Mapping student online actions

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### 1. Keeping track of student learning

In this study, we investigate how students in a physics course on neutron scattering use a web-based wiki-formatted textbook while they are in class [2].

Inspired by [1], we use server log-files to track and construct networks of user sessions on a web-site for learning.

Network analysis has previously been employed to online forum discussions [3,4]. We focus on behaviours while solving problems that are related to learning.

We have constructed so-called wiki-problems. In solving these problems, we aim for students to make use of hints, solutions and other parts of the web-site pages.

We ask the question: "What patterns of engagement can we discern from network representations of student interactions?"

### 2. Student online actions while learning as networks

#### The learning situation

As part of class, students work with online problems that contain hints and solutions that students can open and close as they wish.

As part of the course, students spend time in class solving online problems with hints. Student online actions during these sessions are recorded with web-analytics software OWA (http://www.openwebanalytics.com/).

Specifically, we record ip-adresses, where, when, and on what they click on the web-site pages, and the unique id for each session.

We compare sessions recorded during the weeks in which students engage with online material.

We only consider sessions with duration d>5 min.

Using non-parametric tests, we find the target entropy for 2012 is significantly higher than for 2012 and for 2013 (p<0.01).

The plots show that students focus their engagement early in the course. This is also when they are given time during class to solve these problems.

#### Resulting output and networks

We use networks and network measures to characterize student sessions as these are logged by the server. For example, target entropy [5] is a measure of how predictable student interactions are.

Using educational research to help us interpret the results [3,4], we argue that a high entropy network likely signifies more student active engagement (rather than passively reading the a page).

We want to investigate different online strategies and link these to student learning outcomes. We are in the process of identifying strategies.

#### A low target entropy network - duration between clicks written on links.

A low target entropy network - link color represents degree.

We ask the question: "What patterns of engagement can we discern from network representations of student interactions?"

### 3. Comparison between students from different years

We compare sessions recorded during the weeks in which students engage with online material.

We only consider sessions with duration d>5 min.

Using non-parametric tests, we find the target entropy for 2012 is significantly higher than for 2012 and for 2013 (p<0.01).

### Selected References

5. K. Sneppen et al., EPL (Europhysics Letters) 69.5 (2005): 653

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Ask a question! Sébastien Bize
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Seems like we ran out of questions. But fear not! You can contact Jasper with questions and comments. As we are in the early stages of interpretation, we especially welcome new ideas!