service training</i>
	Kristina Ahlberg, Sweden	Ray Godfrey, UK	Ingrid Nilsson, Sweden
	Eva Svederberg, Sweden	Emmanuel Oluseun Ojo, South Africa	Mona Holmqvist, Sweden Gunilla Lindgren, Sweden
	Åsa Audulv, Sweden	Despina Varnava Maraouchou, Cyprus	Mona Holmqvist, Sweden Karmen Björkman, Sweden Malin Ohlin, Sweden
17.00	Dinner (Optional)		

May 24, 2008 (Saturday)

9.00 – 10.30	Parallel Round Table Discussions		Parallell Paper Presentations	
	<i>Session 5A</i> (Rm 14-221) Maria Pettersson Högskolan Dalarna och Karlstad University, Sweden Discussant: Jo McKenzie	<i>Session 5B</i> (Rm 14-420) Leo Hitchcock Auckland University of Technology, New Zealand Discussant: FERENCE MARTON	<i>Session 5C</i> (Rm 14- 418) Chair: Laura Walsh <i>Learning study and Variation Theory in studies in Physics</i> Margareta Enghag, Sweden Jonte Bernhard, Sweden Anna-Karin Carstensen, Sweden Jonte Bernhard, Sweden	<i>Session 5D</i> (Rm 14- 425) Chair: Kristina Ahlberg <i>Language and Meaning</i> Elsie Anderberg, Sweden Lennart Svensson, Sweden Christer Alvegård, Sweden Annika Åkerblom. Sweden
10.30 - 11.15	Keynote Presentation 5 (Rm 14-418) Ming Fai Pang			
11.15 – 12.00	Panel Discussion (Rm 14-418) ‘Phenomenography and Variation in the future: our hopes and expectations’ Keynote speakers and the organization committee			
12.00	Close of symposium (Rm 14-418)			

IX. Abstract

Parallell session 1A

22 May, 2008

10.15 – 11.45

Room 14-225

Round Table Discussion

Discussant: Ulla Runesson, Göteborg University, Sweden

At risk of failure: a phenomenographic approach in evaluating a Literacy Support Initiative

Pulet Brown, University of East London, Great Britain

This paper forms a study of the impact of a Literacy Support Initiative (LSI), a project which targeted a sample of secondary aged pupils. These pupils' literacy scores on entry to year seven was significantly below that of pupils of their age, and well below the nationally expected level four. As such these pupils were at risk of academic failure.

The study explored a broad range of questions related to the project's implementation in particular research questions: does a Literacy Support Initiative (LSI) improve pupils' literacy? What are the attitudes and perceptions of the senior management team, teachers and pupils to the intervention? Unlike previous research in this field, this study presents an alternative way of exploring the participant's perceptions of the literacy support initiative through the use of phenomenography.

The choice of phenomenography as a methodology incorporates multiple perspectives of the participants. In the study phenomenography is used to describe, analyse and understand the ways in which the participants experience aspects of the literacy support initiative. The point that sets this approach apart from many others studies into primary-secondary transfer is the principle that phenomenography seeks to investigate neither the phenomenon, nor the people who experience the phenomenon but instead aims to illuminate the relationship between the two.

Sixteen individuals (eight teachers and eight support workers) were interviewed in order to discuss their experience and perceptions of the Literacy Support Initiative. All participants were involved in the project: four of the teachers worked with pupils identified as being at risk and another four teachers with other pupils in the year group. The remaining eight participants worked in support roles with the at risk pupils.

The findings in this paper demonstrate how school managers are faced with difficult and immediate decisions as to how best to support pupils within externally set standards and expectations, limited resources and imperfect research conditions. Although teachers' and support workers

perceptions of the literacy support initiative varied, they all possessed a similar goal – that of helping pupils make a good transition to secondary school and of raising their literacy levels.

Parallell session 1B

22 May, 2008

10.15 – 11.45

Room 14-418

Round Table Discussion

Discussant: Ming Fai Pang, The Univeristy of Hong Kong,
China

Conceptions of learning held by upper primary children in government schools in

Brunei Darussalam

Jainatul Halida Jaidin, Queensland University of Technolog, Australia

One of the principal goals in education is to produce self-regulative learners who actively construct their own knowledge through meaningful learning. This goal is embedded in Brunei's new education system called the 21st Century Education System (codenamed SPN21), introduced recently by the Ministry of Education. A new education system along with other measures aimed at promoting developmentally appropriate curriculum is a significant change in the provision of educational services in government-funded schools in Brunei. This change has affected the traditional educational settings prevalent in government-funded schools and thereby, provided an impetus for the current study to take place.

The current study examined the conceptions of learning held by upper primary children in government schools in Brunei. The aim was to provide a better understanding of the qualitatively different ways in which upper primary children experience learning in government-funded schools. In Brunei, the upper primary level is a crucial stage in a child's schooling career because at this stage, children experience their first public examination known as the Primary School Assessment (PSA) examination. Results from PSA are used to determine the children's path in their next level of schooling. Exploring children's conceptions of learning at this point of significant change is necessary and timely.

This study used a phenomenographic research approach to identify and describe the qualitatively different ways in which a group of sixteen upper primary children think about learning in two government schools in Brunei. In-depth data was gained through semi-structured interviews using a scenario approach. Interviews were transcribed verbatim and an iterative cycle of analysis revealed three categories of description depicting three qualitatively different ways in which the participants

experienced the phenomenon. The three categories of description were: *learning as acquiring* (Category 1), *learning as remembering* (Category 2) and *learning as doing* (Category 3). Four dimensions of variation linked and differentiated these categories of description, namely: (1) the children's learning approaches, (2) the role played by the children, (3) the role played by the teacher, and (4) the children's intentions to learn. .

The results of this study indicate that there is variation in the ways in which upper primary children experience learning in government schools in Brunei. The conceptions of learning held by the children in this study reflect a quantitative view of learning. These conceptions differ from the Ministry of Education's constructivist beliefs, and thereby suggest that there is conflict between how the children may conceptualise learning in government schools in Brunei and what the Ministry expects of the phenomenon.

The results revealed in this study shed light on the qualitatively different ways in which upper primary children experience learning in government schools in Brunei. In this way, the study provides an avenue for educators to consider possibilities in creating ways for meaningful learning in government-funded schools and create contexts in which children are given the opportunity to take risks and learn through discovery.

Parallell session 1C

22 May, 2008

10.15 – 11.45

Room 14-425

Round Table Discussion

Discussant: Lennart Svensson, Lund Univesity, Sweden

Education-driven technology: reflections of authentic practices

Selva Rane Subramaniam, Faculty of Education, University of Malaya, Malaysia

There has been abundance of research documented for interventions in the teaching and learning process at various educational levels. In the context of the Malaysian education system, particular reference need to be made to the insurgence of new language demands and technology literate skills for teaching Science and Mathematics. Teachers are faced with challenges of coping and juggling with these interventions in authentic classroom situations. The question of what, how and when these technological accessories need to be used, its priority and its emphasis is still a question yet to be answered and can only be answered by the teacher, an authentic practitioner. Teacher trainers can prescribe ideal strategies and techniques which can be implemented, but again the entire

“prescriptive” package may not be practical or appropriate to be used in authentic situations. The question of what, when and how can only be ascertained by the reflective practices of the teacher. Reflective practices is certainly not a “one-off” tradition and all aspects need to be reflected upon beginning with the “nitty-gritty” of planning the lesson, working through the implementation and “tying up loose ends” at the end of the lesson.

