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**ABSTRACTS**

Paper presentations

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## **MOTIVATIONAL ASPECTS AFFECTING COGNITIVE LOAD**

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### **ABSTRACT**

One important question in instructional design is how learning materials can be arranged to facilitate learning. A frequently used theoretical framework to explain advantages and drawbacks of distinct instructional design formats in learning with multimedia is the Cognitive Load Theory (CLT) (Chandler & Sweller, 1991; Sweller, 1999). It is based on assumptions on the human cognitive system and takes the limited capacity of working memory into account. The amount of mental effort that is required by a certain learning task is not only due to the instructional design but also affected by learner prerequisites (Chandler & Sweller, 1991). The importance of cognitive learner prerequisites such as prior knowledge has been shown in a number of studies (Kalyuga et.al., 2003, Bruenken et. al. 2000). In contrast to that, motivational learner prerequisites have been widely neglected so far. Therefore we review two studies on multimedia learning to examine three research questions (1) Does motivation affect mental effort?, (2) Which motivational variables are important in this context? and (3) Do differences in motivation (high vs. low) lead to significantly different levels of mental effort? The results indicate that motivation affects the amount of mental effort. As expected, not all motivational variables are of the same importance. Challenge, the stimulation of achievement motivation, seems to be crucial in multimedia learning and therefore should be taken into account when analyzing cognitive load.

## **PROCESS-ORIENTED TEACHING IN MATHEMATICS – A RE-ANALYSIS OF THE TIMSS 1999 PUBLIC RELEASE LESSONS**

**Gun-Brit Thoma & Tina Seidel**

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### **ABSTRACT**

International comparative studies such as TIMSS (Beaton, 1996) and PISA (Prenzel et al., 2004), as well as accompanying studies such as the TIMSS Video Studies (Stigler, Gallimore & Hiebert., 2000), offer the opportunity to point out differences between countries with respect to what students have learned and how teachers teach mathematics and science. Factors inside the classroom which play an important role for the development of student competencies are of special interest to education researchers. The TIMSS Video Studies have provided multiple insights into events and classroom organisations in different cultures and countries. The analyses revealed culturally shared routines and scripts in the classrooms; however, they were mainly focused at a descriptive level of classroom organisation.

Thus, the aim of this study was to extend the investigation to in-depth analysis of the quality of teacher-student interactions in classrooms. As a sample the international mathematics lessons of the TIMSS 1999 Public Release Lessons (N=28) in Australia, the Czech Republic, Hong Kong, Japan, the Netherlands, Switzerland and the USA were used. The videos were analyzed using coding systems developed in the IPN Video Study (Seidel, Prenzel & Kobarg, 2005). The results of this study reveal diverse foci of teaching in different countries. In some countries, such as Australia, teaching is characterised by cognitive challenge and intensive feedback. Others, such as Hong Kong, have a stronger focus on verbalising problem-solving

steps. Thus, teachers use different strategies to support students' learning processes, and these strategies are according to TIMSS successful in student learning outcomes.

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### **GOAL-DIRECTED AND STRUCTURED TEACHING IN GERMAN AND SWISS PHYSICS INSTRUCTION -- RESULTS FROM A VIDEO STUDY**

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#### **ABSTRACT**

The study presented aims at exploring the role of goal-directed and structured teaching for students' learning in physics instruction. Goal-directed and structured teaching is characterized by a clear and coherent presentation of teaching goals, tasks and contents. Numerous empirical studies have shown positive effects of these aspects on cognitive learning outcomes (Scheerens et al., 2005; Seidel & Shavelson, submitted). Investigations regarding the effects on motivational-affective outcomes are rare.

Therefore this study explores goal-directed and structured teaching in videotaped physics lessons and its role for students' cognitive and motivational-affective outcomes. Furthermore this study attempts to clarify the different student' learning outcomes certified for German and Swiss students (e.g. Ramseier, 1999) by analysing in-depth structures of instruction in terms of goal-directed and structured teaching. The sample includes videotaped teaching units of 50 German and 41 Swiss 9th grade science classes. The study is embedded in the project "Teaching and Learning Processes in Physics Instruction – A videotape classroom study" (Seidel et al., 2006).

Descriptive analysis show significant differences in the degree of goal-directed and structured teaching in the two countries. Swiss teachers explicate teaching goals and present the learning contents in a clearer and more structured way than their German colleagues.

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### **IDENTITY WORK AS AN ASPECT OF LEARNING: THE CASE OF AN ONLINE COMMUNITY OF YOUNG PROFESSIONALS**

**Carlo Perrotta**  
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#### **ABSTRACT**

The paper reports a study based on the application of James Gee's concept of recognition work to some of the discursive dynamics identified in an online forum of young psychologists. Discourse analysis was carried out to understand whether, and how, a common identity was constructed. The findings demonstrate that the notion of recognition work can account for how identities are constructed in, and across, communities or learners and highlight the role of networked discourse in creating reflective scenarios where people can explore different trajectories of membership.

## **EXPLORATION OF SELF-EXPLANATION AMONG CHILDREN WITH LEARNING DIFFICULTIES**

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### **ABSTRACT**

This paper reports on the first phase of an ongoing research project which aims to investigate self-explanation among children who experience learning difficulties. It aimed to explore patterns of self-explanation generated by these children when they were engaged in activities of explaining their reasoning and an adult's reasoning. Four children with learning difficulties were encouraged to explain their reasoning and an adult's reasoning when they studied three subjects: Reading, Science, and Mathematics. A multiple case study was employed within the social constructivism framework. Semi-structured interviews and videotaped observations were employed to collect the data which were analyzed qualitatively and accompanied, where it is possible, with quantitative account.

Findings showed that the participants were capable of explaining their reasoning and, to some extent, an adult's reasoning. four themes of questions by the teachers stimulated four patterns of self-explanation by the children, including: concept and relationships, prediction on three levels: processes, procedures and outcomes, evaluation of previous knowledge, and cause and effect of own and an adult's reasoning. These were most highly associated with mathematics and science contexts. Explanations of cause and effect were generated the most by all children in all sessions. Identifying these themes and patterns of self-explanation led to the development of the Self-Explanation Technique (SET) which is concluded. The SET is currently under an ongoing more detailed investigation in mathematics with larger group of children than the one in this study.

## **NEGOTIATING AND RE-NEGOTIATING CONVERSATIONAL GROUND RULES APPLYING THE THINKING TOGETHER -APPROACH IN A FINNISH CONTEXT**

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### **ABSTRACT**

Many of today's educational practices or innovations stress the importance of group or peer work either in computer supported learning environments or in face-to-face interaction between learners. Yet only in few cases influencing or guiding the actual interaction of the participants is at the center of these innovative practices.

