CASE STUDY J: Analysing social networks at the University of Wollongong

The aim of SNAPP is to support instructors by showing participant relationships in their discussion forums as real time social network diagrams. Instructors can track the evolution of the relationships by comparing diagrams over time (Bakharia and Dawson, 2011) The SNAPP software can be used a diagnostic tool to help instructors identify students who are isolated from the main discussion, or to see how the overall pattern is progressing (Are a few students dominating? What is the extent of peer discussion?) Because it operates in real time, this gives the instructor an opportunity to intervene in the discussion. Instructors may also use the visualisation to reflect upon the learning design and perhaps redesign the task for a future cohort.

Key takeaway points

- SNAPP is based upon the premise that collaborative learning is important to promote student learning. It visualises participant relationships in online discussion forums in real time, as a network diagram.
- The aim is develop the practice of facilitators so they can avoid dominating the conversation and encourage greater engagement with students who are less connected with their peers in the forum
- Social network analysis has revealed some common interaction patterns that arise in forums, which can be interpreted in terms of learning and teaching, for example, discussions that were facilitator-centric
- SNAPP is a technical innovation, using a Web 2.0 technology to build an extension for multiple learning management systems. Rather than building add-ons for different VLE platforms, SNAPP uses a web-based browser extension that is compatible across platforms and versions, thus avoiding incompatibility and upgrade issues.

Rationale

The central premise of Social Networks Adapting Pedagogical Practice initiative (SNAPP) at the University of Wollongong, New South Wales, Australia is that collaborative learning is important to promote student understanding. The development team noted that existing learning analytic applications did not address this, because they used the basic statistics of learning management systems, such as submission of assignments or attendance at class. In contrast, SNAPP analyses conversations in online student discussion forums to show patterns and relationships in real time. Typically, these forums are moderated by the instructor whilst students tackle specific learning tasks or have general conversations about the subject or administrative issues. The timing and quality of interventions by the instructor can have

significant impact on the student learning experience. Some of these forums may have hundreds of participants, making it difficult for an instructor to keep track of the activity. In other cases, a class may be split into smaller groups of about six students, each working on a parallel task.

The initial project

The SNAPP software was developed in Javascript, enabling it to communicate with a variety of commercial and open-source VLEs and stay up-to-date with new versions of VLE software. This is an innovative technique for extending VLE capabilities. Generally, new tools have been developed within each VLE, as extensions, rather than as enhancements to existing tools. Also, each VLE uses different programming languages and interfaces, so a tool developed within one VLE would not be transferable to another. By using Javascript in a browser extension, SNAPP circumvents these issues.

Features of the software

The SNAPP software is a browser extension that can be added to a web browser to interface with popular open source and commercial learning management systems (Blackboard, Moodle, etc.). SNAPP automatically extracts data from the selected forum and displays the relationships as social network maps. The dashboard has five tabs:

- **Visualisation** to view and adjust the network diagram
- **Statistics** to view posting frequency data in a table
- **Export** to export GraphML or to the .vna format. The .vna format can be opened in NetDraw for additional analysis and visualisation. (GraphML and NetDraw are visualisation software packages available for free download)
- **Help** to view the SNAPP Help online
- **Credits** to view details of the SNAPP development project

Findings and outcomes

Although designed primarily to facilitate real-time intervention, teachers predominantly used SNAPP to reflect after course completion. This was helpful for professional development, because the network patterns indicate different styles of moderation, e.g. if an instructor responds to individual students rather than encouraging wider discussion. In real time, SNAPP was felt to be useful for identifying isolated students, especially in large forums at busy times. Some instructors showed SNAPP network diagrams to their student groups, as a part of a discussion about how to contribute to an online forum. Participants in the study provided the following comments:

> *"[SNAPP] provided me with information in diagrammatic form that assisted me to understand the flow of discussion that took placed between students in the different*

groups."

"I was more targeted at times to engage some of the more disconnected students"

"Made sure I do not dominate the discussion and made sure everybody is engaged."

"The students I thought were doing most of the participation where not the ones doing so."

In 2011, the Australian Learning and Teaching Council published the final report from the SNAPP project. Some key findings and recommendations are summarised below (Dawson et al., 2011, pp. 5-7):

SNAPP Usage: The most frequent usage of SNAPP by teaching staff was at the conclusion of the teaching unit, rather than in real-time during the presentation, and data are primarily analysed from the perspective of the lead teacher. There is an untapped opportunity for staff to use the tool more frequently during the presentation and adapt their use of the discussion forums as a result. SNAPP could be promoted as a reflective teaching tool. Staff development in learning design is also required to maximise the benefits of the use of SNAPP.

Common participant interaction patterns: The project documented several commonly observed network patterns and interpreted them in terms of learning and teaching, for example, discussions that were facilitator-centric. There needs to be a greater awareness of these patterns among staff, and a greater understanding of how to intervene, as a facilitator, in a discussion which shows undesirable patterns of social interaction.

Learning Network data as lead indicators of student academic orientation and performance and online participation: The SNAPP project revealed a strong correlation between student achievement orientation and the types of forums that the student will frequent. For example, students with a strong learning orientation preferred discussions about learning and resource-sharing. Students with a performance orientation focussed on administrative and assessment forum discussions.

Using Web 2.0 Technologies to Build Extensions for Multiple Learning Management Systems: The discussion forum is one of the most used tools available in almost all collaborative learning environments. SNAPP targeted student interaction data as an indicator of engagement and created a visualisation system that works across multiple third-party platforms and versions. SNAPP demonstrated that it is possible to overcome issues encountered when building add-ons to proprietary VLE systems (e.g. incompatibility with upgrades, working across different platforms) by taking a different approach, using a web-based browser extension. This approach could be used to add other functionalities to a VLE.

Future plans

It was recommended that SNAPP should be promoted as a reflective teaching tool and that the importance of learning design in professional development should be emphasised.

Teachers thought that SNAPP would be a useful learning tool for students themselves. Results of the user survey pointed to the need for a better overview of the themes and concepts emerging from the student discussions, particularly in large classes.

In 2010-11, the University of Queensland conducted a case study to identify critical factors in mainstreaming SNAPP across the institution. Although the step-by-step SNAPP instructions were helpful, teachers requested training to interpret the network visualisations and relate them to online student behaviour and the design of the learning task. In future, mainstreaming of SNAPP requires a commitment to both learning design and social network analysis training.

The SNAPP software is available to academic staff from the University of Wollongong website. A user guide is included as an appendix to the final SNAPP report, available from the Australian Government Office for Learning and Teaching website. Future software developments highlighted in the report include the production of animations showing the evolution of the social network over time and semantic analysis of the content of messages.

References

Bakharia, A., Dawson, S. (2011) SNAPP: A Bird's-Eye View of Temporal Participant Interaction, in: Proceedings of the 1st International Conference on Learning Analytics and Knowledge. pp. 168–173.

Dawson, S., Bakharia, A., Lockyer, L., Heathcote, E. (2011) "Seeing" networks: visualising and evaluating student learning networks. Australian Learning and Teaching Council. URL http://www.olt.gov.au/system/files/resources/CG9_994_Lockyer_Report_2011.pdf