This paper reveals authentic teaching practices of pre-service teachers, analysis of their reflections and rationale for pedagogical changes. Two pre-service teachers were involved in this study. Qualitative data collected involved in-depth observations and interviews. The findings showed that the teachers implemented different pedagogical approaches, reflected on different pedagogical aspects and justified with rationale for change. The teachers believed and adopted technology to enable meaningful learning in contrast to “rote” learning. However, bearing in mind that learning is a constructive process, which should not be side-tracked, critical science process skills and laboratory “hands-on” skills pertinent for learning science were not replaced with technological “hands-on” manipulatives. Technological “hands-on” tools was used to supplement or complement inquiry-based laboratory activities. The teachers agreed that the learning style of the students has to be considered in the implementation. The adoption of technology use depended on the availability of technological resources in the learning environment and the expertise of the teacher in utilising it. Teachers adopting the same technology in delivering a lesson have different accomplishments. Technologies become obsolete rapidly and can be struggle for teachers to cope with the change. Hence, it can be concluded that a “template” for the teaching-learning process is absurd due to multiple intervening variables interplaying in actual classroom situation. Everything lies in the hands of the teachers to exercise their ingenuity to perform “post-mortem” of existing practices followed by adopting, adapting, modifying and assessing the feasibility of the education-driven technological practices. This continuous process initiates “new” avenues for multiple teaching-learning pathways, thus eliminating mundane teaching practices.

Parallell session 1D

22 May, 2008

10.15 – 11.45

Room 15-321

Round Table Discussion

Discussant: Mona Holmqvist, Kristianstad University College,
Sweden

*The use of variation theory to enhance primary school students’
understanding of main idea recognition*

Gary To Kwok Kuen, Faculty of Education, The University of hong Kong, China

The aim of this study is to examine that to what extent and in what ways the use of variation theory (see Marton & Booth, 1997; Marton & Tsui, 2004) enhances primary school students' understanding of main idea recognition and whether there is generative learning after the instruction. The study investigates students' qualitatively different ways of seeing of main idea recognition and the effects of introducing different patterns of variation (see Marton & Tsui, 2004) in teaching on their understanding of main idea recognition. It attempts to have an in-depth analysis of the outcome and processes. Moreover, it also examines whether generative learning (see Holmqvist, Gustavsson & Wernberg, 2007) can be constructed. Investigating qualitatively students' different understanding of main idea recognition and what might help them recognize main ideas effectively are the foci of this study. Based on phenomenography, learning study will be adopted.

As this study attempts to have an in-depth analysis of the outcome and processes, a class of 20 Primary 4 students will be chosen. The participants will all be Nepalese students who are the majority in a rural primary school. They are able to speak in English quite fluently but English is still their second language and their comprehension skill is weak and has to be improved. They will then be divided into two groups that will have similar and comparable academic abilities, including high, moderate and low abilities students, with respect to their examination results in the first-term final examination. A learning study group of teachers and the researcher will decide about a common object of learning and discuss the lived object of learning of both groups after the instructions. In this study, the main research question is "To what extent and in what ways does the use of variation theory enhance students' understanding of main idea recognition?" and the specific research questions are "What is the relationship between the process of learning and teaching and student learning outcome?" and "Do students have generative learning after the instruction?"

To examine students' learning process and the change of students' generative learning, pre-test, post-test, delayed post-test and student interviews will be conducted. In the pre-test and post-test, narrative texts will be used but in the delayed post-text, both narrative and argumentative text will be adopted. To collect data on teaching, researcher's reflective journals and the video-recording record of the lessons will be used. It attempts to reveal the differences in Primary 4 students' conceptual understanding of the critical features of the main idea recognition after the instructions based on variation theory. The study will have an in-depth analysis of the outcome and processes.

Parallell session 2A

22 May, 2008

15.00 – 16.30

Room 14-225

Paper presentation

Chair: Maria Pettersson

The Strategic E-Learner: Variations of Cognitive Strategies and Learning Needs

Anna Wiklund-Engblom, Faculty of Education, Åbo Akademi University, Vaasa, Finland

When we are creating instructional design for e-learning environments we need a holistic understanding of learner needs. The process of learning determines our learning outcome. According to social-cognitive theory the environment, the personal factors of the learner and his/her behaviour are the three major determinants affecting the learning process. Bandura (1986) called this relationship for a triadic reciprocal causation. The learning environment is the mediative factor, and the learner needs both cognitive, affective, and behavioural self-regulation techniques in order to adapt to new ways of learning. In e-learning, the way we manage the environment visualises the process of our learning. Thus, how we are able to integrate new knowledge from e-learning, has a lot to do with the strategic behaviour we develop for managing the learning space. This analysis is looking at the relation between instructional design of an e-learning course and variations of how test persons are discussing cognitive strategies and needs during video-stimulated recall interviews.

Keywords: cognitive strategies, learning needs, instructional design, workplace e-learning

Disseminating phenomenography: workshops for the computing education research community

Anders Berglund^{1,3}, Ilona Box², Anna Eckerdal¹, Raymond Lister² and Arnold Pears¹

¹Uppsala Computing Education Research Group, Uppsala, Sweden;

²Faculty of Information Technology University of Technology Sydney and ³Helsinki University of Technology

After the seminal work of Booth (1992), phenomenography has played a certain role within computing education research (CER). However, until recently, the number of phenomenographers, and thus the number of phenomenographic publications, has remained rather low.

To a degree this can be related to the attitude that phenomenography is hard to learn. Most frequently a new researcher acquires his or her competence from a more experienced colleague. Such an approach is by necessity slow.

To accommodate an increasing interest in qualitative research, and particularly in phenomenography, within the CER community, we decided to “teach” phenomenography in a set of workshops (at Hobart, Tasmania, Australia and Salisbury, Kent, UK, respectively). The workshop programs contained lectures and smaller exercises, but the emphasis was on preparing one joint publication for each of the workshops. The publication from the first workshop discussed the experience of being a teacher in computing, while the second focused on teachers’ experience of the problems her or his students encounter when learning computing.

Although the workload was high for the participants, with extensive preparations before the workshop and joint authoring after, the two workshops collected a total of 35 participants from over 20 institutions in 8 different countries.

We find that the workshops have been a successful step to disseminating phenomenography in a new community, but there is certainly more work needed before the participants have “become phenomenographers”. As an immediate result, we can see that the awareness of phenomenography has increased within the computing education community and that several papers have been authored by the workshop participants. The workshops, their impact on the community, and aspects on the quality of the joint publications, are discussed in this presentation, which to a large degree builds on a paper previously presented to the CER community (Berglund, Box, Eckerdal, Lister, & Pears, 2008).

Variation theory as a basis for designing a module on teaching information literacy

Sheila Webber, Senior Lecturer, Department of Information Studies, University of Sheffield, Bill Johnston, Senior Lecturer, centre for Academic Practice and Learning Enhancement, University of Strathclyde and Stuart Boon, Lecturer, centre for Academic Practice and Learning Enhancement, University of Strathclyde

The presenters aim to discuss the way in which the outcomes of a phenomenographic study will be used as a basis for curriculum design in a core module of a new one-year Masters programme (MA Information Literacy) at Sheffield University. This module comprises half the credits in Semester 1 and commences Autumn 2008. Our research study investigated UK academics’ conceptions of information literacy and pedagogy for information literacy (Boon et al, 2007; Webber et al., 2005; Webber and Johnston, 2005). The module “Education for information literacy” includes as learning goals that the student will be able to: identify their existing capabilities, strengths and areas for development in teaching information literacy; compare different approaches to teaching information literacy and demonstrate awareness of implications for

adopting different approaches. The students will be introduced to the conceptions of teaching information literacy, and reflect on their own developing conceptions. A major organising principle for the module will be the variations that emerged from our research study, with sessions concentrating on each variation in turn and exploring what it means to teach information literacy with this focus. The speakers will present their rationale for this approach and plans for delivery. They also hope to gain further insight into potential pitfalls and opportunities through discussion with other delegates.