Building on a socio-cultural framework of human action (Wertsch 1991, Lave & Wenger 1991) this study applies the Thinking together - approach (Mercer et al. 1999) in a Finnish elementary school context. At the heart of the approach lies a set conversational ground rules designed to promote exploratory engagement in collaborative learning tasks. Yet for any educational programme to be successful it has to take seriously the concerns, agendas and ideas of the participants involved. In other words it has to adapt to the local context of the intervention.

The aim of the study is to focus on the intercontextuality (Bloome et al. 2005, Kleine-Staarman 2005) of the conversational ground rules as they are constructed and adopted as common knowledge of a classroom. The intercontextual analysis will look closely at the

sociocultural trajectories (Kumpulainen et al. 2003) of each of the ground rules. This is seen to provide insight into the "long conversation" (Mercer 2000) of that particular community and also into the construction of a tool designed to promote exploratory collaboration.

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## **TEACHERS' HUMOUR AND ITS SIGNIFICANCE TO STUDENTS**

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### **ABSTRACT**

Humour is a significant factor in the interaction between the teacher and students, but it has two sides; it can be used in a positive or negative way. My study explores the nature of teachers' humour and its meanings to students. Various types of teachers' humour have earlier been studied but not in terms of what students regard as good or bad humour. In addition, there are only few studies about the meaning of teachers' humour for students. The data was collected with a questionnaire and interviews. The target group of the questionnaire consisted of 309 high school students. According to the answers, 14 of the senior high school students were chosen for interviews. The results show that humour is not a separate thing, but an important part of the whole interaction between the teacher and the students. Secondly, teachers really use humour both in a positive and negative way in school teaching, which has many opposite influences e.g. on students' affections, motivation, cognitive processes and their enjoyment of school. This study gives unique knowledge of students' experiences of teachers' humour.

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## **TRAINING OF TEACHERS' COUNSELLING COMPETENCE**

**Silke Hertel & Bernhard Schmitz**  
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### **ABSTRACT**

Counselling parents is a main task of teacher's profession but the training of this important competence is not included in teacher-training. Furthermore, there is basically no research done regarding that competence field. We did develop a teacher-training to enhance teachers' counselling-competence. The training was evaluated by an intervention study. Firstly we aimed detecting effects of the training itself. Secondly we aimed to identify specific effects of additional intervention aspects (self-reflection, feedback). The data was collected during an intervention study (two by two by two (training, self-reflection, feedback: yes/no). 98 grammar school teachers participated. The competence assessment based on self-assessment and observer-assessment. Six different instruments were applied. Five aspects of counselling-competence were distinguished: reflectiveness, cooperative-alignement, methods (e.g. verbal strategies, diagnostic-competence), goal-orientation, criticism-coping. We conducted analyses of correlations and analyses of variance with repeated measures. We found positive correlations between competence-level and perceived performance in counselling-interviews. Teachers' participating in the counselling-training improved their competence from pre- to posttesting significantly. The effects for the additional intervention elements (support of self-reflection, feedback) differ for the competence aspects. Teachers' counselling-competence can be improved by the training. Further research should investigate the different effects self-reflection and feedback for competence acquirement.

**EXPLORING TEACHERS' AND CONSULTANTS' CONCEPTIONS ABOUT THE  
PSYCHOPEDAGOGICAL ADVICE IN SPANISH HIGH SCHOOLS**

**Maria Luna Chao**

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**ABSTRACT**

Spanish schools rely on the school psychologists- also known as consultants- to help the teachers to improve the quality of their work. To achieve that objective, teachers and consultants have to build a collaborative relationship. Nevertheless, different studies have shown some difficulties to implement the type of collaboration prescribed by our current education system. One reason for such difficulties could be the different ideas or conceptions that teachers and consultants support. In this study we explore teachers' and consultants' conceptions about the consultants' job, that is to say, about the psychopedagogical advice. We interviewed 12 teachers and 12 consultants of different high schools. The qualitative analysis showed that most of our consultants support an *educative* approach to the psychopedagogical advice: consultants think that their job involves giving advice to teachers and to the whole school. On the other hand, most of our teachers support a *clinical* approach to the consultants' job: teachers consider that consultants should assist mainly with "problematic students". Knowing teachers' and consultants' conceptions about psychopedagogical advice will make us able to improve their training processes. The final objective is to help these professionals to bridge the gap between their postures, in order to build a collaborative relationship.

**TEACHER'S TACIT PEDAGOGICAL KNOWING:  
TOWARDS THE CORE OF PROFESSIONALITY**

**Auli Toom**

University of Helsinki

**ABSTRACT**

The purpose of this paper is to examine teachers' interactive pedagogical thinking and action; their tacit pedagogical knowing. The aim is to study the appearance of teacher's tacit pedagogical knowing and the contents including in teacher's tacit pedagogical knowing. Tacit pedagogical knowing is defined as a process in interactive teaching situation, through which a teacher finds solutions to challenging classroom situations, so that the lesson continues. The research material is gathered from four teachers by videotaping their lessons and by stimulated recall interviews. Research results show that teacher's tacit pedagogical knowing appears in the maintenance of the pedagogical relation, the teacher's relation to content of instruction, and the didactical relation. The maintenance of the pedagogical relation, the teacher's relation to content of instruction, and the didactical relation were elements of the contents as well. In addition, the maintenance of teacher's pedagogical authority, the maintenance of the student's pedagogical authority, and the awareness of the nature of content of instruction are included in the contents of teacher's tacit pedagogical knowing. Based on the results, a model of teacher's tacit pedagogical knowing is developed. Using the model, it is possible to illustrate the factors at the core of teacher's professionalism.

**INTEGRATING INFORMATION TECHNOLOGIES DURING THE PRACTICUM:  
HOW EFFECTIVE IS IT FOR PRESERVICE TEACHERS?**

**Vincent Grenon**  
University of Sherbrooke

**ABSTRACT**

This paper presents the results of a study conducted from October 2005 to June 2006 with 99 preservice teachers in their third year of the teacher education programme at the University of Sherbrooke. The study aimed to identify if the practicum allows preservice teachers to develop three dimensions identified in the literature as prerequisites for the integration of IT (Yuen & Ma, 2001; Larose & Karsenti, 2001): (1) level of computer literacy; (2) attitudes concerning integration of IT; (3) self-efficacy in planning integrative activities for pupils. To effectively integrate IT, Rogers (2000) suggests that preservice teachers be exposed to the integrating practices of inservice teachers. We also contend that interaction between preservice and inservice teachers affects the probability of transfer of integrative uses of IT by preservice teachers (Bandura, 1997). To this end, we developed, validated and used a survey questionnaire containing closed questions to collect data. Findings enabled us to identify an attitude dimension that remains to be developed in teacher education and within the context of practice: the pedagogical usefulness of IT, if we wish to have preservice teachers integrate these technologies to foster their pupils' learning once they become inservice teachers.

