Social networks adapting pedagogical practice: SNAPP

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This poster details the development of a tool that integrates with common commercial and open source Learning Management Systems (LMS) to deliver real-time social network visualisations of discussion forum activity. The tool has aptly been named Social Networks Adapting Pedagogical Practice (SNAPP), because it allows academic staff to identify patterns of student behaviour and facilitate appropriate interventions as required. SNAPP has been designed with the aim of mainstreaming the use of social network analysis as a real-time diagnostic instrument. A unique and non-conventional Web 2.0 approach to LMS extension development has been employed to enable cross system (Blackboard, WebCT and Moodle), web browser (Firefox, Safari and Internet Explorer) and platform (PC and Mac) support. Current features and future enhancements are outlined.

Keywords: social network analysis, learning management system extensions, interaction analysis

Background

The vast majority of the analytics derived from Learning Management Systems (LMS) report on the users interactions with the system in terms of the number of sessions (log-ins), amount of dwell time (how long the log-in lasted) and level of content downloads. While this provides detailed information about content retrieval in a transmission model of learning and teaching, it lacks any interpretive power relating to how students are interacting with each other in a socio-constructivist model. Discussion forum activity has been demonstrated to be a sound indicator of future student academic performance (Dawson, 2009; Morris, Finnegan, & Wu, 2005) and level of engagement in socio-constructivist pedagogies (Macfadyen & Dawson, 2009 In press). A key feature of discussion forums is their capacity to retain an historical archive of all student interactions. This data can be leveraged to provide teachers with real-time visualisations of the student social network formed through discussion activity. Social Networks Adapting Pedagogical Practice (SNAPP) uses information on who posted and replied to whom, and what major discussions were about, and how expansive they were, to analyse the interactions of a forum and display it in a Social Network Diagram.

What can a network diagram tell me?

A network diagram is a visual depiction of all interactions occurring among students and staff. This information provides rapid identification of the levels of engagement and network density emerging from any implemented online learning activities. Social network visualisations provide a snapshot of who is communicating with whom and to what level. A network diagram of students' discussions online can:

- identify disconnected (at risk) students;
- identify key information brokers within a class;
- identify potentially high and low performing students so teachers can better plan learning interventions;
- indicate the extent to which a learning community is developing within a class;
- provide a "before and after" snapshot of the various interactions occurring pre and post learning interventions. (This diagrammatic representation is also a useful indicator of reflective teaching practice e.g. through integration with teaching portfolio artefacts);

- provide timely opportunity for students to benchmark individual performance and engagement against fellow peers.

SNAPP current and future features

Activation of the SNAPP tool results in the in-site embedding of a social network visualisation directly below the threaded forum display. Social network diagrams provide an aggregate visual representation of all interactions that have occurred between participants. SNAPP allows the user to interact with the social graph to uncover any emerging patterns. The user is able to zoom in/out, select an appropriate layout algorithm, filter nodes based upon the number of connections, scale nodes and connections based upon strength. The SNAPP interface is illustrated in Figure 1.

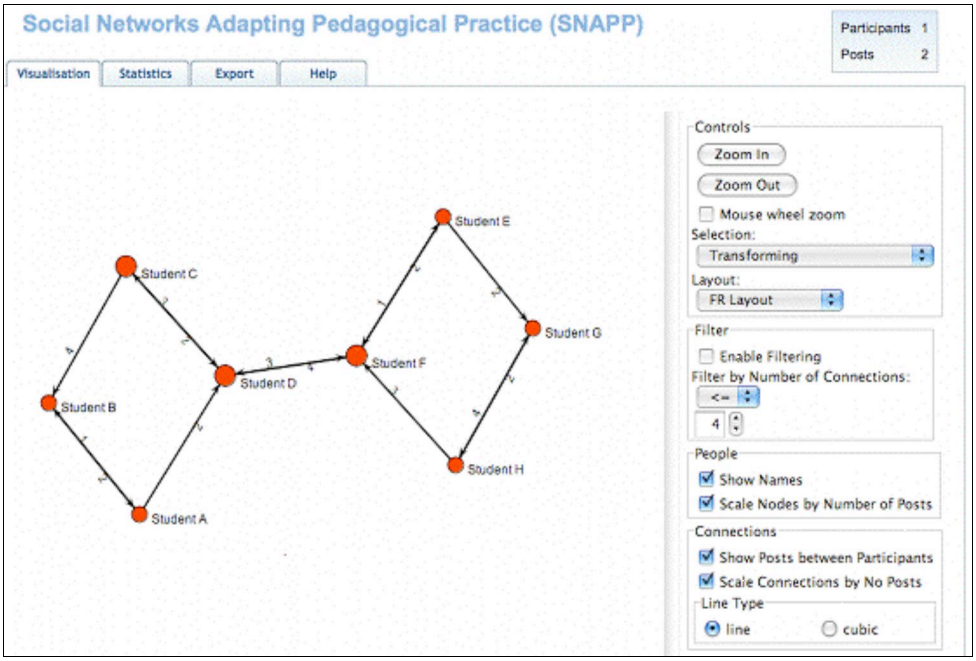

Figure 1: The SNAPP interface

To minimise installation and data access issues, SNAPP uses client side web browser technology. As such, SNAPP has been implemented as a 'bookmarklet' thereby providing a simple solution to many issues surrounding browser and platform compatibility. This is a unique approach to LMS extension development and has enabled the delivery of a tool that seamlessly integrates with discussion forums in real-time. To date, the following key user-features have been implemented:

- *In-line real-time social network visualizations:* SNAPP extracts forum post and reply data in real-time and can be triggered whenever a discussion forum is accessed.
- *Cross LMS, browser and platform support:* Blackboard, WebCT and Moodle are currently supported within popular web browsers (Firefox, Internet Explorer and Safari) on both PC and Mac.
- *Simple installation and usage:* A user simply needs to drag a link to a web browser toolbar. The link is a 'bookmarklet' and can be activated when a discussion forum is viewed.
- *Data export:* SNAPP has significantly reduced the barrier of entry to real-time social network analysis and provides numerous metrics. However, it is not the goal of SNAPP to replace feature rich social network analysis and visualisation software applications. Thus SNAPP provides export to both VNA and GraphML formats. VNA files can be opened for further analysis in Netdraw (Borgatti, 2002).

Future enhancements

Future versions of SNAPP will include support for the following features:
- *Multi-forum support*: The ability to extract data from all forums in a course and across courses in a faculty/degree cohort.
- *Multi-tool support*: The ability to extract and visualise interactions that occur in other tools such as blogs and wikis.
- *Identification of teaching staff on visualizations*: The ability to visually represent roles such as Coordinator, Lecturer, Tutor, etc.

- *Data Mashup support:* The ability to incorporate additional attributes such as grades, access statistics and demographics.
- *Animation*: The ability to display the temporal changes that occur within a network over time.

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