Parallell session 2B

22 May, 2008

15.00 – 16.30

Room 14-418

Paper presentation

Chair: Airi Roivio-Johansson

Reading and Writing Practices supported by the Hypertext in Teacher Formation

Lucía Domínguez A., Luis Ajagán L., Verónica Yáñez M. and Mariana Aillon N.

University of Concepción, Education Faculty, Concepción Chile, Southamerica:

Internet development among young people is causing critical changes in the way they relate themselves with reading and writing competences. What is the level of incidence of information fragmentation caused by Internet in low level academic literacy? How do university students interact with the hypertext? What skills (competences) should teachers develop to encourage speech skills in students? Answers to these questions are analyzed in a qualitative phenomenographic research.

A sample of 40 students belonging to the career of Primary Education of the Faculty of Education of the University of Concepción, Concepción, Chile was chosen to work with. Data was recorded by means of meetings with students and Faculty professors as well as examination and analysis of written reports and oral presentations of the students. All of these tasks were generated with Internet support.

The goal of the research is to determine in what way hypertext use influences the quality of teaching students academic literacy and from this starting point to generate suggestions to be used in a didactic way to be able to optimize comprehension processes and text production in the initial teacher formation.

Phenomenographic variation theory not only provides the possibility to describe *common aspects* of students perceptions in their interaction processes with the hypertext but also to detect *variant aspects* in the phenomenon experimentation. Critical information is obtained from these last aspects to generate methodological suggestions related to current

needs and technological potentialities from the hypertext perspective with the purpose of improving academic literacy in the formation of the Chilean primary teacher formation.

The application of variation theory in undergraduate teaching: addressing some difficulties in the context of students' understanding of saving

Peter Davies[†], Cecilia Lundholm^{◇†} and Jean Mangan[†]

[†] IEPR, Staffordshire University, UK,

[◇] Stockholm University

This paper reports some findings from a small project that aims to address three difficulties that limit the application of variation theory in the teaching of some subjects. The first difficulty is reliance upon intensive methods to uncover different ways in which a phenomenon is understood. For example, phenomenographic research has suggested categorical differences in ways of understanding only a few phenomena in economics and, as far as we are aware, none at all in business studies. A second difficulty lies in the identification of a phenomenon. Current teaching frequently presents a way of understanding a phenomenon as the phenomenon itself. 'Today we are going to learn about product life cycles'. In these circumstances it is not always a straightforward matter to identify the phenomenon. A third difficulty lies in variation in the ways in which different social phenomena can be experienced.

The project examined students' understanding of 'withdrawals from the economy'. Data were collected through interviews and students' examination answers. The interviews focused on the effects of changes in saving, first at an individual and then at a collective level. Interview transcripts were analysed by the three researchers to identify differences in ways of understanding the phenomenon of saving and these categories were then compared with those arising from the examination transcripts. These data are used to provide a basis for the discussion of the three difficulties identified above.

Teachers' and students' different ways of constituting the learning object in Accounting

Airi Rovio-Johansson, Gothenburg Research Institute (GRI), School of Business, Economics and Law at Göteborg University

The aim of the study is to investigate the differences between three teachers' constitution of the learning object in a lecture of the three year Business program in Higher Education for undergraduate students. The aim is also to investigate their students' understanding of the lecture content and the learning object. The phenomenographic approach is used

as a theoretical frame and the theory of variation is applied in the analysis of the lectures' learning objects and students' solutions of a problem related to the lecture content. The empirical data are generated from three video recorded and transcribed lectures, where three lecturers are teaching the same course content. Five students from each lecture group were afterwards interviewed about their understanding of the lecture content, and asked to solve a problem related to the lectures' content.

The results indicated clear differences among the three teachers' ways of using the same lecture content and creating an enacted object of learning. Two of the teacher applied a practice oriented approach to the course content, while the third teacher used the theoretical way this content was introduced in the students' textbook. The students' qualitatively different ways of experiencing and apprehending the content of the lectures were captured in categories of description and dimensions of variation and invariance, Their understanding were then systematically related to the each teachers' learning object, also expressed in dimensions of variation and invariant dimensions. The results indicated that the teachers developed various learning conditions for the three groups of students.

Parallell session 2C

22 May, 2008

15.00 – 16.30

Room 14-425

Paper presentation

Chair: Paulet Brown

Can learning studies be used with young children? Some experiences from small-scale empirical studies

Ingrid Pramling Samuelsson, Cecilia Wallerstedt and Niklas Pramling

The background to this presentation is a course for doctoral and master students on children's learning of their surrounding world. As examination, the course participants tried to conduct learning studies with 3- to 8-year-old children in preschool, the preschool class, and the first year of primary school. Learning objects were chosen from a range of knowledge domains such as: mathematics, phonetics, science, literacy, and music. While not all of these studies are in a strict sense learning studies even if this was the intention, they explicitly or implicitly raise a number of issues that need further consideration. We will conduct a meta-analysis of these studies in an attempt at answering the question of whether learning study can be used with young children in preschool (and the early years of schooling). Some difficulties and dilemmas faced by the teachers/researchers when trying to develop children's understanding in this way will be discussed. These include: thematic work vs. specific learning object, steering children's attention vs. the child's free exploration, spontaneous vs. planned, play vs. learning, activities vs. content, and the issue of testing.

Exploring natural phenomena

Prof. Dr. Lydia Murmann, University of Hamburg, Germany

Pre- and elementary school children are increasingly introduced to science early. They are encouraged to follow own interests and are confronted with prepared material, experimental tasks and offers. Between exploring natural phenomena playfully and systematic scientific experimentation lies a wide field of exploratory, incidental, and knowledgeable hands-on possibilities. The more sophisticated programmes are in terms of introducing “science” the more do they tend to focus on experimentation solely as a means of testing hypotheses, i.e. ideas derived from theory. This is not what children (can) do, when they explore unknown phenomena. But, neither is it what scientists do when they enter a field of research of which they have little knowledge of so far. According to modern views of science (e.g. Rheinberger 2006), exploratory (as opposed to theory-driven) experimentation is common in laboratories and fundamentally necessary for the development of theory. This is a content related reason on top of pedagogical reasons to focus on exploration in its own right, particularly on the elementary and pre-school level. So it seems worthwhile to understand the variation of motives as well as the variation of strategies that scientists and young children (age 6-8 yrs) apply when the “explore” natural phenomena. Categories of description for motives followed by children during hands-on activities have already been developed. They range from “undirected play/aesthetic involvement” to “understanding causal relationships”. The variation of strategies applied is being focused on now. Both will be presented and compared with incidents of scientific exploration in order to derive didactical orientation.

Relating classroom teaching to student learning about negative numbers

Angelika Kullberg, Göteborg University

In this paper an analysis of a study about addition and subtraction with negative in grade 7 (13 year old students) is reported. In this study four teachers, in two different schools, implemented two different lessons (lesson designs) in two different groups. The lesson designs were defined by their content specific critical features. In lesson design 1 only two critical features, juxtaposed to lesson design 2 four critical features were intended to be brought out by the teachers in the lessons. How the critical features were brought out in the different lessons and what was actually possible to learn during the eight lessons are analysed. The tentative analysis of the lessons show that different lessons within the same lesson design affords different possibilities to learn. In this paper I will show how one particular lesson with lesson design 1 became more similar to

lesson design 2. In this case, a particular student raised questions concerning the object of learning and made it possible for other students to discern the critical features. In this paper I will show the result from students learning outcomes, from pre-, post- and delayed post-test together with an analysis of the lessons. I will argue that the content specific critical features to some extent can predict what is possible to learn during the lessons. Although in the dynamic process of teaching the students also contribute to bringing up critical features for learning.