**ANALYSING THE ROLE OF LANGUAGE IN STUDENTS' DEVELOPMENT OF  
SOCIAL, COGNITIVE AND METACOGNITIVE PROCESSES DURING THEIR  
PARTICIPATION IN A WEB-BASED ENVIRONMENT**

**Susana Gòdia**  
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**ABSTRACT**

The E-learning Action Plan (European Commission, 2000) is a European educational objective that uses the Information and Communication Technology (ICT) and the internet to improve the learning quality. For this reason, the main goal of this study is to explore the educational use of the internet as a learning tool in Secondary School. To sum up, the focus of this study is the relationship between the language and the cognitive, metacognitive and social processes involved when students work in pairs to solve a computer-based activity. The design is quasi-experimental (using pre-test, intervention and post-test): students need to solve one computer-based activity on a scientific topic (planet Mars) without previous intervention; after the intervention they need to solve another equivalent computer-based activity on another scientific topic (the Moon). The intervention responds to a design computer-based instructional environments learning: 9 activity-projects using the WebQuest methodology (Dodge, 1995). These environments are based on authentic problems, inquiry web-learning and scaffolded procedures. The sample comprises 18 students working in pairs in the 4th level of Secondary School (15-16 years of age) of three different educational institutions of Lleida (Spain). Two institutions were selected randomly as experimental groups while the third one was taken as the control group. The data collected consist of both video recording and the actions students carried out on the screen (CamStudio 2.0) during the task-solving process. The video recording of each group (6 experimental pairs and 3 control pairs) was analysed by means of conversation analysis. The results show that more often than not students fail to solve the task with a truthful collaborative interaction. We therefore

conclude that it is necessary to design a training process for the students to work collaboratively.

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**ASSESSING THE VOCABULARY KNOWLEDGE AS A PREDICTIVE MEASURE  
OF ACADEMIC SUCCESS OF FIRST-YEAR ENGLISH MAJORS**

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**ABSTRACT**

It is widely recognized that vocabulary, alongside with grammatical and pragmatic knowledge, plays a significant role in the overall success of language learning, especially in case of academic studies done in the target language. The study reported here assesses the English as a foreign language lexical proficiency of 148 Hungarian students entering university as English majors. In order to assess the complex nature of the lexical knowledge of these subjects, three tests were administered to them: the Vocabulary Levels Test (Nation, 1990), the Productive Vocabulary Levels Test (Laufer & Nation, 1995) and the Lex30 test of productive vocabulary (Meara & Fitzpatrick, 2000). Although using parallel assessments tools provides a fuller picture of students' lexical competence, usually only one testing method is used in academic context for practical purposes. This paper explores the correlation between scores obtained on three tests to examine how results in one test can be extrapolated into other aspects of lexical proficiency of the same subjects. The implication of the research findings are discussed from the practical perspective of using these three tests as predictive measures of academic success of students in their first year of university studies in English.

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**ASSESSING METACOGNITIVE AND MOTIVATIONAL SKILLS BY USING  
LEARNING DIARIES FOR STUDENTS WITH MIGRATIONAL BACKGROUND IN  
ELEMENTARY CLASSROOMS**

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University of Potsdam  
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**ABSTRACT**

Empirical research was conducted in order to better understand how self-regulated learning processes could be investigated through the use of learning diaries in a elementary classroom focusing on students with migrational background. Keeping learning diaries was intended as a longitudinal approach to measure metacognitive and motivational skills (e.g. Wohland and Spinath, 2004). The sample includes 33 students from an elementary school in Berlin aged 9 to 13 who kept a diary for 14 weeks. In this paper we focus on analyzing diaries including students reflection regarding metacognitive and motivational aspects during the learning phases. Related contextual variables like the difficulty and the task requirements have been assessed respectively. We measured context-sensitive variables such as task culture via semi-structured teacher interviews. Results regarding self-regulated learning aspects indicate a high variability when comparing students statements in the planning, monitoring and reflection phase. Furthermore we found a connection between task characteristics and specific motivational and metacognitive aspects and we found evidence that the quality of statements is related to task requirements and person-related factors.

**FROM BRACKETING TO EMBRACING  
- REFLECTING ON THE RELATIONSHIP AMONG THE RESEARCHER, THE  
RESEARCH PARTICIPANTS AND THE RESEARCH STUDY**

**Margarita Gerouki**  
University of Helsinki

**ABSTRACT**

Within her research, the researcher's place is a negotiated understanding. In this paper I am dealing with issues that have arisen while collecting data for my PhD research project on teachers' experiences of their pupils sexual behaviours at school, studied through first-person phenomenological approaches. Interviewing teachers on the subject compelled me to deal with questions regarding my position within the research. "Bracketing" as a process and part of phenomenological research design aims to distance the researcher from her research data and co-participants in order to be able to approach the phenomenon in its "pure essence". As my research evolved I started reflecting on my position as a teacher, as well as a researcher. I understood that progressively, I was becoming a part of my own research and needed to identify and negotiate further the challenges that this presented. The inevitability of being subjective within qualitative research designs is not a new concept. However, as I argue in this paper, exploring subjectivity and integrating it throughout the research design might be feasible. Auto/ethnographic methods, as well as, memory-work have been used productively in qualitative research in the past. Here, my aim is to propose a methodological framework that integrates the person (the researcher) to the group (research participants) and uses the researcher's narrative as a contributor in the research data. I argue that the experience of researching within "familiar territory" can potentially provide with additional tools that enrich understanding of the whole research study. Within the above line of thinking I also argue for the possibility to open the brackets of perception in order to embrace the research experience itself.

**AN EXPLORATORY STUDY TO STUDENT TEACHERS' REGULATION  
ACTIVITIES IN A DUAL LEARNING ENVIRONMENT**

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**Perry den Brok**

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**ABSTRACT**

University-based teacher education is more and more organized in dual learning programmes in which two learning environments are combined: studying at the university and learning from practice in schools. These programmes often call upon a high degree of self-regulated learning (SRL) in student teachers. However, it is unclear whether these student teachers are capable to regulate their learning to this extent. Student teachers' SRL has hardly been studied and theories on SRL are mostly based on student learning in traditional instructional settings. This paper aims at answering the question: "What kind of regulation activities do student teachers undertake in a dual learning environment to foster their learning to teach?"

In this study, twenty-eight student teachers were asked to describe their learning experiences and corresponding regulation activities in an open question log. Phenomenographic analysis

identified a set of categories of description in the data. It is hypothesized that three patterns can be discerned to explain the results. One pattern includes activities towards regulation of the learning process, the other two describe activities towards regulation of teaching behaviour. The results reveal the unique character of student teachers' regulation activities and are valuable for further research into the quality of student teachers' SRL.

