Network on Intrapersonal Research in Education (NIRE)

Seminar 2: Technology enhanced data collection

15 Norham Gardens
University of Oxford
Oxford
OX26PY
11th June 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

09:30-10:00 - Registration and refreshments

10:00-10:10 - Lars-Erik Malmberg, Rebecca Eynon, and Rob Klassen: Welcome and introduction to the seminar

10:10-10:50 - Thomas Goetz (University of Konstanz, Germany) Assessing academic emotions via experience sampling methods

One of the primary goals in research on academic emotions is to predict real-life emotional experiences in students and teachers. However, although prominent theories of emotions in achievement settings, such as Pekrun’s (2006) control-value theory, typically focus on intraindividual functioning (within-person relations), empirical studies in this area have primarily assessed interindividuval (between-person) relations. In fact, Voelkle, Brose, Schmiedek, and Lindenberger (2014) suggest that ~90% of research in psychology entails the analysis of between-person variation, despite inter- and intraindividual relations being statistically independent (Molenaar & Campbell, 2009), calling into question the validity of typical inferences from interindivudual findings to intraindividual functioning. This presentation outlines the experience sampling method (ESM) as an appropriate and sophisticated method for assessing intraindividual variability in emotional experiences that, although has been often used in occupational and health psychology research, has to date been underutilized in research on academic emotions (e.g., Bieg, Goetz, & Lipnevich, 2014).

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10:50-11:30- Neal Lathia (University of Cambridge, UK) Opportunities and challenges of using smartphones for health/behaviour monitoring and intervention

In the UK, more than 70% of mobile users now own a smartphone. These increasingly powerful, sensor-rich, and personal devices present an immense opportunity to monitor health-related behaviours and deliver digital behaviour-change interventions at unprecedented scale. In this talk, I will briefly discuss how Computer Scientists have been using smartphone sensors to monitor and make inferences about users’ behaviours. I will then present the apps that we have built in this domain, including Emotion Sense (with colleagues in the Department of Psychology), an app that tracks users’ mood and sensor data, and Q Sense (with colleagues in the Behavioural Science Group), an app that delivers a context-aware smoking cessation intervention. Emotion Sense has, to date, been downloaded over 35,000 times – providing us with a unique data set of diurnal behaviours and moods. I will summarise the opportunities and challenges for using this technology alongside some suggestions for how it could be used in educational research and practice.

11:30-12:20- Lunch

12:20-13:00- Andreas Gegenfurtner (Maastricht University, The Netherlands) Eye Tracking as Online Measure of Visual Expertise

In this talk, current models of visual expertise in complex domains will be discussed. An important criticism of these previous models is that they have been developed based on verbal protocol data. As a methodological alternative, eye tracking is presented as an objective measure to trace learning processes online in real time. Studies that used eye tracking to examine the expertise development of novice, intermediate, and expert professionals in the domains of teaching and medicine are discussed. Grounded in these studies, a cognitive model of visual expertise is presented. The discussed examples from teacher education and medical education will offer implications for the technology enhanced measure of visual expertise using eye tracking, as a standalone method and in combination with complementary research methods in education.

13:00-13:40- Anu Karvonen (University of Jyväskylä, Finland) Connecting mental states and bodily events: measuring autonomic nervous system activity

The autonomic nervous system (ANS) is also called the involuntary nervous system, because it functions largely below the level of consciousness. Studying bodily events may reveal effects of mental states which are not observable in overt behaviour or speech. In our Relational Mind project, several psychophysiological measures (e.g. heart rate variables, respiration and skin conductance) are recorded from both clients and therapists during couple therapy sessions. Afterwards, participants are interviewed individually by showing video clips of the session and by asking: “What kind of thoughts, emotions and/or bodily feelings did you have at that time?”. ANS activity is also recorded during these Stimulated Recall Interviews. In my presentation I will talk about the practicalities, advantages and disadvantages of ANS measuring, as well as present some examples of our findings to shed light on what kind of psychological phenomena can be studied using the ANS measures.

13:40-14:10- Coffee break

14:10-14:50- Phil Waters (University of Exeter Medical School, UK) Moving pictures: capturing affect through mobile technology

This presentation considers the use of technology in some of our studies that aimed to capture children’s perspectives, including their motivations, feelings and actions. It acknowledges particular problems posed by studying children on the move and reflects on some of the opportunities and challenges of audio and video methodologies in overcoming these, including analysis using time-sampling and ‘restorying’ methods, and especially in relation to research with very young people.
Using Sadler’s Joystick Method to Observe Behaviour of Teachers and Students

There is an increasing interest in knowledge about processes that underlie the development of interpersonal relationships in education and psychology. Studying the temporal interpersonal dynamics of teacher-student interactions can improve this knowledge. One useful and promising method to studying the temporal dynamics of interactions is **Sadler’s computer joystick method** (Sadler, Ethier, Gunn, Duong, & Woody, 2009). The joystick method enables researchers to observe two-dimensional constructs as they occur in time. For example, a person’s agentic and communal interpersonal behaviour. The corresponding software **joymon.exe** records twice per second the observed location of the joystick as Cartesian coordinates (i.e., X- and Y-coordinates). For example teacher and student behaviour in terms of observed level of interpersonal agency (dominance or submission) and communion (hostility and warmth). This results in lengthy sequences of behaviours or states, which can be analysed using time-series analysis (for example with (cross-)spectral analysis, (cross-) recurrence quantification analysis or state space grid analysis). In our research we have used the joystick method to assess the predictableness of teacher behaviour and synchronization in teacher-student interactions. We are now collecting data that links joystick time-series data to intensive longitudinal physiological measures of arousal to investigate the association between classroom interactions and teacher emotions.

**Discussion: Digital data collection in classrooms.**