Parallell session 3A

23 May, 2008

10.15 – 11.45

Room 14-225

Paper presentation

Chair: Angelika Kullberg

Second-Degree Equations as Object of Learning

Constanta Olteanu, Ingemar Holgersson, Torgny Ottosson

Kristianstad University College

The purpose of this paper is to report aspects focused by teachers in classroom practice when teaching the solving of second-degree equations ($ax^2 + bx + c = 0$ with a, b and c parameters and $a \neq 0$) by help of the formula

$$x_{1,2} = -\frac{p}{2} \pm \sqrt{\left(\frac{p}{2}\right)^2 - q} \quad (p, q \text{ parameters})$$

and the students' ways of discerning particular aspects. The presentation is based on data collected in an upper secondary school in Sweden, and consists of video-recordings of lessons, individual sessions, interviews and the teachers'/researcher's review of the individual sessions. Test results also constitute an important part of the data. The study includes two teachers and 45 students in two different classes.

In the data analysis, concepts relating to variation theory have been used as analytical tools. Data have been analysed with respect to aspects focused by the teachers during lessons, aspects that are ignored, and patterns of dimensions of variations that are constituted. Data have also been analysed with respect to the students' focus when solving different problems in tests. The results show that the teachers focused on the parameters and the unknown quantity in an equation in different ways and this implicated that the students had the possibility to discern different aspects referring to the relation between a second-degree equation and the formula. Furthermore, some of these aspects are identified as critical aspects in the students' learning.

The implications of variation theory for teaching Western academic writing to Chinese undergraduates. A collaborative project between Kristianstad University and Ningbo University

Jane Mattisson, Kristianstad University College, Sweden

The concept of an essay is perceived differently in the West and in China. In Chinese, the word 'essay' denotes 'scattered article'. In the West, an essay is expected to be logically structured and incorporate a linear discussion with a clear introduction and conclusion. By juxtaposing the Chinese and Western conceptions of an essay and allowing Chinese students to identify for themselves the constituent features of the two kinds of essay, students learn how to write an essay which complies with Western standards and formats. My paper focuses on cultural differences related to so-called 'high context' as opposed to 'low context' cultures as well as on discourse patterns and management. It demonstrates how, when cultural differences and their implications for essay writing are presented in a context in which students identify for themselves the major differences between Chinese and Western-style academic essays, generative learning results. Studies carried out at Ningbo University and Kristianstad University demonstrate that students can apply their knowledge to different kinds of academic essays, descriptive, narrative and expository. I present the results of and some of the teaching materials used in a collaborative project between myself and Zhu Yiner, Academic Writing Instructor at Ningbo University, China.

Parallell session 3B

23 May, 2008

10.15 – 11.45

Room 14-418

Paper presentation

Chair: Anders Berglund

Qualitative variation in the learning experiences of Communities of Practice's members: towards a model of learning in a Community of Practice

Paul Ashwin, Lancaster University, UK

Amaury Daele, University of Fribourg, Switzerland

Communities of Practice (CoPs) are groups of professionals who share their knowledge, ideas and practices on a common domain or topic. So far, the learning process within a CoP have been widely studied within 'situated learning' approaches (Lave & Wenger, 2001) which highlight the key processes related to learning within such framework: negotiation of meaning, reification, sense of belonging, participation, etc. Rather than

trying to highlight such general processes, we chose a phenomenographic approach in order to understand the qualitative variation in CoP members' experiences of learning with CoPs. By analysing variation in learning experience, we sought to examine different reasons for engaging in a CoP, variation in the perceptions of the learning process, and variation in the perceptions of learning outcomes. This ongoing work is intended to be used to develop resources for those involved in the development of CoPs' in order to understand these differences and suggest ways of working with CoP members who have different reasons for engaging with CoPs, different experiences of the learning process and different learning outcomes.

This research involved a multi-national interdisciplinary research team who, working in two languages, collectively generated and analysed the data using a phenomenographic approach. Through this work, we collectively generated an Outcome Space of the qualitative variation in learning experiences:

Variation in reasons for participating in CoPs	Variation in perceptions of how learning occurs in CoPs	Variation in outcomes
<ol style="list-style-type: none"> 1. To gain an insight into the knowledge/practices of others; 2. To share or exchange knowledge/practices; 3. To change individual knowledge/practices; 4. To change communal knowledge/practices. 	<ol style="list-style-type: none"> 1. Personal knowledge/practices are developed through learning from experts; 2. Personal knowledge/practices are developed through learning from others; 3. Personal knowledge/practices are developed through participating in collective activities; 4. Communal knowledge/practices are transformed by participating in collective activities. 	<ol style="list-style-type: none"> 1. Individual Information; 2. Consolidation of individual knowledge/practices; 3. Change in individual knowledge/practices; 4. Change in communal knowledge/practices.

Our presentation will describe the CoPs as our context of research, the purpose of our research and our methodology. We will present the generated model as well as resources developed for those involved in developing CoPs. We will discuss the issues involved in conducting such research in a multinational, multi-disciplinary and distributed team of researchers working across two languages.

A phenomenographic exploration of student experiences of learning through face-to-face and online discussions in a political science course

Ana-Maria Bliuc, Robert Ellis, Peter Goodyear, & Leanne Piggott

University of Sydney

This study is part of a more comprehensive research program on student learning which integrates qualitative and quantitative explorations into the ways students experience learning through face-to-face and online discussions. Specifically, the current paper reports on research investigating student experiences of learning through face-to-face and online discussions in a political science course on the Palestinian-Israeli conflict, in the Department of Government and International Relations at the University of Sydney. Based on the phenomenographic research tradition, the study investigates associations between key aspects of student learning such as approaches to learning, conceptions of what students learn and learning outcomes in the context of face-to-face and online discussions. The instruments developed to quantify these experiences are based on the phenomenographic approach on student learning in higher education, particularly, they are built on work by Biggs (1987), Ramsden (1991), Crawford and colleagues (1998), and Prosser and colleagues (2000). The main hypothesis tested here was that there are qualitative differences in the student approaches to and conceptions of learning through discussions in both face-to-face and online contexts. Furthermore, it was expected to find that student approaches are linked to their conceptions and also to their academic performance. The analysis of the data collected through closed-ended questionnaires identified variations in the quality of student approaches and conceptions and also revealed strong associations between the way students approach their learning, what they think their learning is about and the learning outcomes in both contexts. Implications of these findings for research and practice are further discussed.

Parallell session 3C

23 May, 2008

10.15 – 11.45

Room 14-425

Paper presentation

Chair: Anna-Karin Carstensen

A Phenomenographic Study of the Development of Conceptual Knowledge and its Relationship with Problem Solving in Physics

Laura N. Walsh, Robert G. Howard, Brian Bowe

This work outlines research investigating the relationship between the development of conceptual knowledge and quantitative problem-solving ability and approach in physics, specifically in the context of the Irish education system. Much research has been carried out that has shown that physics students are not developing the conceptual knowledge necessary to become adept problem-solvers. This may be due to the fact that traditional physics education tends to rely on the assumption that students will develop an understanding of the conceptual nature of physics by solving quantitative problems. Research has shown that this is not the case and education needs to explicitly reflect the qualitative and quantitative nature of physics.

This empirical study was conducted using a phenomenographic approach to collect, analyse and interpret data from individual semi-structured interviews with introductory physics students. It also builds on previous research carried out in order to obtain a better understanding of how students learn physics and the difficulties they have developing an understanding of the conceptual nature of physics. This paper presents a systematic way of identifying the variations in these students' conceptual knowledge development, the variations in the students' approaches to problem solving and an assessment of the affect this has on student learning. This research will inform teaching and assessment practices, not only in physics education but also in other disciplines so that third level education can produce better problem-solvers for industry, research and a knowledge-based society.

Learning in physics group work – Dynamics, variation and the experience of relevance

Åke Ingerman¹, Maria Berge² & Shirley Booth³

¹Department of Education, University of Gothenburg, Sweden.

²IT-university, Chalmers University of Technology, Sweden.