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### **YOUNG CHILDREN AND SELF-REGULATED LEARNING: A QUALITATIVE CLASSROOM STUDY**

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#### **ABSTRACT**

Self-regulated learning is discussed as a way of learning that becomes more and more important in modern societies and should therefore be fostered and supported in modern classrooms. Many studies have been accomplished concerning self-regulated learning of older children and college students. In recent years there has been evidence that already primary school children are able to regulate their learning under certain conditions and it is proposed that the advancement of self-regulative abilities should start in primary school years.

The study examines self-regulated learning in the first and second year of school. The aim is to develop a fine-grained analysis of children's self-regulation in daily classroom situations and of their perspectives on learning. Following a qualitative approach data collection was done by observation, video observation and semi-structured interviews. The research questions are: How do children self-/ and co-regulate in learning situations? How do they verbalize their learning practices and their beliefs about learning and how are these aspects related?

Data analysis shows that young children do indeed self-regulate their own learning process, that at least a part of it is observable, and that they are able to talk about it. The results reveal processes of self-regulation in daily classroom situations concerning metacognitive, strategic and motivational aspects. Young children act and speak in a way that is associated with self-regulated learning. They monitor and evaluate their learning and in pursuit of their goals they act strategically. In some situations this occurs in a way that is opposed to what the teacher intended and what might be regarded as appropriate for the given task. Anyhow it shows knowledge and abilities that are a basis for the promotion of self-regulated learners.

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### **SUPPORT OF STUDENTS' LEARNING PROCESSES IN THE CLASSROOM - THE TEACHERS VIEW**

**Mareike Kobarg & Tina Seidel**

University of Kiel

#### **ABSTRACT**

This study investigates teachers' views of support for students' learning processes in the classroom. Students' learning processes are an important factor for their construction of knowledge (Bransford, Brown & Cocking, 2000). It is the teachers' task to support students' learning processes in the classroom (Bolhuis, 2003). The teachers' view is of interest, since it is assumed that teachers will be better able to support their own students' learning processes if

they learn to notice this support while observing a classroom video (e.g. Sherin & Han, 2004). Empirical evidence underpinning this assumption is rare. This study takes one step towards its investigation by exploring teachers' views of support for students' learning processes. For this investigation, data from the "LUV – Learning from Classroom Videos" study is used (Seidel & Prenzel, 2007). In LUV, teachers observed a classroom video and documented their observations. For the current study, 36 of these documentations were analysed with regard to the teachers' view of the support for students' learning processes. The results show that the views of the teachers in this sample differ. Further investigation will reveal whether these differing views are reflected in the teachers' own support for student learning.

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### **SCRUTINIZING PEER ASSESSMENT VALIDITY: A REVIEW OF RESEARCH STUDIES**

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#### **ABSTRACT**

The past decades, researchers have been arguing for changing the focus in assessment from an *assessment of learning* approach to an *assessment for learning* approach (Black & William, 1998, Assessment Reform Group, 1999; Stiggins, 2002). Accordingly, attention has been paid to modes of assessment that are in alignment with the assessment for learning approach. With the increasing popularity of modes of assessment, such as *peer assessment*, quality questions arose: to what extent can peer assessment practices stand the proof of quality? Since the 1990's, various authors (e.g. Linn, Baker, & Dunbar, 1991) discussed the appropriateness of traditional, psychometric criteria of validity and reliability in the context of assessment for learning. Although new criteria were formulated to give notice to the unique features of assessment for learning, to date, they have not yet been explicitly operationalised in the context of peer assessment. In order to search for quality criteria that are relevant in the context of peer assessment, we conducted a qualitative review study. Several databases were searched for studies implementing peer assessment. Eight studies explicitly took into account the validity of the implemented peer assessment and were included in this review. The contents of the selected studies were analyzed to determine which criteria were applied on which steps or aspects of the peer assessment construction. The results indicate that several of the proposed quality criteria for assessment for learning are, although implicitly, taken into account in current studies investigating peer assessment. To be able to manage and measure the quality of peer assessments, it is important to explicitly take into account these quality criteria in the future. At the same time, to derive at a more robust framework of quality criteria for peer assessment, (conceptual) refinement of the criteria and their operationalisations is needed.

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### **ARGUMENTATION AND EFFECTIVENESS OF THE MASTER'S THESIS**

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#### **ABSTRACT**

This paper presents the research and results of university students' masters theses. Thesis writing is an inherent and important part of university studies that guarantees academic qualifications. The aim of this paper is to present results of the quality of the argumentation,

scientific knowledge building, the skills of research and fairness of assessment of the theses. The data consist of fifty masters' theses from five departments that have received grades of excellent and good. The method of assessment was argumentation analysis which has been used at the first time.

According to the results, the rating of the theses has been done fairly, in accordance with a standardized grading criteria (the principles of the criteria of thesis). The quality of argumentation was not satisfactory in almost all theses. There were a little excellent chain of reasoning and argumentation almost in all theses which is a sign of problems in the processes of learning, reasoning and teaching in general. It is recommended that in order to promote academic learning, teaching and counselling that students use and apply theoretical and scientific concepts systematically. In addition, students should learn to form multidimensional chains of argumentation and draw conclusions effectively. Moreover, students should learn to construct knowledge creatively but systematically during university studies. Suggestions for future research includes develop argumentative writing as creative knowledge building tool which might also promote a learning methods and assessment. Furthermore, the research promoted to develop scale of argumentation analysis

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## **ASSESSING MODELLING SKILLS OF HIGH SCHOOL CHEMISTRY STUDENTS' LEARNING IN A COMPUTERIZED MOLECULAR MODELLING ENVIRONMENT**

**Zvia Kaberman**

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### **ABSTRACT**

The learning unit *Case-based Computerized Laboratories (CCL) and Computerized Molecular Modeling (CMM)* was developed in Israel for high school chemistry students. The organic chemistry part of the unit was taught in the CMM environment, where students could investigate daily-life organic molecules using two CMM software packages downloaded from the Internet. The research objective was to investigate the effect of the CMM learning unit on students' modeling skills. We focus on drawing models and transferring between molecular or structural formula and models and vice versa. Our research participants consisted of 12<sup>th</sup> grade chemistry students of whom 614 studied the CMM learning unit and 155 studied chemistry via other methods. Both experimental and comparison students were assessed for their modeling skills by pre and post case-based questionnaires. We performed detailed content analysis using validated rubrics and then analyzed the data statistically. Findings showed that students improved their scores in modeling skills significantly. The net gain scores of the experimental group students were significantly higher than those of their comparison peers. We recommend that teachers adopt the CMM environment, use case-based assessment tools to assess their students' modeling skills, and emphasize the importance of the visualization and modeling skills in chemical education.

