Quantext in the classroom: lessons from tertiary teachers

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Abstract
First presented as a proof of concept at ALASI 2017, Quantext, a text analysis tool for teachers, has developed substantially since then and has been used by a number of teachers and institutional support staff at three NZ universities, one Australian university and one polytechnic. In this 3-hour workshop, using fully anonymised data, we present three use cases derived from a NZ nationally-funded project to pilot Quantext, inform its development and evaluate its use in tertiary classrooms. Each use case demonstrates a distinct approach to analysing text to derive actionable insights. With the use cases serving as models, workshop participants will gain hands-on experience with Quantext using either their own data or our demonstration data sets. There will be ample time for discussion, reflection and feedback.

Keywords
Formative feedback, academic development, text analytics, student evaluations of teaching, discourse analytics.

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1. Quantext Workshop Focus

The pedagogical value of timely and relevant feedback is well established (e.g. Black & Wiliam, 2005). Feedback closes a critical loop between teachers and learners in Laurillard's (1993) Conversational Framework and feedback is as important for teachers as it is for learners (e.g. Hattie, 2015; Hendry & Dean, 2002). Especially at undergraduate level, increased class sizes compromise the quality of learning conversations and teachers are challenged to find time to read and respond to students' work. Opportunities to monitor and learn from discursive interactions between teacher and students throughout a course are minimal or non-existent. In worst possible cases, learners never receive feedback from teachers or receive feedback only when it is too late and teachers fail to respond to feedback implicit in the work their students produce (e.g. Hendry & Dean, 2002; Mason, 1992). However, there is potential for aggregated text to reveal learning challenges and (mis)conceptions, depth of understanding, and disciplinary literacy development (McDonald, Bird, Zouaq & Moskal, 2017). If flexible and reliable tools are available to support analysis of student text, the benefits to students and teachers should be immediate. The goal of the Quantext development team is to provide such a tool (McDonald & Moskal, 2017).

1.1. Classroom use cases

A range of use cases are emerging. The most common, and arguably the most useful, are often the simplest and perhaps the most obvious: identifying what students find hard, using opportunities to link student interests to coursework, and providing opportunities for teacher reflection. Each of these use cases is briefly described below. In addition, teachers and institutional researchers are evaluating Quantext as a tool to aggregate or summarise free text comments from Student Evaluations of Teaching (McDonald, Moskal, Goodchild, Stein & Terry, 2019) and there is considerable interest in developing Quantext as an accessible tool for qualitative educational research.

1.1.1. Identifying what students find hard

In two large undergraduate classes, each week, teachers asked their students what they found most challenging from the lecture material introduced during the week. Students responded to free text questions presented in the University LMS quiz tool. Student responses were then aggregated in Quantext. Quantext summarises content words that occur together more often than expected by chance. The concepts that most students find challenging are visualised as bar charts. This simple procedure allows teachers to be immediately alert to difficult areas. They know which material to revisit in following lectures and can provide additional examples for students to work through.

1.1.2. Linking student interests and experiences to course content

In some contexts, finding out about students' interests at the start of a course presents an opportunity to relate these interests to course material. One example, a post-hoc concept demonstration, has previously been reported at LAK18 (Elgort, Lundqvist, McDonald, & Moskal, 2018). Subsequently, an in-class use case in a foundation level course at an Australian university demonstrated the benefit of adapting course content to student interests (Stokes & McDonald, 2018). Most recently, in an undergraduate education class, students were asked to relate their personal experiences to specific theoretical concepts. The teacher shared aggregated summaries of students' responses with the class and reported that this was greeted positively by students; they could immediately see the value of their own experiences in relation to the course.

1.1.3. Promoting teacher reflection

Quantext allows teachers to group responses by length, keywords, key groups of words (ngrams) as well as by arbitrary search terms and common collocations (words which occur together more often than expected by chance). Responses can be viewed using either a keword-in-context view or a wordtree view (Wattenberg & Viégas, 2008). This is especially useful where students use terms or expressions that seem unusual given the context. For example, aggregated summaries of foundation chemistry student reponses to a question about chemical structure alerted the course teacher to a small group of students developing an erroneous conception of a 'bent tetrahedron'.

2. Intended Learning Outcomes

These use cases are simple examples of deriving valuable teaching insight directly from students' writing. None of them would be possible without the right tools to facilitate the process. By the end of this session, participants will: be able to describe basic approaches to analysing text at scale; be aware of classroom contexts where these approaches add value; be able to analyse their own or sample data; have an awareness of key cautions and caveats in relation to basic text analytic techniques.

3. Workshop Presenter Credentials

Jenny McDonald is lead investigator for the Quantext Pilot Project and co-developer of Quantext. She holds honorary/adjunct roles at the University of Auckland (CleaR) and Victoria University of Wellington (CAD).
Adon Moskal is a senior lecturer in IT at Otago Polytechnic, and lead developer for Quantext.
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