³Department of Education, University of the Witwatersrand, South Africa & Lärande Lund, Lund University, Sweden

In this presentation, we thematise the process of learning in the context of physics group work. Empirically, we base our analysis on data from a university context. Students' discussions while working in small groups of three or four with physics problems concerning force and friction were captured on video and audio, and the subsequent analysis primarily relies on transcriptions.

Theoretically, we make use of the phenomenographic notion of *variation* as the basic mechanism of learning, illustrating empirically how *experiencing variation* around a particular aspect of an object of learning drives the potential for experiencing it in a qualitatively different way. We see the realisation of this potential as being tied to an *experience of relevance* – that students connect the structure of this variation to meaning, which is consistent with other parts of their experience of the situation as a whole. The structural and the referential aspects of the object are intuitively reorganised, and the object reconstituted through the experience of variation. This can be related initially to the relevance structure of the situation, and then to the dynamic of the structuring of awareness in line with Gurwitsch's links of pointing relevance, linking theme to thematic field in a dynamic of sense-making through relevance. In this way, we identify and describe critical steps in the students' learning.

In our results, we identify and illustrate:

- how students together create variation with respect to an object of learning;
- how students relate different parts of the whole learning object to one another and to the whole;
- how the presence and experience of variation is necessary, but not sufficient for learning;
- and how the presence of an experience of relevance is necessary for learning.

Discerning the referent - an entrance to concept learning

Helge Strömdahl, Linköping University, Sweden

What are the demands for leaning a formal concept in the natural sciences? This question has been the main focus in science learning research the last 30 years. Conceptual change theories and different variants of constructivism are the main theoretical frameworks for both analysing students and teachers current conceptions and to elaborate remediation teaching sequences. However, the mechanism of conceptual change is an intriguing issue.

In Strömdahl (submitted) a two-dimensional semiotic analysing schema (2-D SAS) is proposed to elucidate the properties of terms (words) from a

semiotic/semantic point of view (Fig 1, below) and to contribute to inform the “conceptual change”- mechanism.

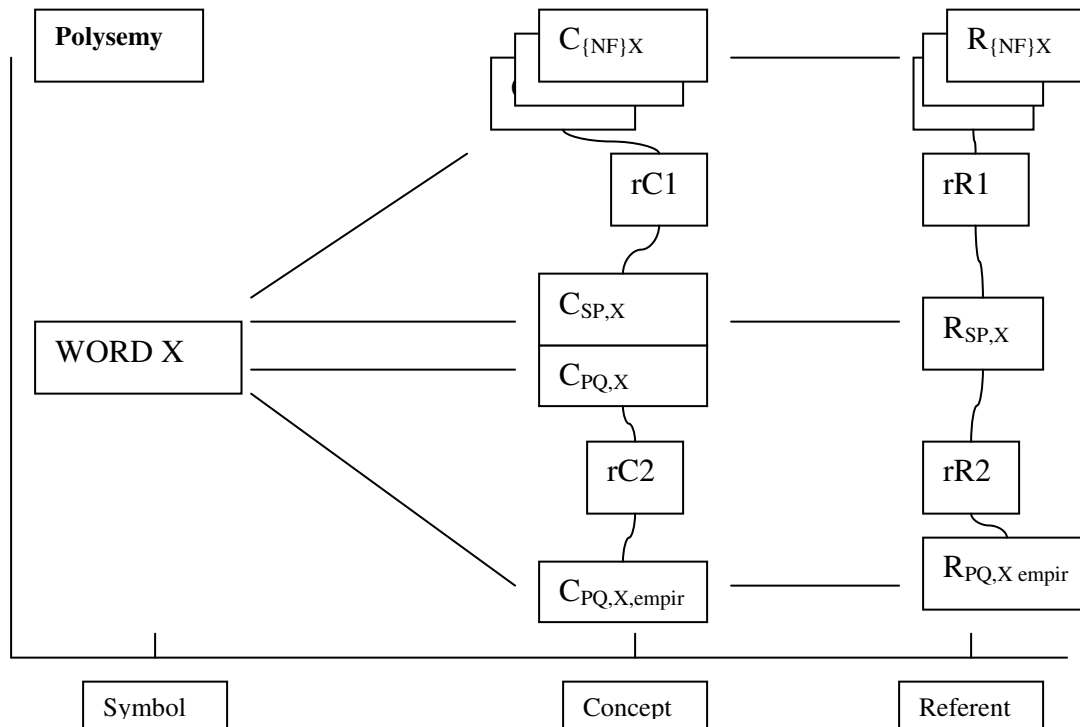


Fig 1 **The two-dimensional analysing schema, 2D-SAS - tetradic approach.** The schema is structured by the vertical axes denoting the polysemy (different senses) of a word (term) and the horizontal axes denoting the semiotic structure of a word. The schema is denoted as tetradic since the word is connected to four different concept entrances. (From Strömdahl (submitted))

The schema accounts for the word X (symbol, term) as non-formal concepts ($C_{\{NF\}X}$) and their referents ($R_{\{NF\}X}$) as well as for the scientific formal qualitative concept ($C_{SP,X}$), physical quantity concept ($C_{PQ,X}$) and the empirical quantification concept ($C_{PQ,X,empir}$) and their referents ($R_{SP,X}$ and $R_{PQ,X,empir}$). $rC1$ och $rC2$ are the relationships between the concepts, and $rR1$ and $rR2$ denotes the relationships between the referents, respectively.

According to Marton & Tsui (2004, 230) a necessary condition for bringing about learning is that the students are able to focus on the object of learning and discern its critical features.

In my paper I argue for the discernment of the elements in the analysing schema as critical features, especially the referents, as an entrance and necessary condition for concept learning.

Parallell session 4A

23 May, 2008

14.15-15.45

Room 14-425

Paper presentation

Chair: Constanta Olteanu

Missing Links in Pedagogy– Towards a Relational Ontology

Kristina Ahlberg, Department of Education, Uppsala University

In this paper connections are made at epistemological as well as methodological levels between phenomenography and pedagogical research performed in the early years of the last century. Theoretical connections are discussed between phenomenography and variation theory of learning. The author puts forward pheomenographic relational ontological claims, contrasting them with behaviouristic, cognitivistic, constructivistic and socio-cultural approaches. It is suggested that a developed and formulated phenomenographic ontology could provide an efficient theoretical base to visualise, describe, explain and investigate relational processes of individuals' learning in the world as interactive and contextual processes. The conclusion of the paper is that a phenomenographic relational ontology could offer a comprehensive tool for research of many urgent pedagogic issues in today's society.

Keywords: Behaviourism, Cognitivism, Constructivism, Epistemology, Methodology, Pedagogy, Phenomenography, Relational Ontology, Socio-Cultural, Urgent Pedagogic Issues of Today's Society, Variation Theory of Learning.

Food, health and irregular work hours

- *Conceptualizations of food and health in choices of meals*

Eva Svederberg, Kristianstad University College

In today's Europe just 24 per cent of the labour force always work regular daytime, which in consequence also results in irregular meals. The aim of the present study was to explore the participants' conceptualization of food and health in relation to their choices of meals during working-hours. The participants were eight bus-drivers in city-traffic, representing irregular working-hours close to round the clock, and six assistant nurses in geriatric care, representing irregular daytime and night-time working-hours. The open and explorative form of data collection comprised participant observations (a full working-day for each person) and half-structured interviews. The qualitative analysis of interview data involved using the methodology of contextual analysis, which was developed in relation to the phenomenographic research approach. The analysis was supported by use of a computer program for analysing qualitative data (Atlas.ti). Results from the analysis indicated that a main element in the

participants' conceptualization of food and health was the importance of safety and confidence in their choices of meals. The search for knowledge to secure safety and confidence was managed in two ways: *Partly* within the framework of the content of foods and meals, that is, judgement of nutrients, freshness, hygiene and taste. *Partly* within the framework of the structure of foods and meals, that is, conditions for meals and opportunities to make informed choices.