**VARIATIONS IN THE RELATIONSHIP BETWEEN COGNITIVE ACTIVITIES  
AND TEXT QUALITY IN L1 WRITING: WHEN AND WHY?**

**Daphne van Weijen**  
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**ABSTRACT**

This study was set up to investigate to what extent writers adapt their writing processes to minimal task variation. Therefore twenty participants (first year university students) wrote four short texts each in their L1 (Dutch) under think-aloud conditions. The assignments were identical in every aspect except their topic. In this paper, the writing process is defined as a set of 11 cognitive activities which each play a role during the writing process. Results for two activities, namely Reading the Assignment and Formulating are reported here.

Results indicate that writers adapt their writing process to the changing task demands as they write. Participants were more likely to Read the Assignment at the start of the writing process and Formulate in the middle. Secondly, there are clearly large differences between subjects, although the extent to which subjects vary depends on the moment in the writing process. This holds both for Reading and Formulating. Differences within subjects (between tasks) were only large for Reading at the end of the writing process, while for Formulating they were small initially but clearly increased as the writing process continued. Thirdly, the correlations between cognitive activities and text quality vary during the writing process. Furthermore, task characteristics influence the strength of the correlation but not the general pattern.

Finally, the usefulness of adapting to the task at hand appears to depend on the moment in the writing process as well as on the activity being carried out. For Reading, adaptivity only appears to be advantageous in the beginning, while for Formulating adaptivity appears useful in both the beginning and at the end of the writing process.

**PROBLEMS BEHIND EDUCATION FOR ALL (EFA):  
THE CASE OF SIERRA LEONE**

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**ABSTRACT**

Sierra Leone, one of the world's poorest countries, experienced an 11-year civil war until 2002, and has been rebuilding the nation. The net primary school attendance is 41 percent (UNICEF, 2005, p. 100). Working closely with donors, the government has made a commitment to achieve the international goal of "Education for All" (EFA). A free primary education policy introduced in 2000 has led to some progress in terms of access to schooling. However, fieldwork research based on observation of schools, interviews with teachers, and questionnaires from pupils, parents and teachers in 27 schools in five towns, shows that the quality of the education provided has been traded off against the rapid increase in the number of enrolled children; a high teacher-pupil ratio, a shortage of teaching and learning materials, school buildings and furniture, and low motivation on the part of teachers are quite common. Furthermore, "school fees" that schools charge parents on an individual basis are a barrier to regular schooling for the poor. The data also demonstrates that Non-Governmental Organizations (NGOs) have made significant efforts to provide education.

This research reveals that the commitment to EFA could have unintended consequences if its success is measured only by results showing quantitative gains while downplaying the decline in the quality of the education offered. It also highlights the role of NGOs in supplementing government efforts to expand educational access of acceptable quality, especially when the government capacity to provide education is weak. The research demonstrates that while a free education policy in pursuit of the achievement of EFA has had a positive impact on access, it does not necessarily lead to quality education and may not always benefit the poor who are the majority of the population. Equal access to quality education is an integral part of EFA.

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**SOUTH SUDANESE ADULT LEARNERS IN AUSTRALIAN CLASSROOMS:  
OPPORTUNITY, AGENCY, AND COREGULATION IN CROSS-CULTURAL  
LEARNING-TEACHING DIALECTICS**

**Marianne Turner**  
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**ABSTRACT**

The number of South Sudanese immigrants to Australia has been increasing, and the emerging community is currently comprised of around 6000 people. Like any culturally and linguistically diverse migrant group, this group has brought with them learning practices which are not always congruent with the teaching practices which they encounter in Australia. The dialectics between adult South Sudanese students' learning practices and their educators' teaching practices are discussed in this paper in terms of the concepts of agency, opportunity and culture in social theory (e.g., Giddens 1979; Gibson 1984; Rubinstein 2001). A theoretical approach which sees human activity as a function of systemic coregulation is also employed (McCaslin 2004, p.254). Data is derived from an ethnographic study of three different groups and learning environments. The study found that learning-teaching dialectics appeared to be highly dependent on opportunity and agency as well as on cultural orientation, and the South Sudanese students' ability to transform learning-teaching practices through their classroom participation appeared both to facilitate and obstruct their learning in different ways. These patterns in opportunity, agency and culture which informed learning-teaching dialectics are explored using themes salient in the data, such as choosing/volunteering content of study, and teaching through conversation/discussion.

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**SECONDARY STUDENTS' WILLINGNESS TO UNDERTAKE SPECIFIC ACTIONS  
TO COMBAT GLOBAL WARMING:  
CAN ENVIRONMENTAL EDUCATION HELP?**

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**Martin Stanisstreet & Edward Boyes**  
University of Liverpool

**ABSTRACT**

One aim of environmental education is to encourage people to act in more environmentally sustainable ways; this is particularly urgent in the case of global warming. This study explores links between school students' reported willingness to undertake specific pro-environmental actions and their belief in the usefulness of those actions in combating global

warming. A closed-form questionnaire was administered to 1460 Spanish school students aged 12 to 16 years. The questionnaire contained 20 items about students' intentions to undertake various pro-environmental actions (their *Degree of Willingness to Act*, DWA) and 20 items concerning their beliefs about the efficacy of each action in reducing global warming (their *Believed Extent of Action*, BEA). We plotted values of DWA against BEA for each specific action to depict the extent to which increased belief in the efficacy of an action might increase the intention to adopt that action. For some activities there was a relatively strong relationship between the extent to which respondents believed such actions to be effective and the degree to which they were willing to adopt them. In such cases, education about the efficacy of a particular action in reducing global warming might lead to a greater willingness to adopt it.

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### **THE INFLUENCE OF CULTURE ON LEARNING STYLES IN INTERNATIONAL HIGHER EDUCATION**

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#### **ABSTRACT**

This paper presents selected results from a multi-stage study on the learning styles of culturally diverse students studying Hospitality Management in an Institute of higher education in Switzerland. The research question addressed here is whether or not one finds culturally related differences in learning style preferences. The subjects were first (n=315) and sixth (n=189) semester students. The instrument used was an adaptation of the Honey and Mumford (1986) Learning Styles Questionnaire. The students, of 47 different nationalities, were assigned to cultural clusters for classification purposes. The results from the analyses suggest that Asian students, particularly Indonesian students are more *reflective* than are other students. These differences were statistically significant amongst the first year subjects but not for the sixth semester subjects where learning styles seemed to have converged between the different clusters with non-Asian students being more *reflective* and all the students more *theorist*. Further comparative analysis, between sub-samples of Indonesian, Chinese and French subjects, is also presented. Overall the results provide support for the theory that learning styles are influenced by the educational setting and that they evolve over time. Implications for curriculum design and delivery for international cohorts are discussed.

