Network on Intrapersonal Research in Education (NIRE)
Seminar 1: Educational processes: theoretical and conceptual models
15 Norham Gardens
University of Oxford
Oxford
OX26PY
19th March 2015

About NIRE

We live in a time when technology is part of our daily lives. The devices that we all use make it possible to collect in real-time vast amounts of data about ourselves. This opens up novel opportunities for individuals and organisations, particularly in the field of education: children using digital games for learning, students and teachers monitoring progress, researchers undertaking ambitious data collection. However, a coherent view of how we can utilise these technological advances and complex data sets to understand learning processes in real-time is yet to emerge.

The seminar series aims to bring together experts, researchers and practitioners so we can:

- discuss the ways technology can be best utilised in research and practice
- promote the study of learning in real-time
- provide useful guidelines for collection of real-time data
- integrate real-time cognitions, emotions and behaviour into models of educational processes
- discuss appropriate statistical methods for analysing such data.

Program

9:30-10:00- Arrivals and coffee reception.

10:00-10:15- Lars-Erik Malmberg (University of Oxford): Welcome and Introduction to the seminar series

10:15-11:00- Jan Vermunt (University of Cambridge, UK): Processes and strategies of student and teacher learning

In this talk, current models of student learning and teacher learning will be discussed. An important criticism on these models is that they are black box models, in which the processes of learning are missing. As an alternative, a multi-layer process model of teacher learning and student learning and their interrelationships is presented. Studies on both student learning and teacher professional learning that departed from this common learning process model are discussed. Implications for future learning sciences that study teachers’ and students’ learning in a more interconnected way will be derived, as well as implications for educational and learning practices.

11:00-11:45- Peter Molenaar, (The Pennsylvania State University, USA): Ergodicity: The end of averaging across persons

The results obtained in psychological research should be applicable to individual persons. The standard approach to obtain these results, however, is statistical analysis of inter-individual variation. Results thus obtained apply at the population level; generalization to the level of individual persons only is valid if the psychological processes concerned are ergodic. Several arguments and empirical results are presented to show that most psychological processes are non-ergodic. It also is proven that standard analysis of inter-individual variation is blind to the presence of non-ergodicity; it requires subject-specific analysis of intra-individual variation to detect and accommodate this. The consequences of this state of affairs are far-reaching. For instance, classical test theory turns out to be non-ergodic and hence does not validly apply at the level of individual assessment. An overview is given of a set of subject-specific data analysis techniques yielding results with non-ergodic processes that are valid at both the individual and population levels. Special emphasis is given to generalizations of the integrated trait-state model for personality processes.
Most studies dealing with education and learning are designed as cross-sectional or longitudinal studies with two or three measurement occasions. They are not very well suited to study time courses of learning in detail, because learning is influenced by situations and varies highly over time. A really good alternative is the analysis of processes. A process is defined as sequence of states, with a lot of measurement points. Processes can be analyzed using time-series. In this presentation we demonstrate some examples of learning processes. The focus is on studying individual time-series. It is argued that the analyses of individual processes has many advantages compared to analyses of samples. We give examples of studying individual trajectories, performing intervention analyses and dynamic relationships between different learning variables.

Traditionally, research on affect and motivation in education used between-person (interindividual) research strategies. We argue that these strategies need to be complemented by within-person (intraindividual) strategies, because between-person and within-person parameters for affective variables can diverge. This talk will focus on more recent work. Using Pekrun’s (2006) control-value theory of achievement emotions and multiple empirical methodologies, we examined interindividual versus intraindividual parameters for developmental trajectories, origins, and functions of students’ achievement emotions. Longitudinal data from a diary study (Study 1, \( N = 72 \) student teachers, 42 diaries per student) showed that the development of emotions before and during students’ final university exams varied substantially between students and was not well represented by sample-based mean change across students. Multi-level modelling using data from an experience sampling study (Study 2, \( N = 120 \) grade 10 students) demonstrated that the intraindividual relations between students’ achievement goals (mastery, performance-approach, and performance-avoidance) and their achievement emotions (enjoyment, pride, anxiety, shame, anger, and boredom) were largely the same as the interindividual relations between these variables. Finally, data from Study 1 and from a qualitative interview study (Study 3, \( N = 56 \) university students) showed partial convergence for interindividually and intraindividual relations between students’ exam-related enjoyment, anxiety, and hopelessness and their motivation to learn. Implications for research on affect and motivation in education are discussed.