A question of How – A systematic review of how phenomenography is applied in nursing research.

Audulv, Å. Dep. of Health Sciences, Mid Sweden University

OBJECTIVE: To describe how results are presented in phenomenographic studies in nursing research.

MATERIAL AND METHODS: This systematic review was based on 19 peer-reviewed phenomenographic papers who aimed to investigate patients' conceptions about their life-situation with a disease or illness, coping strategies or other managements of their situation.

RESULTS: The studies were uniform in their methodological descriptions of phenomenography, but their results were presented differently. Four ways of presenting results were identified: a) variation between individuals, b) variation in ways of conceptualising, c) detailed descriptions of conceptions of broad phenomena, d) descriptions of different parts of a phenomenon. The four ways of presenting results differed regarding the aspects of *what* and *how*, detail of conception-descriptions, and presentation of variation. The focus on variation in ways of conceptualising was most similar to traditional phenomenography. However, only two of the studies had that focus.

CONCLUSION: The heterogeneous way of presenting results in phenomenographic nursing research may depend on methodological disparities between the traditions. Traditionally, nursing research investigates extensive phenomenon as health or illness, use narrative interviews, and focus on lived experiences. In contrast, the phenomenographic tradition works with well defined phenomenon, uniform interviews, and variation in conceptualisations. Combining these underlying assumptions might generate challenges regarding focus in the analysis and means of presenting the findings. Different ways of applying and presenting phenomenography in nursing studies may be a result of each researcher's attempts to deal with these challenges.

Parallell session 4B

23 May, 2008

14.15-15.45

Room 14-418

Paper presentation

Chair: Ray Godfrey

Phenomenography in contested or complex contexts

Ray Godfrey

Reader in Education Statistics, Canterbury Christ Church University, UK

Phenomenography deploys a powerful range of concepts: awareness, discernment, simultaneity etc.; but a quest for a hierarchical set of descriptive categories appears central. Mathematically, categories with a relation placing some above others (in some sense) may not form simple sequences. Well-ordered sets exist, with all elements in simple sequences; but there are also continua, with no immediate successors, and lattices, where some elements are not related to each other at all.

Within education some category is likely to be privileged and tops a hierarchy and phenomenographic enquiry may find a well-ordered set. However, in contested or complex contexts the existence of a simple hierarchy for a particular field should be viewed as a working hypothesis. The paper examines phenomenographic studies to see how far strict hierarchies characterize their findings.

In England many people recalling sectarian violence around religious schools in Northern Ireland and fearing Islamist terrorism, regard faith schools as inimical to social cohesion. Phenomenography, however, allows a challenge to the populist view. Learning to live alongside people of different religions or ethnicities might involve a sequence of categories best grasped by variation of ethnicity and religion in the classroom: faith schools might simply hold children back from the discernment required to live peacefully in multi-ethnic and multi-religious societies. Or these ways of seeing might have a more complex ordering: faith schools might successfully develop categories of description related to respecting otherness, equipping children to encounter variation in ethnicity and religion outside school.

A Phenomenographic Study of Students' Conceptions and Experiences Of Internationalisation at the University of the Witwatersrand

Emmanuel Oluseun Ojo, University of the Witwatersrand, Johannesburg, South Africa

The study of internationalisation as an area of research in relation to higher education has gained prominence over the years. The challenge is that, though many studies over the last decades have been concerned with

internationalisation in/of higher education, it has not been from the perspectives of teachers and students and their experiences of aspects of internationalisation in relation to their educational context (that is, as a student, and as a teacher) (Wihlborg, 2005). This working paper investigates students' conceptions and understanding of internationalisation at the University of the Witwatersrand. It attempts three main dimensions in contributing to literature- (i) conceptual dimension; (ii) methodological dimension and (iii) policy dimension. The working paper re-modifies Bernstein's analysis of "intellectual fields" and "pedagogical identities" (1990, 2000) and Run us (2005) as a conceptual framework to explain Wits' students' conceptions of internationalisation using phenomenography as a research methodology. Drawing on semi-structured interviews of postgraduate students at the university, the working paper addresses three main questions: How do students at the University of the Witwatersrand *conceptualise, understand* and *experience* internationalisation in relation to their learning (academic context) and their interaction within the university (social context)? Is the understanding and experiences amongst the participants convergent or divergent, or both and why? Are the expectations of the students with respect to what they believe and hope to learn in an internationalised university met?

First Year Experiences of learning: a phenomenographic research of students' conceptions of business learning

Despina Varnava Marouchou, European University - Cyprus

A phenomenographic research approach was used to compile and explore the conceptions of learning from the perspective of the students themselves. The study concentrated in describing students' early experiences of learning their introductory business courses in a private university in Cyprus.

This is one of the first studies to be undertaken in Cyprus using phenomenography and involving students attending higher education and in particularly private higher education. It is hoped that the findings of the study will expand our understanding about students' conceptions, by bringing to the fore, what Cypriot students in particular, think about their learning.

Two main groups of conceptions were identified as: those of receiving subject knowledge (lecturer-dependent or lower-level) and those of learning for meaning and understanding (student-dependent or higher-level). The findings appeared to indicate that many of the students interviewed hold subject-oriented or reproductive conceptions of learning (lower-level), in which learning is somewhat external to them. Most specifically, Cypriot students saw note gathering and passing course exams resulting to academic qualifications as one of the most important indicators of successful learning. The study also discovered that Cypriot

students consider friendly relationships with their lecturers as vital to their learning.

More specifically, the research argued for a more precise understanding of the students' first year experiences of learning their specific courses. This is particularly important for the development and design of business courses, specifically in terms of teaching and course content.

Parallell session 4C

23 May, 2008

14.15-15.45

Room 14-425

Paper presentation

Chair: Mona Holmqvist

Learning as integration of competencies

Ingrid Nilsson, University of Halmstad, School of Teacher Education

Svensson (1976) is discussing the importance of holistic approaches to learning and knowledge. According to Teacher Education, Utbildningsdepartementet (2007) is lifting forward the importance of integration of general teacher competencies with subject knowledge. The same concerns integration of knowledge from university courses with teaching practice.

Teachers in compulsory school can see the integration of general teacher competencies and subject knowledge as important according to in-service training (Nilsson, 2006).

Teacher students and teachers in practice are supposed, during the teacher students' practice, to use general teacher competencies and subject knowledge in a common process for teaching pupils.

Davies and Dunhill (2008), is claiming the possibility to use the method learning study in teacher education for development of teacher students' learning.

A theory of variation described in Marton, Runesson and Tsui (2004) will be used as starting point for teacher students', teachers' and pupils' learning in learning studies.

A project, 2007-2009, aims to investigate the teachers' and teacher students' conceptions of what competencies they are developing and using in a learning study in mathematics, and how the competencies are used. Six teachers were interviewed about integration of general teacher competencies and subject knowledge. Two of the teachers were interviewed in depth and their pupils were interviewed concerning learning. The interviews were the starting point for developing a learning study. The teachers are attending a university course of learning study. Another learning study is going to be developed with teacher students and the teachers from the former learning study.