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### **HIGHER EDUCATION STUDENTS' APPROACHES TO STUDY IN ASYNCHRONOUS ONLINE CONFERENCES**

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#### **ABSTRACT**

Asynchronous online conferences are increasingly used in higher education. They may resource students' learning in many ways; immersing students in meaningful text, encouraging them to develop a perspective, construct an argument and engage in dialogue.

However, this unfamiliar and sometimes ponderous way of communicating may also constrain learning. Conference participants not only need to acquire the skills and knowledge which make up the explicit content of a course, they must also learn how to organise themselves and relate to each other in an online environment.

A pre-existing framework which acknowledges the complex interplay of demands on and motivations of distance-learning students is that of approaches to study. This robust framework distinguishes three approaches to study (deep, strategic and surface), while emphasising that these approaches are not innate but are contextually situated. Approaches to study can therefore be used to identify and explore contextual factors.

To investigate factors which mediate the process of learning in asynchronous conferences, an 'approaches to study' framework was adapted for the analysis of archived conference data from a wholly online course at the UK's Open University. The course required students to work together online on meaningful group tasks, which were then assessed. The framework enabled a detailed analysis of the data, allowing the study of learning as a process. Learning in such an environment was shown to be an interactional rather than an individual accomplishment, for which it was important for learners to mobilise social resources in order to build a sense of mutuality and confidence in the group.

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## **FIRST-YEAR STUDENTS' PERSISTENCE AT UNIVERSITY: THE ROLE OF CLASSROOM EXPERIENCES AND SOCIAL INTEGRATION**

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### **ABSTRACT**

In Belgium, drop-out and failure risks are particularly high during the first year at university. The transition from secondary school to university is a challenging period implying important changes in students' life. Tinto's Integration Model (1993, 1997) emphasizes the role of social integration in students' persistence process. This study aims, on the one hand, to investigate the impact of social integration (including extra-academic activities, informal relations with peers and faculty) regarding first-year students' persistence and, on the other hand, to measure the effects of classroom experiences (i.e. perception of cooperation, competition, teacher support and classmates support) on both social integration and persistence intention. Furthermore, the additive role of emotional and academic factors in the persistence process will be investigated. 405 first-year students from two Belgian universities were surveyed twice (September and November 2006). First results indicate that supportive classmates' relationships have a considerable influence on students' social integration. Moreover, social integration is the strongest predictor of first-year students' persistence intention, beside factors like student residence, initial expectations, classroom competition and academic efforts. Some classroom experiences, like cooperation, have an indirect effect on students' persistence intention. Although related, emotional variables weren't significantly predictors of students' persistence. Some implications will be discussed.

**USING A CONCEPTUAL RESOURCES PERSPECTIVE TO ANALYZE LEARNING  
ABOUT THE PARTICULATE STRUCTURE OF MATTER**

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**ABSTRACT**

Research in students' learning has long considered students' conceptions as a key issue for science learning. It is now evident that students use manifold conceptions or multiple models to explain phenomena related to the structure of matter, and that the use of these conceptions is sensitive to the context. In order to explain this variability in students' reasoning, Hammer (2004) has proposed the notion of '*conceptual resources*' as smaller elements of cognition that can be used to explain the multiplicity of conceptions as well as its context-dependency. In this paper we present results from a qualitative study in which secondary students (12 – 17 years) from Mexico and the UK were interviewed in order to explore their explanations about phenomena related to the structure of matter in three different contexts: mixtures, chemical reactions and changes of state. Such explanations were analyzed using a grounded-theory approach (Strauss & Corbin, 1998). The 'conceptual resources' perspective was used to characterize students' answers in terms of phenomenological primitives (diSessa, 1993) and particle-related mechanisms. Such detailed analysis seems to be useful in order to find out which could be the structural elements that build up these multiple conceptions and could be used to understand progression in students learning.

**MATRIX PRACTICE EFFECTS:  
HELP OR HINDRANCE FOR ADULTS OF DIFFERENT AGES?**

**Mary A. Hancock-Niemic**

**ABSTRACT**

The effect of matrices on posttest performance and age of adult learners was investigated. The 47 participants (27 females and 20 males), ages 17 to 66 ( $M = 24.98$ ,  $SD = 9.7$ ), were randomly assigned to a practice format (matrix vs. linear) in a paper-pencil probability statistics unit. The median split method was used to establish two levels of the age variable:  $\leq 20$  (ages 17 to 20) and  $\geq 21$  (21 to 66). Although there was no statistical difference between group posttest scores, there was a significant difference in posttest completion time; the matrix group took longer. Further analysis revealed a significant interaction between age and treatment. The simple main effect for age demonstrated that older learners performed appreciably better than younger learners within the matrix group, which contradicted the research hypothesis. Paradoxically, prior studies indicated that matrices improved performance for younger students due to their ability to display patterns, show hierarchical relationships, and reduce cognitive load. Ironically, this study suggests that matrices enhance learning for older adult learners; yet when compared to the linear format treatment group, there was no statistical difference. Clearly, these results make further investigation necessary to clarify the instructional value of the matrix for all ages.

## **SHARED CONTROL AND TASK VARIABILITY: EFFECTS ON TRANSFER PERFORMANCE AND TASK INVOLVEMENT**

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Shared Control and Task Variability: Effects on Transfer Performance and Task Involvement

### **ABSTRACT**

Current educational theories emphasize the positive effects of providing learners with control over their own learning, which is believed to positively influence learning performance. Nevertheless, the positive effects of learner control are decreased when learners do not perceive the control given to them, make didactically unsound choices and are overwhelmed by the amount of choice. This study proposes shared control (i.e., learners choose from system pre-selected tasks) over high variable tasks to tackle these problems. Students profit more from this shared control when the tasks to choose from show variable surface features as compared to the prior task to enhance perception of control and to decrease the chance of making didactically unsound choices. In addition, cognitive overload may be prevented when learners share control with the system and are given the opportunity to select a task from a range of tasks preselected by the system. Ninety-four students participated in a 2x2 factorial design experiment with the factors control (system, shared) and variability (low, high). Results show superior effects on transfer and task involvement of shared control when learners can choose from preselected tasks with surface features that are different from previous tasks.

## **UNDERSTANDING THE PEDAGOGICAL PRACTICES OF REFLECTION IN TERTIARY DANCE EDUCATION**

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Utrecht University

### **ABSTRACT**

There are three different perspectives on reflection in education, embedded in the philosophy traditions of Pragmatism, Critical Social theory and Kant. The aim of this study was to find out according to which tradition teachers in tertiary dance education work, and describe their pedagogical practices of reflection. Research data was collected from fourteen dance teachers using semi-structured interviews. We found five types of reflection practiced, four of them related to the Kantian notion. Accordingly, students are expected to connect concepts and principles related to dance discipline and their personality with their dance practice using determinative judgments. In addition, dance students are also expected to develop new concepts and principles in regard to the dance discipline and self based on their own practice using reflective judgments. While these reflection activities were mainly associated with daily practice, the fifth type of reflection, which is in line with the Pragmatists' notion of reflection, was associated with evaluation moments taking place over a longer period of time in order to elaborate on the students' developments and make plans for a next period. Hardly any evidence on the practices of the Social Critical notion of reflection in tertiary dance education was found in this study.

