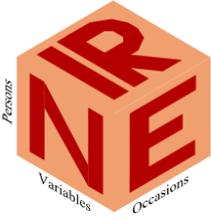


Network on Intrapersonal Research in Education (NIRE)

Seminar 4: Innovations in online learning environments: Intrapersonal perspectives



17th March 2016
9:30 to 16:00



King's Manor, University of York
Exhibition Square, York City Centre
YO1 7EP

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 use 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

Conveners

Lars-Erik Malmberg (*University of Oxford, UK*), Rebecca Eynon (*University of Oxford, UK*), Rob Klassen (*University of York, UK*), Katariina Salmela-Aro (*University of Helsinki, Finland*).

Programme

9.30-10.00: Arrival, registration and coffee

10.00-10.05: Introduction by Rob Klassen (University of York)

10.05-10.55: Han L. J. van der Maas (University of Amsterdam, The Netherlands): ***Adaptive practice and monitoring systems for education and research***

In order to collect daily data on children's cognitive development we developed a web-based practice and monitoring system for math and language based on an innovative application of computerised adaptive testing. These systems, Math Garden and Language Sea, are now used by over 200.000 children in the Netherlands. In this talk I will explain the algorithm behind the adaptivity of the system. The game based nature and especially the adaptively are attractive to children. Teachers are provided with detailed learning analytics. The data, over 600 million responses to items of 40 different tasks, are used for scientific research. I will give an overview of the studies we published in the last three years.



10.55-11.45: Ulla Richardson (University of Jyväskylä, Finland): *Challenges and possibilities of analyzing game log data from the digital online environment, GraphoGame*



The GraphoGame method is used for supporting the development of early reading skills especially in struggling learners. I will provide a brief description on the theoretical and methodological backgrounds of the GraphoGame method together with findings using the method in the specifically designed technology-enhanced online learning environment GraphoGame (www.graphogame.com) in different orthographies. However, the focus of my talk will be on the nature of the game log data attained from the individually adaptive game environment. I will present some of the challenges and possibilities these data provide for learning about individual learner's performance (accuracy, time, and specific learning content) and changes of performance within gaming sessions.

11.45-12.35: Tom Stafford (University of Sheffield, UK): *Factors influencing optimal skill learning: data from a simple online game*

We have used data from a simple online game ($n > 1.2$ million players), tracking players from their first attempts up to their first hundred games to test and extend cognitive theories of learning. Our results, on the whole, validate the role in skill learning of known factors such as practice, spacing and exploration of the strategy space (Stafford & Dewar, 2014), and allow extensions in a real-world domain. This large, observational, dataset presents particular challenges and opportunities for theorist of learning. I will discuss the analytic strategies we used to try to identify factors most likely to be causal. I will also argue that very large data behooves us to move from thinking about simple effects to what I call 'parametric comparison' (Stafford & Haasnoot, under review) - analyses that reveal changes in the size and direction of influence a factor has on learning, not just the demonstration that it has an effect. Two planned extensions of this work are to investigate the same intrapersonal factors in learning in different domains and to investigate how the factors known to optimise learning interact with motivation.



12.35-13.05: LUNCH

13.05-13.55: Katharina Scheiter (Universität Tübingen, Germany): *Self-regulated learning from multiple representations: Using eye-tracking to uncover and support students' processing in online learning environments*



Many students show maladaptive study behaviours when learning in online environments that contain multiple representations (e.g., text, diagrams, animations). Rather than studying all representations in a balanced fashion and integrating the information extracted from them into a coherent mental model, students often focus on only of the representations (usually the text) at the expense of other representations as revealed by eye tracking studies. In the research conducted in my lab we consider this observation as an indication of students' problems in self-regulating their learning in that they pick inadequate processing strategies or implement them in unsuited situations. In my presentation, I will report on studies in which we addressed these problems by instructional interventions aimed at improving students' use of processing strategies. In a first set of studies, we asked students to internalize implementation intentions (i.e., if-then plans to apply certain processing strategies once a suitable opportunity arises) prior to studying multimedia materials. These implementation intentions not only fostered learning outcomes; in addition, they changed students' processing behaviour in the expected ways and these changes explained the effectiveness of the intervention. In another set of studies, we modelled an effective use of learning strategies by showing students a video with the eye movements of a successful learner superimposed onto the learning materials. Students who watched the video-based modeling outperformed students receiving no strategy instruction, an effect that could be explained by more attention being allocated to the processing of the diagram of the prior students compared with the latter. A follow-up study revealed that the video-based modeling was effective only if students were told that these eye movements were recorded from another (regular) learner rather than telling them that the eye movements were those of an expert. These findings in line with social learning theory suggest that effects of modeling depend on the perceived distance between the learner and the model. Taken together, these findings suggest that eye tracking serves as a useful tool in uncovering students' learning processes as well as in designing interventions aimed at improving their learning.

13.55-14.45: Henrik Bellhäuser (University of Darmstadt, Germany): *Traces of Self-Regulated Learning: An Intrapersonal Perspective on Log File Data*

Log file data from online learning platforms (e.g. the open-source software Moodle) can provide rich information about learning behavior of students. However, they are rarely used by researcher so far, possibly because data cleansing and analyses seem to be more complex for log files than for other measurement instruments. Moreover, the interpretation of log files as traces of self-regulated learning might not be as straightforward. Parameters that can be derived from log files include time on task, mean login times, variability in login times, and complexity of navigation patterns. Whether these types of information are sufficient to infer competencies of the user remains an open research question. In my talk I will target this question on the basis of time series data from an online mathematics course, focusing on an intrapersonal perspective.



14.45-15.00: Coffee break

15.00-15.50: Manolis Mavrikis (University College London, UK): *Affect-aware support for exploratory learning environments*



The iTalk2learn project developed and evaluated affect-aware intelligent support components that tailor feedback according to students' affective state as deduced both from speech and interaction. The affect prediction is used to determine which type of feedback is provided and how that feedback is presented (interruptive or non-interruptive). The talk will first present the process by which we `trained' the system from data gathered in a series of ecologically-valid Wizard-of-Oz studies. Additionally, there will be an emphasis on empirical results from realistic classroom settings that point to the potential and positive impact of affect-aware intelligent support in relation to students' learning and their overall learning experience.

15.50-16.00: Wrap-up: Lars-Erik Malmberg (University of Oxford)

Registration details

This ESRC-supported seminar is free to attend, but pre-registration is required. Lunch will be provided.

Webinar streaming will also be available.

To book a place, or for information about webinar streaming, please e-mail: nire@education.ox.ac.uk.