Bringing teacher education and teachers' in-service training together with the aid of a learning study

Mona Holmqvist and Gunilla Lindgren, Kristianstad University College, Sweden

This study focuses on students from a teacher training programme and practising teachers in inservice-training. The students were introduced to the variation theory. They carried out a learning study on English as a Second Language (ESL) incorporating five parallel research lessons (rather than a cycle). Five classes, five students from a university course and two researchers participated in the study. The aim of the learning study was to describe how students from school year 5 (ten years old) to high-school level discern the letter *s* at the end of a word. 's' at the end of a word can be interpreted in at least five varying ways - as a contraction, plural, third person singular, genitive or possessive. The results demonstrate how students of different ages discern *s* at the end of a word. A pattern has been distinguished with respect to how knowledge about a phenomenon develops as a consequence of teaching. This pattern was analysed in terms of the structure of the students' first language.. The results show how the students try to understand the second language by means of the structure of the first. A good example is the pronoun *your* (dependent possessive form) and *yours* (independent possessive form). As there is no variation in Swedish between dependent and independent possessives, students equate the the two forms with the difference between d- and t-gender. This distinction is made in Swedish (din/ditt) but not in English:

Swedish/English	Dependent possessive form	Independent possessive form
d-gender	din/your	din/yours
t-gender	ditt/your	ditt/yours

Finally, working with a learning study in collaboration with teacher training students and practising teachers creates new opportunities for learning both about a subject and about students' learning. This model combines subject-based studies with the study of learning. In this way, teachers learn to plan and carry out instructions based on the critical aspects students must, or can, discern in a learning situation.

Historical awareness or guess what the teacher thinks?

A learning study at an upper secondary school.

Mona Holmqvist, Kristianstad University College

Karmen Björkman, Kristianstad University College

Malin Ohlin, Kristianstad University College

This study has been carried out within the project "The Pedagogy of Learning" which aims to develop knowledge about learning and teaching by using theory as well as practice. The study was implemented at an upper secondary school and involved students in the first year of the social science programme. Two classes were evenly divided into three groups. The method known as 'Learning Study' was employed. Three research lessons in history were the focus of the study. The aim was to describe what the students could learn and compare this with what they actually learned in terms of the critical aspects of the learning object historical awareness. Historical awareness was exemplified by the period when the south part of Sweden, known as Skåne, became Swedish after a period of Danish rule. By examining different dimensions of variation opened up in the learning situation, the results show what aspects are necessary to bring about learning. The lessons have been analysed according to the Variation Theory, and its constituent concepts of discernment, simultaneity and variation. What varies and what is invariant in a learning situation are important in determining what can be learned. Changes in how the critical aspects are presented to the students were implemented with the purpose of improving the students' learning outcomes. The results show how the different aspects offered to the students in the classroom also result in different learning possibilities. One such aspect is the ability to identify with those who lived during the period studied. Creating a kind of compassion for one or a few fictive person/s enabled the students to discern more easily the critical aspects. One conclusion of this study is that an effective learning strategy for students is hard to develop as they try to focus both on the learning object itself (and try to understand it) and gather hints from the teacher about what will feature in the coming examination (as a second implicit learning object). This is reminiscent of a "Guess what he is thinking" game with the teachers rather than developing a real understanding of the learning object itself. Another conclusion is how important developed understanding of the learning object is in producing long term or so-called 'generative learning'. The study demonstrates that there is a difference in long term learning results with regard to decreased results concerning isolated facts and increased results concerning comprehension-based historical phenomena.

Key words: learning study, variation theory, historical awareness.

Parallell session 5A

24 May, 2008

9.00 – 10.30

Room 14-221

Round Table Discussion

Discussant: Jo McKenzie

Teacher reasoning and concerns on their assignment to teach and conditions for teaching evolution in a Biology course in upper secondary school, Sweden.

Maria Pettersson, Högskolan Dalarna och Karlstads Universitet

Background

This paper is a part of a project to study the science content in school Biology, focusing on the topic evolution. Which content the teachers find necessary is not well researched (Fensham, 2001.) How teachers are reasoning on which content to present, is connected with how they reason on how to fit and adjust the specific content into the course. It is then of interest to investigate what teachers are orientating towards. It concerns how teachers interpret the curriculum in the current school tradition, and what they give emphasis to.(Douglas,1982) The specific content on teaching evolution is not reported here, but this paper will discuss how experienced teacher reasons about their assignment to teach and on how they adjust the curriculum content, reasons and regards for their teaching in a biology course.¹ The National Curriculum (Skolverket 2002) have many aims, but it also gives the teachers free rein, within their professional role, to make choices on which content to emphasize.

Method

21 experienced teachers from schools in different types of socio-economical surroundings where involved in semi-structured interviews. The interview focused on planning for the topic evolution in the Biology course. The audio recorded interviews were transcribed and these transcripts were read over and over again. The transcripts from the 21 interviews were regarded as a whole and themes of what the teachers described emerged. They were labelled as concerning Worldviews, teacher self, students, organisation and content.

In all transcripts the statements regarding these themes where marked. From collections of statements from the teachers this analyse investigatesshow much each teacher is oriented into each theme. The procedure was to calculate words in each category (in procentage) what teachers, when engaged in discussing their assignment to teach and the conditions for teaching evolution, stated. These figures was scored in a bold scale from zero to ten. By ranking numbers, categories of orientation was identified.

¹ the course Biology A, which is one of the courses in the Science programme in Swedish upper secondary school.

Findings

All teachers emphasized one or two themes.

The themes most frequently attended to was world views and students. In teacher reasoning on their assignment to teach and to the conditions for teaching evolution within the context of the course Biology A in upper secondary School, Sweden, these categories of orientation can be seen.

Tabel 1. Categories teacher orientation

	Number of teachers
World view <i>and</i> student	6
World view <i>and</i> organisation	6
Student	5
World view	1
World view and content	1
Organisation	1
Content	1
	<hr/>
	Total 21

A combination of orientation towards world view and students and world view and organisation seems to from the most frequent category of teacher orientation, followed by orientation towards students.

Discussion

From this paper it is apparent that there is a variation in teacher's orientation. Further studies of statements within these described themes will give more information and examples of what teachers regards as crucial and which adaptations of the content teachers do in order to fit their students.

Parallell session 5B

24 May, 2008

9.00 – 10.30

Room 14-420

Round Table Discussion

Discussant: Ference Marton

A Phenomenographic Design for Research of Study Abroad Sojourner Experiences

Leo Hitchcock, School of Computing and Mathematical Sciences, Auckland University of Technology

The key research issue of this proposed PhD research concerns intercultural competences learned and developed during a study abroad

intercultural immersion sojourn. The overarching research issues centre on the conditions that must be present in the overall sojourn experience for such intercultural competences learning to occur, those perceptions of sojourn experiences that can detract from such learning, and the effect such experiences have on the participant's future intercultural competences.

Specific questions to be addressed are:

1. What intercultural competences are attained from an intercultural immersion sojourn (specifically a student exchange programme)?
2. What experiences enhance intercultural competence (ICC), and what experiences detract from ICC?
3. Into what categories do these experiences and subsequent ICC development fall? (What are the phenomenographic dimensions of variation that give life to intercultural competence).

This study will be a phenomenographic analysis that will examine and analyse individual perceptions of the research participants' experiences before and during a cultural immersion student exchange and the resulting conceptions of what has been learned.

The research wishes to examine the subjective experiences of exchange students immersed in a culture different to their own which result in learning something. Such learning, I argue, occurs within a society of socially constructed viewpoints - viewpoints that differ to the experiencee's.

According to Berger and Luckman (1966), reality is a socially constructed phenomenon through the following processes:

1. The phenomenon is observed by an interested actor as objective reality.
2. The reality is internalised by the actor.
3. Once internalised, the phenomenon becomes the actor's subjective reality.
4. The phenomenon becomes legitimised and institutionalised.

This, according to the theories of intercultural competence, I contend, is the process of intercultural learning. The learning is a phenomenon in itself as it is contingent on our social selves, that is it would not exist had we not built it, that it serves a social purpose, and we can freely reject it (Boghossian, 2001: 6).