**CRAFT, PROCESS AND ART: MUSIC STUDENTS’  
EXPERIENCES OF CREATING A COMPOSITION**

**Mandy Lupton**  
Griffith University

**ABSTRACT**

This paper explores university music students’ experiences of creating a composition. In semi-structured interviews, 19 students from two distinct composition courses (music technology and jazz) were asked about learning to compose. The theoretical framework used for the study was information literacy. Therefore, students were asked about the information they used to compose, and how this related to their learning.

Three nested categories were created as an outcome of the phenomenographic study. The categories are an aggregation of the two student groups, and as such they represent the similarities and differences between the ways students’ experienced learning composition in the two courses.

In the *Craft* category, students’ experienced composition as the craft of applying techniques. Their aim was to prove they understood and could use the techniques. The *Process* category was experienced only by the music technology students. In this category, students created a composition through a process of discovery. This involved trying out and experimenting with sound manipulation techniques. The composition was a two-stage process, as students composed sounds using computer software, and then composed a piece utilising the sounds. In the *Art* category, students created a composition through expressing themselves and finding their identity as a composer. Students’ primary strategy was to apply the craft of composition to create art.

The outcomes of the study have implications for the design of music composition curricula in higher education.

**TWO TYPES OF INSTRUCTIONAL SUPPORT FOR CREATING KNOWLEDGE IN  
COLLABORATIVE PROBLEM-SOLVING: SCRIPTED COLLABORATION AND  
INFORMED PLANNING**

**Anne Meier & Hans Spada**  
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**ABSTRACT**

Based on social psychological research on small group decision making, as well as research on collaborative learning, the roles of information sharedness and instructional support on the effectiveness on collaborative problem solving were investigated. Student dyads collaborated on a murder mystery problem requiring them to create knowledge from distributed information. In particular, collaborators had to draw inferences from pairs of information that were either shared by both of them, located with only one person, or distributed between persons (information sharedness). A control condition was compared to two instructed conditions which were informed about typical task difficulties, and either were supported in planning their own collaboration, or received external guidance from a collaboration script (instructional support). Results show substantial effects of information sharedness on all levels of the problem-solving process, as well as in a memory post-test. Instructional support

led to more correct solutions and a stronger focus on inferences during discussion, but did not improve the drawing of inferences from unshared information.

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### **FACTORS PROMOTING AND HINDERING COLLABORATIVE LEARNING IN CSL-CONTEXT**

**Essi Vuopala**  
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#### **ABSTRACT**

Collaborative learning is one of the current approaches when discussing about qualitative learning. Learning research has indicated that collaboration can lead to deeper understanding of new knowledge among learners. However, collaborative learning is not easy and it needs to be supported. Otherwise collaborative learning may fail, e.g. stay in superficial level (Salomon & Perkins, 1998). One way to support collaborative learning is to support factors promoting collaboration and collaborative learning and correct factors that hinder it.

This study explores factors promoting and hindering collaborative learning and the need of scaffolding in the context of computer-supported collaborative learning (csl.) The data (N=120) has been collected from the international virtual course for higher-education students. The data consists of students' interviews, on-line questionnaires, learning-diaries, discussion notes and log-data in technology-based learning environment. Data analysis is carried out mainly with qualitative data-driven content analysis (e.g. Creswell, 1998).

Preliminary results show that factors promoting and hindering collaborative learning are related to the pedagogical model of the course, reciprocity between the students, the grouping, students' metacognitive skills and scaffolding giving by the tutor or a teacher. Especially tutor's social role is important in order to support collaboration and collaborative learning.

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### **DISTRIBUTING SCAFFOLDS BETWEEN PEERS, TEACHERS AND MOBILE TECHNOLOGIES - DESIGN EXPERIMENT FOR COLLABORATIVE INQUIRY LEARNING IN THE NATURE**

**Jari Laru**  
University of Oulu

#### **ABSTRACT**

Recently, there have been a growing number of research projects on the subject of mobile learning systems. However, the application of the theory to the use of these technologies for educational purposes is lacking and the educational potential of mobile technologies remains largely unexplored. In this study learning with mobile technologies is grounded on theories of cognitive tools and distributed scaffolding, which were applied to a scaffold collaborative inquiry learning in a nature trail. The general aim was to design, implement and examine the case for a collaborative inquiry into learning in a nature context. The specific aims of the study were to investigate the nature of students' face-to-face collaborative inquiry learning, whether and to what extent the distributed scaffolds and new mobile technologies supported learning in nature, and what were the contextual features which contributed to the process of inquiry learning. The group (n=22) of primary school students worked in eight triads and two dyads, for two hours observing traces of animate and inanimate nature in the wild. The data was gathered by means of questionnaires, mind map-tasks, creation of fliers and recorded

discussions in order to find out how distributed scaffolds supported the collaborative inquiry learning in the wild. The preliminary results showed considerable differences in the nature of the discourse and inquiry learning. Preliminary results revealed that one reason behind the differences were contextual features which contributed to learning; for example incoherence between the features of the technologies, teacher's and students' conceptions and used pedagogical models. Such incoherence and degrees of freedoms in technology provided to the participants caused recognisable barriers for collaborative inquiry learning.

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### **DO STUDENTS' GOAL ORIENTATIONS AFFECT THEIR EVALUATION OF LEARNING AND TEACHING?**

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University of Helsinki

#### **ABSTRACT**

The purpose of this study was to establish whether students with different achievement goal orientation profiles evaluate their learning and teaching differently. The study was conducted in two phases. A latent class analysis was used to classify 263 1<sup>st</sup> and 2<sup>nd</sup> year students of the Finnish National Defence University in Phase 1 and 208 students in Phase 2 on the basis of their mastery-intrinsic, mastery-extrinsic, performance-approach, performance-avoidance and avoidance goal-orientations. According to BIC-criterion, the latent class analysis identified four homogenous groups of students, labelled as Mastery-oriented, Indifferent-avoidance-oriented, Success-performance-oriented and Avoidance-oriented. Analysis of variance was used to examine between-group differences in the evaluation of learning and teaching. The results of Phase 1 indicated significant differences between the identified groups of students on their ratings of the student's own activities and the student's activeness. In Phase 2 differences were found on ratings of interest and the student's own activities. The mastery-oriented students were more positive in most aspects in both phases, especially when compared to the students with an avoidance-focused goal orientation profile. The findings of this study both add to our understanding and raise new questions on the situationally varying effect of students' motivational constructs. Instructional implications are discussed.