This research aims at description, analysis, and understanding of *experiences* (Marton, 1981: 180), that is, of those experiences within the social construction of a different culture that result in changing cognitive perceptions of the culture, resulting in attainment of or increased intercultural competence by the experiencee. It is research that seeks an experiential description; what is thought of by the experiencee as that

which is lived, that which is culturally learned, and those which are individually developed (Marton, 1981: 180), culturally self-efficacious and interculturally competent ways of relating to the alien social world around them. Phenomenography allows the research to focus on these perceptions of specific aspects of experienced reality (Marton, 1981: 189). Rather than focus on any given model of intercultural competence as the essence of the research with a view to the proving or refinement of such a model, as would be the case with phenomenology, this research prefers to focus on those experiences that may neither prove nor disprove such a model, but will inform the experiencee's perceptions, attitudes and actions in relation to that model.

Parallell session 5C

24 May, 2008

9.00 – 10.30

Room 14-418

Paper presentation

Chair: Laura Walsh

Learning Study in upper secondary about Newton's second law

Margareta Enghag

Within a learning study, (Marton & Ling, 2007), a group of teachers work together with a researcher to improve the students' learning outcomes of a learning object that is found to be of special difficulty for the students. A learning study cycle proceeds from 1) the students' pre-conceptions, 2) the teachers' experiences, and from 3) insights from didactic research. It consists of several lessons, during which the critical aspects of learning are identified and varied. Pre- and posttests regarding the students conceptual understanding are given. Each lesson is videotaped and all the teachers analyze the film, or are present in the classroom, during all lessons. Learning studies are a step towards use of research based teaching.

Newton's second law is one of several physics concepts that give students in upper secondary school physics difficulties, as it is contra intuitive and shows a big step from every-day thinking to the scientific way to see how forces have impact on speed and acceleration of objects. In this study is the aim to contrast the teaching of Newton's Law in a way that has impact on learning outcomes. After the first lesson critical aspects were identified – the way falling objects with air resistance are discussed in the class-room. This critical aspect was identified during group discussions between students, and the students' questions in the discussion with the teacher. We discuss how the critical aspects we find depend on the instruction design that is used (e.g. if student – student talk, or teacher – class talk).

*The realisation and non-realisation of disciplinary perception:
Instrumental realism and variation in physics labs*

Jonte Bernhard, Campus Norrköping, Linköping University, Sweden

One necessary condition for learning is that students are able to focus on the object of learning and discern its critical features (Marton & Tsui, 2004). A typical part of physics instruction is labs. Learning physics is about acquiring a disciplinary perception. This perception is active and co-determined by technology. In a lab, an experiential *human–instrument–world* relationship is established. The instruments used places some aspects of reality in the foreground, others in the background, and makes certain aspects visible that would otherwise be invisible. In labs, this can be used to bring critical features into the focal awareness of students and to afford variation. In a previous study (Bernhard, 2003), I have shown that labs using sensor-computer-technology (“probeware”) can be effective in learning physics, but that this technology also can be implemented in ways that lead to low achievements. In this study, I will present studies based on video recordings of student’s activities in labs. I will show that the realisation and non-realisation of disciplinary perception in labs can be related to the design of tasks, i.e. patterns of variance and invariance, as well as the physical setup of and the instruments used in the lab. In particular, I will show that the technology in some setups does not afford critical variation and discernment, and that this is an example of “instrumental realism” (Ihde, 1991). I conclude that my study supports variation theory, but I also argue that the role of the technology cannot be neglected when studying labs.

*Finding keys to open up for learning – Combining Variation Theory and
Threshold Concepts in order to open up learning spaces*

Anna-Karin Carstensen^{a, b, c} and Jonte Bernhard^{b, c}

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In higher education the focus is very often on complex concepts. The students may have come across some of these concepts in schools, but in less complex contexts, e.g. current and voltage. In order to make calculations on these concepts the examples are simplified and complex relations, e.g. non-linearity, are not discussed. In our research we have video-recorded electrical engineering students at lab-work, changed the instruction in line with ‘variation theory’. We noticed dramatic changes in the ways students deal with the tasks, and that they understand the topic, transient response, in a totally different way than before changes. But we have also seen that the ideas in the recent emergent theory of ‘threshold

concepts' may contribute to the process of finding critical aspects, and to our understanding of what happens in the lab; when we changed the instructions to help students understand what to expect from their calculations, the hesitation they used to show towards the mathematics is gradually diminishing.

We have earlier proposed the idea of *key concepts* – concepts which do not just open up for learning of a “particular concept, but also learning of other concepts related to it”.

In our paper we will further discuss the relationship between variation theory, threshold concepts and key concepts.

Parallell session 5D

24 May, 2008

9.00 – 10.30

Room 14-425

Paper presentation

Chair: Kristina Ahlberg

The function of language use in learning about complexities: Handling ambiguities of the meaning-making process

Elsie Anderberg, Annika Åkerblom, Christer Alvegård, Lennart Svensson, Department of Education, Lund University, Sweden

The paper investigates micro-processes of meaning-making in the context of a special dialogue setting. The particular phenomenographic perspective on learning adopted in the present study applies an intentional-expressive approach to the function of language use in learning. The approach is based on a relational conception of language that focuses on the learner's actual use of language in developing and expressing understanding. A special dialogue was used, to both stimulate pupils' reflection, and to document their reflection over the ways they expressed their understanding of different phenomena. Nineteen 10-year olds participated in the investigation, discussing physical phenomena in mechanics and astronomy. The analysis of the micro-processes examined how the ambiguity of the interplay between conceptions, meanings and expressions was handled and constituted. The results are presented in three inclusive descriptive categories: 1) Inventory of expression's meanings 2) Testing the function of expressions use 3) Identifying the function of expressions use. These categories show qualitative differences both with regard to variations in the ambiguity of the relationships, and ways of handling the ambiguity. The results are discussed in relation to cognitive and socio-cultural theories on learning, particularly those theories that focus on the development of reasoning and conceptual understanding.

The broken triangle:

The function of language use in learning about complex phenomena

Elsie Anderberg, Lennart Svensson, Christer Alvegård, Annika Åkerblom, Department of Education, Lund University, Sweden
Thorsten Johansson, Department of Philosophy, Uppsala University, Sweden

In research on learning, one of the fundamental questions concerns issues of language and thought. A number of empirical studies have revealed the interplay between conceptions, expressions and meanings to be more dynamic and ambiguous than is commonly acknowledged. The aim of this paper is to make a contribution to the theoretical development of phenomenography, outlining an alternative and intentional-expressive approach to the study and understanding of the interplay between use of language and understanding of subject matter: the epistemological role of language use in learning. The approach is based on a relational conception of language that focuses on learners' actual use of language in developing and expressing understanding, illustrated with "the broken triangle". The learner is seen as an agent, and emphasis lies on the function of language use from the learner's perspective. Four aspects of the intentional-expressive approach are described and discussed. Conclusions concern the value of this approach, which serves as a complement to the dominant communicative and cognitive conceptions of language. The research represents a continuation and deepening of previous phenomenographic research on deep and surface approaches to learning and studying.

The interplay between expressions and meanings in meaning-making

Annika Åkerblom, Elsie Anderberg, Christer Alvegård and Lennart Svensson, Department of Education, Lund University, Sweden

In learning and teaching, language is often taken for granted. Knowledge and ways of expressing knowledge are seen as a unity. However, a great variety exists in ways of expressing the same conception, while the same expressions can be used to express different conceptions. Our research draws on the phenomenographic tradition and is a development concerning language use. Focus lies on individual meaning-making, in the relation between individual language use and conception. An intentional-expressive approach to the function of language use in learning is developed, that focuses the interplay between linguistic expression, meaning and conception from the learner's perspective. A special dialogue structure has been used with preschool children, 4th and 8th grade pupils (6,10 and 14 years old, respectively), focusing the same

initial questions concerning phenomena described in classical mechanics and basic astronomy. In this study two expressions often occurring in the dialogues, “air” and “gravity” are focused and the interplay between the expressions and meanings used is explored and described and the age groups are then compared. The result shows that the relation between the chosen expressions and meanings is ambiguous and varied, and that the variation is of a special character.