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### **THE AFFECTIVE SIDE TO TEACHING: AN ANALYSIS OF ITS EFFECTS ON COMPUTER-ASSISTED LEARNING**

**Mary Pearson**  
University of Sherbrooke

#### **ABSTRACT**

This paper focuses on the affective side to teaching, a component of instruction that emerged from a case study conducted over a period of three years (1998-2001), to evaluate the impact of a computer-assisted learning environment on later childhood pupils (grades 4, 5, and 6) in a low socioeconomic school setting. The study got underway at the dawning of the Quebec school reform that came into effect in 1997 when competency-based instruction became the order of the day to replace a curriculum that for over 40 years had been based on the acquisition of behavioural objectives. Aimed at enabling pupils develop subject-related and cross-curricular competencies to prepare them for secondary school (grades 7 to 11), our study reveals that the affective side to teaching correlates with learner well-being and academic success. A comparative analysis of the social interactions of the teacher

participating in our study with those of four of his colleagues teaching under similar conditions illustrates the pre-dominance of the affective dimension that characterized his educational intervention. Results of the study show that his desire to replace textbook learning with a computer-assisted didactical and pedagogical device that he called a “virtual classroom” became instrumental in enabling him attain his main teaching objective: to provide his 23 pupils with a learning context that, while catering to their educational well-being, would also optimize their potential to succeed.

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## **THE PRESENTATION OF FEEDBACK IN VIRTUAL ENVIRONMENTS: A COMPARISON BETWEEN CONCEPTUAL AND PROCEDURAL SUBJECTS**

**Anna Espasa**

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### **ABSTRACT**

Teaching and learning processes in a virtual environment are based in the asynchronous interaction around the learning content between teacher and student as well as students among themselves. Within this frame it is understood that the assessment has to be formative and therefore, feedback throughout the educational activity becomes a key element for promoting students' learning regulation as well as knowledge building (Allal, 1988, about learning regulation; Perrenaud, 1998, about formative assessment; Dunn, Morgan, O'Reilly and Parry, 2003; Lou, Dedic, and Rosenfield, 2003 about feedback in virtual environments). The intention of this paper is to analyse whether form or presentation of feedback related to academic subjects of an essentially conceptual content, differ from those of procedural content.

From specific literature and the teaching practice experience in virtual scenarios, an instrument was developed with the aim to gather the characteristics of feedback presentation in virtual classrooms. The reliability of the instrument has been analysed by the inter-judges agreement with a 0.81 Cohen's Kappa coefficient. An observation was conducted applying the instrument to 2216 electronic messages from 9 classrooms of several faculties within the Open University of Catalonia.

The study results allow to characterise the feedback subjects analysed according to the moment which feedback is offered: at the beginning of teaching and learning process, during, or at the end of it, to the emitter, to the recipient, to the space in which virtual communication occurs and when, and also, considering whether nature of knowledge which is promoted within the subjects is theoretical or applied. The study will show that feedback is statistically different between theoretical or conceptual subjects and applied or procedural ones. As it will be discussed, these differences seem to be related to its different way of use of the technological platform and the pedagogical practice itself.

**EXPLORING TEACHERS' COLLABORATION:  
WHAT IS THE ROLE OF ICT IN THEIR COMMUNITY BUILDING?**

**Niina Impiö**  
University of Oulu

**ABSTRACT**

The teachers' way of working has changed from independent trade to knowledge sharing. This study examines teachers' collaboration in pedagogical practices and schools' working culture. The research questions are 1) How have teachers' communities been built and formed?, and 2) What is the role of information and communication technology (ICT) in the contexts of teachers' communities? Especially, the study focuses on how teachers share expertise, and in which ways collaboration was supported by ICT. The study reported in this paper is a part of a larger research project funded by The Finnish Ministry of Education in which the impact of ICT on comprehensive schools is investigated. The data was collected by teacher (N=33) interviews and questionnaires from twelve primary schools. The study showed that when teachers used ICT in teaching, it enhanced their collaboration and community building. The results show that teachers have networks both inside and outside the school. It seems that collaboration occurs both in informal and in formal situations. However, the results show that there are problems in shared understanding between the teachers.

**HOW TEACHERS MAKE USE OF ICT IN EDUCATION?**

**Catarina Player-Koro**  
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**ABSTRACT**

This study investigates teachers in the Swedish ten-year compulsory school who use ICT (Information and communication technology) in their classroom practice. It poses and gives answers to questions about what is contributing most to explain why they choose to use computers and information technology in their work with students/pupils and uses multiple regression analysis in order to investigate the best pattern of predictive variables. A significant model emerged suggesting that teachers using ICT with students were interested in changing their classroom practice. They also felt self-efficacious in using computers in education and they have positive attitudes toward using ICT in education. The present investigation differs from other studies in that it examines teachers who already are using technology in their classroom practice and it could be seen as a building block in the development of knowledge about how teachers can become more competent and confident in using ICT in their pedagogical work in classroom practice.

**A STUDY OF THE USE OF A TEACHING THEORY (VARIATION THEORY) TO  
DEVELOP STUDENTS' FINANCIAL LITERACY FOR THE HONG KONG  
SECONDARY SCHOOL**

**Tommy Chan Chuen Kei**  
University of Hong Kong

**ABSTRACT**

This study attempts to examine whether the use of a teaching theory, variation theory, can help to develop the Secondary School students' financial literacy, one of the generic skills advocated by Education and Manpower Bureau in recent educational reform. Variation theory as an analytical tool is not used only for describing and understanding learning, but can also be a pedagogical tool for designing lessons for experiential learning. The object of learning in this study is to develop the Secondary School students' capability of making financial decision in a wiser and effective way.

The Grade 12 students from 6 schools were invited to participate in this study. They were divided at random into the theory-inspired learning group and the non-theory promised comparison group. Lesson plans from both groups were designed according to a pilot study, revealing students' prior conceptions of different forms of financial situations. This study is a quasi-experiment design, written tests, viewing of the video-tapped lessons and interviews were the major method of data collection. The main difference in this design experiment research is that, while the teachers in the comparison group tried their teaching as usual, the teachers in the theory-inspired focused on dealing with the object of learning, including identifying the critical aspects of the object of learning, allowing students to experience different forms of variation, and bring students to the focal awareness of the critical aspects of the object of learning.

One of the most significant results from this study shows that the students in the theory-inspired group develops conceptual change from a lower level of understanding to a higher level of understanding. Another significant finding reveals that a majority of students in the theory-inspired group are able to develop meta-cognitive skills, a self-regulative and self-directed learning skill, to deal with the novel situations that they had never come across. Both inter-comparison and intra-comparison of students' attainment have confirmed that the students in the theory-inspired group learn better.